Partners in UK offshore wind

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

HRA integrity matrices

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Image of an offshore wind farm

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Glossary

Term	Meaning
Annex II species	Animal or plant species of community interest, defined in Annex II of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive), whose conservation requires the designation of Special Areas of Conservation.
Applicant	Morgan Offshore Wind Limited.
Appropriate assessment	A step-wise procedure undertaken in accordance with Article 6(3) of the Habitats Directive, to determine the implications of a plan or project on a European site in view of the site's conservation objectives, where the plan or project is not directly connected with or necessary to the management of a European site but likely to have a significant effect thereon, either individually or in-combination with other plans or projects.
Conservation objectives	In its most general sense, a conservation objective is the specification of the overall target for the species and/or habitat types for which a site is designated for it to contribute to maintaining or reaching Favourable Conservation Status (FCS) of the habitats and species concerned, at the national, the biogeographical or the European level.
Cumulative effects	Changes to the environment caused by a combination of present and future projects, plans or activities.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project.
Ensonified	Filled with sound.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Morgan Offshore Wind Project.
European site	A Special Area of Conservation, possible SAC, or candidate SAC, a Special Protection Area (SPA) or potential SPA, Ramsar site, or a site listed as a Site of Community Importance.
Evidence Plan	The Evidence Plan is a mechanism to agree upfront what information the Applicant needs to supply to the Planning Inspectorate as part of the Development Consent Order (DCO) application for the Morgan Offshore Wind Project.
Habitat	The environment that a plant or animal lives in.
Habitats Directive	The Habitats Directive is the short name for European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. The Directive led to the establishing of European sites and setting out how they should be protected, it also extends to other topics such as European protected species.
Habitats Regulations	The Conservation (Natural Habitats, &c.) Regulations 1994, the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species 2017.
Habitats Regulations Assessment (HRA)	A process required by the Habitats Regulations of identifying likely significant effects of a plan or project on a European site and (where likely significant effects are predicted or cannot be discounted) carrying out an appropriate assessment to ascertain whether the plan or project will adversely affect the integrity of the European site. If Adverse Effects on Integrity cannot be ruled out, the latter stages of the process require consideration of the derogation provisions in the Habitats Regulations.

Term	Meaning
In-combination effects	The combined effect of the Morgan Generation Assets in-combination with the effects from a number of different projects on the same feature/receptor.
Inter-array cables	Cables which connect the wind turbines to each other and to the offshore substation platforms. Inter-array cables will carry the electrical current produced by the wind turbines to the offshore substation platforms.
Interconnector cables	Cables that may be required to interconnect the offshore substation platforms in order to provide redundancy in the case of cable failure elsewhere.
Likely Significant Effect (LSE)	Any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the European site was designated but excluding trivial or inconsequential effects. A likely effect is one that cannot be ruled out on the basis of objective information. A 'significant' effect is a test of whether a plan or project could undermine the site's conservation objectives.
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities.
Morecambe Offshore Windfarm: Generation Assets	The Morecambe Offshore Windfarm is located in the east Irish Sea approximately 37.13 km (20.1 nm) from the northwest coast of England (when measured from MHWS). The anticipated nominal capacity of the Morecambe Offshore Windfarm is 480 MW.
Morgan Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables, offshore export cables and offshore substation platforms (OSPs) forming part of the Morgan Generation Assets will be located.
Morgan Offshore Wind Project: Generation Assets	This is the name given to the Morgan Generation Assets project as a whole (includes all infrastructure and activities associated with the project construction, operations and maintenance, and decommissioning).
The Morgan Generation Assets Preliminary Environmental Information Report (PEIR)	The Morgan Generation Assets PEIR that was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan Offshore Wind Project Generation Assets.
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 offshore export cables, landfall site, onshore export cables, onshore substations, 400kV grid connection cables and associated grid connection infrastructure such as circuit breaker infrastructure.
Offshore Substation Platform (OSP)	A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Ramsar site	A wetland site designated to be of international importance under the Ramsar Convention. The Convention on Wetlands, known as the Ramsar Convention.
Special Area of Conservation (SAC)	Special Areas of Conservation are areas designated under the European Union Habitat's Directive to help conserve certain plant and animal species listed in the Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).

Term	Meaning
Special Protection Area (SPA)	Special Protection Areas (SPAs) are sites classified under the EU Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds) to protect rare or vulnerable birds (as listed on Annex I of the Directive), as well as regularly occurring migratory species.
Species	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.
The Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.
The Secretary of State for Energy Security and Net Zero	The decision maker with regards to the application for development consent for the Morgan Offshore Wind Project: Generation Assets.
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.

Acronyms

Acronym	Description
ADD	Acoustic Deterrent Devices
CIS	Celtic and Irish Sea
DCO	Development Consent Order
EDR	Effective Deterrence Range
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
HRA	Habitats Regulations Assessment
iPCoD	Interim Population Consequences of Disturbance Model
IS	Irish Sea
ISAA	Information to Support an Appropriate Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MHWS	Mean High Water Springs
MMMP	Marine Mammal Mitigation Plan
MMOs	Marine Mammal Observers
MU	Management Unit
NAS	Noise Abatement System
OSP	Offshore Substation Platform
OSPAR	Oslo Paris Convention
PAM	Passive Acoustic Monitoring
PEIR	Preliminary Environmental Information Report
pSPA	Potential Special Protection Area

Acronym	Description
PTS	Permanent Threshold Shift
SAC	Special Area of Conservation
SCI	Site of Community Importance
SEL	Sound Exposure Level
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area
SPL	Sound Pressure Level
TTS	Temporary Threshold Shift
UXO	Unexploded Ordnance

Units

Unit	Description
%	Percentage
dB	Decibel
m	Metre
MW	Megawatt
nm	Nautical mile
km	Kilometre
kV	Kilovolts

1 Habitats Regulations Assessment: Integrity matrices

1.1 Introduction

1.1.1.1 This document presents the Habitats Regulations Assessment (HRA) integrity matrices for the Morgan Offshore Wind Project: Generation Assets (hereafter Morgan Generation Assets) and summarises the Appropriate Assessments presented in the HRA Stage 2 Information to Support an Appropriate Assessment (ISAA) Part 2 – Special Area of Conservation (SAC) assessments (Document Reference E1.2) and Part 3 – Special Protection Area (SPA) and Ramsar Site assessments (Document Reference E1.3) for the Morgan Generation Assets. The layout of the document is as follows:

- Section 1.2.2 presents the integrity matrices for SACs designated for Annex II diadromous fish
- Section 1.2.3 presents the integrity matrices for SACs designated for Annex II marine mammals
- Section 1.2.4 presents the integrity matrices for SPAs designated for offshore ornithological features.

1.1.1.2 The integrity matrices present the potential impacts on the European sites and features which were identified for potential Likely Significant Effect (LSE) from the Morgan Generation Assets alone and/or in-combination with other plans or projects in the HRA Stage 1 Screening report (Document Reference: E1.4) and were considered in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) and Part 3 – SPA and Ramsar Site assessments (Document Reference E1.3). The integrity matrices also summarise the evidence provided within the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) and Part 3 – SPA and Ramsar Site assessments (Document Reference E1.3) for why it has been concluded whether potential impacts of the Morgan Generation Assets alone and/or in-combination with other plans or projects have/ or do not have a risk of Adverse Effect on Integrity on the European site and the relevant features.

1.1.1.3 A summary of the European sites, features and impacts which were considered in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) and Part 3 – SPA and Ramsar Site assessments (Document Reference E1.3) are presented in Table 1.1.

Table 1.1: Summary of European sites and relevant qualifying features for which potential LSEs were identified and screened in for further assessment in the HRA Stage 2 ISAA.

European site	Relevant qualifying features	Project phase	Impact
River Ehen SAC	Atlantic salmon *Salmo salar*	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• Electromagnetic Fields (EMF) from subsea electrical cabling • In-combination effects.
	Freshwater pearl mussel *Margaritifera margaritifera*	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey *Petromyzon marinus*	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	River lamprey *Lampetra fluviatilis*	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
River Derwent and Bassenthwaite SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	Sea lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors

European site	Relevant qualifying features	Project phase	Impact
			• In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	River lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
River Kent SAC	Freshwater pearl mussel	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
Solway Firth SAC	Sea lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	River lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
River Bladnoch SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
River Dee and Bala Lake/Afon Dyfrydwy a Llyn Tegid SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	Sea lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	River lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
Afon Gwyrfai a Llyn Cwellyn SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
River Eden SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	Sea lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
	River lamprey	Construction/decommissioning	• Underwater sound impacting fish and shellfish receptors • In-combination effects.
		Operations and maintenance	• EMF from subsea electrical cabling • In-combination effects.
North Anglesey Marine/Gogledd Môn Forol SAC	Harbour Porpoise *Phocoena phocoena*	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during Unexploded Ordinance (UXO) clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • Changes in fish and shellfish communities affecting prey availability (construction only) • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
North Channel SAC	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Strangford Lough SAC	Harbour seal *Phoca vitulina*	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Murlough SAC	Harbour seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC	Bottlenose dolphin	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance

European site	Relevant qualifying features	Project phase	Impact
	Tursiops truncatus		• Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
	Grey seal *Halichoerus grypus*	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
West Wales Marine/Gorllewin Cymru Forol SAC	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities

European site	Relevant qualifying features	Project phase	Impact
			• In-combination effects.
The Maidens SAC	Grey seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Cardigan Bay/Bae Ceredigion SAC	Bottlenose Dolphin	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
	Grey seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys

European site	Relevant qualifying features	Project phase	Impact
			• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
Lundy SAC	Grey seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Isles of Scilly Complex SAC	Grey seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Rockabill to Dalkey Island SAC	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities

European site	Relevant qualifying features	Project phase	Impact
			• In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Saltee Islands SAC	Grey seal	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Roaringwater Bay and Islands SAC	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
Blasket Islands SAC	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance

European site	Relevant qualifying features	Project phase	Impact
			• Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
17 French Sites: • **Chaussée de Sein Site of Community Importance (SCI)** • **Mers Celtiques - Talus du golfe de Gascogne SCI** • **Abers - Côte des legends SCI** • **Ouessant-Molène SCI** • **Côte de Granit rose-Sept-Iles SCI** • **Anse de Goulven, dunes de Keremma SCI** • **Tregor Goëlo SCI** • **Côtes de Crozon SCI** • **Cap Sizun SCI** • **Récifs du talus du golfe de Gascogne SCI**	Harbour Porpoise	Construction/decommissioning	• Injury and disturbance from elevated underwater sound during piling • Injury and disturbance from elevated underwater sound during UXO clearance • Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys • Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.
		Operations and maintenance	• Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
• **Anse de Vauville SCI** • **Cap d'Erquy-Cap Fréhel SCI** • **Baie de Saint-Brieuc – Est SC** • **Banc et récifs de Surtainville SCI** • **Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI** • **Estuaire de la Rance SCI** • **Baie du Mont Saint-Michel SCI.**			
Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar	Lesser black-backed gull *Larus fuscus* Herring gull *Larus argentatus* Breeding seabird assemblage	Operations and maintenance	• Collision risk • In-combination effects.
Ribble and Alt Estuaries SPA/Ramsar	Lesser black-backed gull Breeding seabird assemblage	Operations and maintenance	• Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
Bowland Fells SPA	Lesser black-backed gull	Operations and maintenance	• Collision risk • In-combination effects.
Copeland Islands SPA	Manx shearwater *Puffinus puffinus*	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA	Manx shearwater	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Lambay Island SPA	Kittiwake *Rissa tridactyla* Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
	Herring gull	Operations and maintenance	• Collision risk • In-combination effects.
	Guillemot *Uria aalge* Razorbill *Alca torda*	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Ireland's Eye SPA	Kittiwake	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
Howth Head Coast SPA	Kittiwake	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Ailsa Craig SPA	Gannet *Morus bassanus* Kittiwake Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Wicklow Head SPA	Kittiwake	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Rathlin Island SPA	Kittiwake Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
	Guillemot (non-breeding season) Razorbill (non-breeding season)	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Skomer, Skokholm and the Seas off Pembrokeshire SPA	Kittiwake Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
	Lesser black-backed gull (non-breeding seasons)	Operations and maintenance	• Collision risk • In-combination effects.
	Manx shearwater Guillemot (non-breeding season) Razorbill (non-breeding seasons)	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
North Colonsay and Western Cliffs SPA	Kittiwake Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
	Guillemot (non-breeding season)	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Grassholm SPA	Gannet	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Saltee Islands SPA	Gannet Kittiwake Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
	Guillemot Razorbill		• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects
Mingulay and Berneray SPA	Guillemot (non-breeding season) Razorbill (non-breeding season) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
The Shiant Isles SPA	Razorbill (non-breeding season) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Isles of Scilly SPA/Isles of Scilly Ramsar	Lesser black-backed gull (non-breeding season) Great black-backed gull *Larus marinus* (non-breeding season) Breeding seabird assemblage	Operations and maintenance	• Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
	Manx shearwater	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Handa SPA	Guillemot (non-breeding season) Razorbill (non-breeding season) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
St Kilda SPA	Gannet (non-breeding season) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
	Guillemot (non-breeding season) Fulmar *Fulmarus glacialis* Manx shearwater	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Cape Wrath SPA	Kittiwake (non-breeding seasons)	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
	Breeding seabird assemblage		
	Guillemot (non-breeding seasons)	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Flannan Isles SPA	Guillemot (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
North Rona and Sula Sgeir SPA	Gannet (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Buchan Ness to Collieston Coast SPA	Kittiwake (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
East Caithness Cliffs SPA	Kittiwake (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Flamborough and Filey Coast SPA	Kittiwake (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Forth Islands SPA	Gannet (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Hermaness, Saxa Vord and Valla Field SPA	Gannet (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Rum SPA	Manx shearwater Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
Sule Skerry and Sule Stack SPA	Gannet (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
	Guillemot (non-breeding season)	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Troup, Pennan and Lion's Heads SPA	Kittiwake (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
West Westray SPA	Kittiwake non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
Irish Sea Front SPA	Manx shearwater	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
North-west Irish Sea SPA	Kittiwake	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.

European site	Relevant qualifying features	Project phase	Impact
	Herring gull	Operations and maintenance	• Collision risk • In-combination effects.
	Guillemot *Uria aalge* Razorbill *Alca torda*	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.
Seas off St Kilda SPA	Gannet	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • Collision risk • In-combination effects.
	Guillemot (non-breeding season) Fulmar	Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure • In-combination effects.

1.2 Matrix key

1.2.1.1 The following matrix key is applicable to the matrices presented in the subsequent sections of this document:

- ✓ = Risk of Adverse Effect on Integrity
- × = No risk of Adverse Effect on Integrity
- C = Construction
- O&M = Operations and maintenance
- D = Decommissioning.

1.2.1.2 Within the integrity matrices, lower case letters relate to the evidence which supports the conclusions made within the footnotes.

1.2.1.3 Where effects were screened in within the LSE screening matrices and were considered in the ISAA, they have been coloured with green, effects that were screened out within the LSE screening matrices, and were not considered in the ISAA, they have been greyed out in the integrity matrices.

1.2.1.4 The distances to the Morgan Array Area within the integrity matrices refer to the closest distance from the European designated site using a marine pathway for European sites with Annex II diadromous fish and Annex II marine mammal features and a straight-line distance for European sites and Ramsar sites with ornithology features.

1.2.1 Integrity matrices for Annex II diadromous fish and shellfish

Table 1.2: Integrity matrix for Annex II diadromous fish and shellfish species of the River Ehen SAC.

European Site: River Ehen SAC Distance to Morgan Array Area: 62.77 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Atlantic salmon	×a		×a		×b		×c	×c	×c
Freshwater pearl mussel	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** – The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that Atlantic salmon features within close proximity to piling operations may experience injury or mortality. Atlantic salmon may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on Atlantic salmon features. Behavioural effects in response to piling may occur in Atlantic salmon features, such as avoidance reactions. Sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. Although there is potential for indirect adverse effects on freshwater pearl mussels in their larval stage, due to their reliance on their host Atlantic salmon individuals, since the assessment concluded that there will be no significant effects on Atlantic salmon there will be no significant indirect effect to the freshwater pearl mussel. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Ehen SAC during construction

or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling -** Atlantic salmon features are considered to have a low sensitivity and high recoverability to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact Atlantic salmon ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3)). As the Atlantic salmon features for the SAC are highly mobile and pelagic, they are capable of changing course when migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts include cable burial, to increase the distance between Atlantic salmon features and cables, reducing the effect of EMFs. Freshwater pearl mussels have been considered within the HRA Stage 2 ISAA Part 2 - SAC assessments (Document Reference E1.2), and although reliant during their parasitic phase of their lifecycle on Atlantic salmon, there are no indirect effects of EMF on freshwater pearl mussels for reasons outlined above. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Ehen SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** – The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets (hereafter referred to as Morecambe Generation Assets), and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets and the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase). No Tier 3 projects overlap with the Morgan Generation Assets construction phase. In-combination effects for all three scenarios which were assessed were predicted to be of relatively short-term duration and intermittent over the construction phase of the Morgan Generation Assets (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3). Other projects are likely to implement measures, similar to those implemented as part of the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Ehen SAC as a result of elevated underwater sound impacting

fish and shellfish receptors (or dependent species) with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets, and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF were predicted to be long term in duration but the Annex II diadromous features are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined to the close vicinity of cables (local spatial extent). Other projects considered under the three Scenarios are likely to implement measures such as cable burial, which will increase the space between Annex II diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous fish. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Ehen SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.3: Integrity matrix for Annex II diadromous fish and shellfish species of the Dee Estuary/Aber Dyfrdwy SAC.

European Site: Dee Estuary/Aber Dyfrdwy SAC Distance to Morgan Array Area: 70.09 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Sea lamprey	×a		×a		×b		×c	×c	×c
River lamprey	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** – The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that sea and river lamprey features within close proximity to piling operations may experience injury or mortality. Diadromous fish may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on lamprey features. Behavioural effects in response to piling may occur in lamprey features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Dee Estuary/Aber Dyfrdwy SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** – sea and river lamprey features are considered to have a low sensitivity and high recoverability to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact lamprey ecology. As the lamprey features for the SAC are highly mobile and pelagic, they are capable of changing course when

migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between lamprey features and cables, which will reduce the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Dee Estuary/Aber Dyfrdwy SAC during the operations and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects**

i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, and the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase). No Tier 3 projects overlap with the Morgan Generation Assets construction phase. For all three Scenarios, underwater sound from the Morgan Generation Assets in-combination with other projects will be intermittent, all projects are likely to implement mitigation measures similar to the Morgan Generation Assets, such as soft starts, and sea and river lamprey are expected to have low sensitivity to the effect. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF for all three scenarios were predicted to be long term in duration but the sea and river lamprey features are assessed as having a low sensitivity and high recoverability in relation

to the impact, with EMF effects confined to the close vicinity of cables. Therefore, the effects of EMF from the Morgan Generation Assets in-combination with the projects assessed under Scenarios 1, 2 and 3 will be localised in spatial extent. Other projects are likely to implement measures such as cable burial, which will increase the space between diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the sea and river lamprey features of the site. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

Table 1.4: Integrity matrix for Annex II diadromous fish and shellfish species of the River Derwent and Bassenthwaite SAC.

European Site: River Derwent and Bassenthwaite SAC Distance to Morgan Array Area: 71.28 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Atlantic salmon	×a		×a		×b		×c	×c	×c
Sea lamprey	×a		×a		×b		×c	×c	×c
River lamprey	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** – The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that diadromous fish features within close proximity to piling operations may experience injury or mortality. Diadromous fish may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on diadromous fish features. Behavioural effects in response to piling may occur in diadromous fish features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3)) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Derwent and Bassenthwaite SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** - Atlantic salmon and lamprey features are considered to have a low sensitivity to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact the diadromous fish

features ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement). As the diadromous fish features for the SAC are highly mobile and pelagic, they are capable of changing course when migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between diadromous fish features and cables, reducing the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Derwent and Bassenthwaite SAC during the operation and maintenance phases of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase). No Tier 3 projects overlap with the Morgan Generation Assets construction phase. For all three Scenarios, underwater sound from the Morgan Generation Assets in-combination with other projects will be intermittent, all projects are likely to implement mitigation measures similar to the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Derwent and Bassenthwaite SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets, the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland

Interconnector Cable. In-combination effects for EMF for all three scenarios were predicted to be long term in duration but the Annex II diadromous features are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined to the close vicinity of cables. Therefore, the effects of EMF from the Morgan Generation Assets in-combination with the projects assessed under Scenario 1, 2 and 3 will be localised in spatial extent. Other projects are likely to implement measures such as cable burial, which will increase the space between diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous features of the site. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Derwent and Bassenthwaite SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

Table 1.5: Integrity Matrix for Annex II diadromous fish and shellfish species of the River Kent SAC.

European Site: River Kent SAC Distance to Morgan Array Area: 82.44 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Freshwater pearl mussel	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** - Freshwater pearl mussels are confined to freshwater habitats and so there is no pathway for direct underwater sound effects to the species during construction and decommissioning of the Morgan Generation Assets. There is potential for indirect adverse effects on freshwater pearl mussels in their larval stage, due to their reliance on their host Atlantic salmon individuals, but assessment on diadromous fish features (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement) concluded that potential underwater sound impacts would be relatively short-term and intermittent with no barrier to their migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Kent SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** - Freshwater pearl mussels have been considered within the HRA Stage 2 ISAA Part 2 - SAC assessments (Document Reference E1.2) and although not subject to direct effects there is the potential of indirect adverse effects on the larval stage of the freshwater pearl mussel, as this is when they are reliant on Atlantic salmon as a host species for their first year. However, assessment of Atlantic salmon concluded that there are no significant indirect effects of EMF on freshwater pearl mussels. This is due to Atlantic salmon having low sensitivity and high recoverability to localised EMF effects and therefore, there is negligible risk of disruption to Atlantic salmon migration and in turn the populations of freshwater pearl mussel from the Morgan Generation Assets. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Kent SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

   i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the

Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase). No Tier 3 projects overlap with the Morgan Generation Assets construction phase. In-combination effects were predicted to be relatively short-term and intermittent for all three Scenarios which were assessed (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3)). It was concluded that for each Scenario, there is no pathway for in-combination underwater sound to result in adverse effects to the qualifying features of the site. In addition, other projects are likely to implement measures, similar to those implemented as part of the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. Further, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration to Atlantic salmon, so there will be no significant indirect effect on the freshwater pearl mussel feature of the SAC. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Kent SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF were predicted to be long term in duration but the Annex II diadromous features are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined to the close vicinity of cables (local spatial extent). Other projects considered under the three Scenarios are likely to implement measures such as cable burial, which will increase the space between Annex II diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous fish. Therefore, there is negligible risk of disruption to Atlantic salmon migration and in turn the populations of freshwater pearl mussel from the Morgan Generation Assets. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Kent SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.6: Integrity matrix for Annex II diadromous fish and shellfish species of the Solway Firth SAC.

European Site: Solway Firth SAC Distance to Morgan Array Area: 84.32 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Sea lamprey	×a		×a		×b		×c	×c	×c
River lamprey	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** - The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that sea and river lamprey features within close proximity to piling operations may experience injury or mortality. Diadromous fish may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on lamprey features. Behavioural effects in response to piling may occur in lamprey features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Solway Firth SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** – sea and river lamprey features are considered to have a low sensitivity and high recoverability to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact lamprey ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement). As the lamprey features for the SAC are highly mobile and pelagic, they are capable of changing course when migrating and it is concluded

that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between lamprey features and cables, reducing the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Solway Firth SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase). No Tier 3 projects overlap with the Morgan Generation Assets construction phase. For all three Scenarios, underwater sound from the Morgan Generation Assets in-combination with other projects/plans will be intermittent, all projects are likely to implement mitigation measures similar to the Morgan Generation Assets, such as soft starts, and sea and river lamprey are expected to have low sensitivity to the effect. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Solway Firth SAC, as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF for all three scenarios were predicted to be long term in duration but the sea and river lamprey features are assessed as having a low sensitivity and high recoverability in relation

to the impact, with EMF effects confined to close vicinity of cables. Therefore, the effects of EMF from the Morgan Generation Assets in-combination with the projects assessed under Scenario 1, 2 and 3 will be localised in spatial extent. Other projects are likely to implement measures such as cable burial, which will increase the space between diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the sea and river lamprey features of the site. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Solway Firth SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

Table 1.7: Integrity matrix for Annex II diadromous fish and shellfish species of the River Bladnoch SAC.

European Site: River Bladnoch SAC Distance to Morgan Array Area: 89.57 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Atlantic salmon	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** – The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that Atlantic salmon feature within close proximity to piling operations may experience injury or mortality. Atlantic salmon may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on diadromous fish features. Behavioural effects in response to piling may occur in diadromous fish features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Bladnoch SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF** - Atlantic salmon features are considered to have a low sensitivity to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact the diadromous fish features ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement). As the diadromous fish feature for the SAC is highly mobile and pelagic they are capable of changing course when migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between diadromous fish feature and

cables, reducing the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Bladnoch SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase). No Tier 3 projects overlap with the Morgan Generation Assets construction phase. In-combination effects were predicted to be relatively short-term and intermittent for all three Scenarios which were assessed (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3). Other projects are likely to implement measures, similar to those implemented as part of the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Bladnoch SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF were predicted to be long term in duration but Atlantic salmon are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined to the close vicinity of cables (local spatial extent). Other projects considered under the three Scenarios are likely to

implement measures such as cable burial, which will increase the space between Annex II diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous fish. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Bladnoch SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.8: Integrity matrix for Annex II diadromous fish and shellfish species of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

European Site: River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC Distance to Morgan Array Area: 91.6 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Atlantic salmon	×a		×a		×b		×c	×c	×c
Sea lamprey	×a		×a		×b		×c	×c	×c
River lamprey	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** – The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that diadromous fish features within close proximity to piling operations may experience injury or mortality. Diadromous fish may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on diadromous fish features. Behavioural effects in response to piling may occur in diadromous fish features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** - Atlantic salmon and lamprey features are considered to have a low sensitivity to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact the diadromous fish features ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement). As the diadromous fish features for the SAC are highly mobile and pelagic, they are capable of changing course when migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between diadromous fish features and cables, reducing the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase. No Tier 3 projects overlap with the Morgan Generation Assets construction phase. For all three Scenarios, underwater sound from the Morgan Generation Assets in-combination with other projects/plans will be intermittent, all projects are likely to implement mitigation measures similar to the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the

relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF for all three scenarios were predicted to be long term in duration but the Annex II diadromous features are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined to close vicinity of cables. Therefore, the effects of EMF from the Morgan Generation Assets in-combination with the projects assessed under Scenario 1, 2 and 3 will be localised in spatial extent. Other projects are likely to implement measures such as cable burial, which will increase the space between diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous features of the site. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

Table 1.9: Integrity matrix for Annex II fish and shellfish species of the Afon Gwyrfai a Llyn Cwellyn SAC.

European Site: Afon Gwyrfai a Llyn Cwellyn SAC Distance to Morgan Array Area: 118.05 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Atlantic salmon	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** - The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that Atlantic salmon feature within close proximity to piling operations may experience injury or mortality. Atlantic salmon may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on diadromous fish features. Behavioural effects in response to piling may occur in diadromous fish features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Afon Gwyrfai a Llyn Cwellyn SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** - Atlantic salmon features are considered to have a low sensitivity to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact the diadromous fish features ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement). As the diadromous fish feature for the SAC are highly mobile and pelagic, they are capable of changing course when migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species.

Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between diadromous fish feature and cables, reducing the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Afon Gwyrfai a Llyn Cwellyn SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** - The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase. No Tier 3 projects overlap with the Morgan Generation Assets construction phase. In-combination effects were predicted to be relatively short-term and intermittent for all three Scenarios which were assessed (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3)). Other projects are likely to implement measures, similar to those implemented as part of the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-Ireland Interconnector Cable. In-combination effects for EMF were predicted to be long term in duration but Atlantic salmon are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined

to the close vicinity of cables (local spatial extent). Other projects considered under the three Scenarios are likely to implement measures such as cable burial, which will increase the space between Annex II diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous fish. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.10: Integrity matrix for Annex II diadromous fish and shellfish species of the River Eden SAC.

European Site: River Eden SAC Distance to Morgan Array Area: 125.73 km									
Qualifying features	**Underwater sound impacting fish and shellfish receptors**			**EMF from subsea electrical cabling**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Atlantic salmon	×a		×a		×b		×c	×c	×c
Sea lamprey	×a		×a		×b		×c	×c	×c
River lamprey	×a		×a		×b		×c	×c	×c

a. **Underwater sound impacting fish and shellfish receptors** – The sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3) demonstrates that diadromous fish features within close proximity to piling operations may experience injury or mortality. Diadromous fish may be expected to move through the Morgan fish and shellfish ecology study area during migration, however they are highly mobile and given the vast extent of their migratory range relative to the extent of the zone of influence of underwater sound impacts, barrier effects would not occur. The measures adopted (piling soft-start and ramp-up), as part of the Morgan Generation Assets will also allow individuals in close proximity to piling to move away from the ensonified area, further reducing the likelihood of injury and mortality on diadromous fish features. Behavioural effects in response to piling may occur in diadromous fish features, such as avoidance reactions. However, sound modelling outputs (including sound contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3)) demonstrated that piling sound would result in behavioural responses within a range of approximately up to tens of kilometres from the Morgan Generation Assets. However, these would not extend close to the coasts of North Wales and Northwest England and therefore would not represent a barrier to migration to and from the SAC. Further, the potential sound impacts will be relatively short-term and intermittent in nature during the construction phase only, with piling occurring over approximately 114 days over a two year piling phase. Given that there will be no piling during decommissioning, any impacts from underwater sound will be less than for construction. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Eden SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound impacting fish and shellfish receptors.

b. **EMF from subsea electrical cabling** – Atlantic salmon and lamprey features are considered to have a low sensitivity to EMF effects, and it has been concluded that impacts from the Morgan Generation Assets would not impact the diadromous fish

features ecology (see Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement). As the diadromous fish features for the SAC are highly mobile and pelagic, they are capable of changing course when migrating and it is concluded that any EMF impacts would be localised and would not result in any barriers to the population or distribution of the qualifying species. Measures adopted as part of the Morgan Generation Assets for localised impacts includes cable burial, to increase the distance between diadromous fish features and cables, reducing the effect of EMFs. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Eden SAC during the operation and maintenance phase of the Morgan Generation Assets as a result of EMF effects.

c. **In-combination effects:**

i. **In-combination assessment for underwater sound** – The in-combination assessment for underwater sound impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Project; Tier 2: Morecambe Generation Assets, the Transmission Assets, the ENI HyNet Carbon Capture and Storage (Mooir Vannin is not expected to overlap temporally with Morgan Generation Assets construction phase. No Tier 3 projects overlap with the Morgan Generation Assets construction phase. For all three Scenarios, underwater sound from the Morgan Generation Assets in-combination with other projects/plans will be intermittent, all projects are likely to implement mitigation measures similar to the Morgan Generation Assets, such as soft starts, which will reduce any potential for in-combination sound effects. In addition, despite the increase in the frequency of effect, the ranges of impact for Annex II diadromous fish do not significantly increase. As such, cumulative effects from in-combination elevated underwater sound from piling will not present a barrier to migration. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Eden SAC as a result of elevated underwater sound impacting fish and shellfish receptors with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

ii. **In-combination assessment for EMF** - The in-combination assessment for EMF impacting fish and shellfish receptors considered the three Scenarios outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Scenario 1 considered the Morgan Generation Assets in-combination with the Transmission Assets, Scenario 2 considered the Morgan Generation Assets in-combination with the Transmission Assets and the Morecambe Generation Assets, and Scenario 3 considered the Morgan Generation Assets in-combination with the Transmission Assets and the relevant Tier 1, Tier 2 and Tier 3 projects. The following projects were considered under Scenario 3: Tier 1: Awel y Môr Offshore Wind Farm and Mona Offshore Wind Farm; Tier 2: Morecambe Generation Assets, the Transmission Assets and the Mooir Vannin Offshore Windfarm; the only Tier 3 project included in the assessment was the MaresConnect-Wales-

Ireland Interconnector Cable. In-combination effects for EMF for all three scenarios were predicted to be long term in duration but the Annex II diadromous features are assessed as having a low sensitivity and high recoverability in relation to the impact, with EMF effects confined to the close vicinity of cables. Therefore, the effects of EMF from the Morgan Generation Assets in-combination with the projects assessed under Scenario 1, 2 and 3 will be localised in spatial extent. Other projects are likely to implement measures such as cable burial, which will increase the space between diadromous fish and cables, attenuating the EMFs and thereby reducing the effect of EMFs on the Annex II diadromous features of the site. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the River Eden SAC as a result of EMF effects with respect to the operation and maintenance phase of the Morgan Generation Assets in-combination with other plan/projects considered under Scenarios 1, 2 and 3.

1.2.2 Integrity matrices for Annex II marine mammals

Table 1.11: Integrity matrix for Annex II marine mammals of the North Anglesey Marine/Gogledd Môn Forol SAC.

European Site: North Anglesey Marine/Gogledd Môn Forol SAC Distance to Morgan Array Area: 28.22 km																		
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**Changes in fish and shellfish communities affecting prey availability**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×a		×a	×a		×a	×b	×b	×b	×c			×d	×d	×d

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an Acoustic Deterrent Device (ADD), there would be no risk of injury to harbour porpoise from cumulative Sound Exposure Level (SEL_{cum}), however peak Sound Pressure Level (SPL_{pk}) leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the Marine Mammal Mitigation Plan (MMMP; Document Reference J17) (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments (Document Reference E1.2) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the North Anglesey Marine/Gogledd Môn Forol SAC. Assessments for disturbance due to elevated underwater sound from piling included both the Effective Deterrence Range (EDR) approach alongside the unweighted sound threshold value of 143 dB re 1 μPa^2s SEL_{ss}. The maximum area of disturbance, based on the 15 km EDR for pin piles does not overlap the North Anglesey Marine/Gogledd Môn Forol SAC. The unweighted 143 dB re 1 µPa2s SEL_{ss} threshold demonstrates a daily overlap of 0.002% with the North Anglesey Marine/Gogledd Môn Forol SAC, which does not exceed the daily 20% guidance threshold from the Joint Nature Conservation Committee (JNCC) (2020). Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the

Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of Permanent Threshold Shift (PTS) and disturbance. Disturbance (using Temporary Threshold Shift (TTS) as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys, sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity on the North Anglesey Marine/Gogledd Môn Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey

Marine/Gogledd Môn Forol SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **Changes in fish and shellfish communities affecting prey availability –** Impacts to prey species are predicted to be localised, short term and intermittent, and harbour porpoise populations expected to adapt and recover quickly to changes in fish and shellfish communities within the vicinity of the Morgan Generation Assets. Despite the increased energetic cost it may cause harbour porpoise to adapt to these impacts on prey species, it is anticipated that harbour porpoise can compensate any loss by increasing foraging outside the impact zone, of which there is sufficient similar prey resources available in the wider area of the Irish Sea (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC during the construction phase of the Morgan Generation Assets as a result of changes in prey availability.

f. **In-combination effects:**

i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for both Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets) and Scenario 2 (Morgan Generation Assets, Transmission Assets and Morecambe Offshore Windfarm), there is no overlap of the respective EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. The maximum area of disturbance within the North Anglesey Marine/Gogledd Môn Forol SAC resulting from piling at Morgan Generation Assets alone would be 0.002% (on any given day) and the Transmission Assets Preliminary Environmental Information Report (PEIR) ruled out any overlap of 143 dB re 1 μPa^2s SEL_{ss} sound contours with the North Anglesey Marine/Gogledd Môn Forol SAC. The unweighted 143 dB re 1 μPa^2s SEL_{ss} contour approach has not been applied to the assessment of disturbance for harbour porpoise features with the Morecambe Generation Assets, as this would require the generation of project-specific unweighted 143 dB re 1 μPa^2s SEL_{ss} contours for this project, which are not publicly available. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. For Scenario 3 (Morgan Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects) the maximum area of disturbance within the North Anglesey Marine/Gogledd Môn Forol SAC resulting from Tier 1 and Tier 2 projects considered within the in-combination assessment (Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr Offshore Wind Farm) would be 5.172% (on any given day), which does not exceed either of the thresholds for significant disturbance. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as

standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result

of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

v. **In-combination assessment changes in fish and shellfish communities affecting prey availability** - The in-combination effects assessment considered the impact of changes in fish and shellfish communities affecting prey availability under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Whilst there may be some potential in-combination effects to fish and shellfish communities, these effects will be highly localised and short term and therefore harbour porpoise are likely to be able to compensate and move to alternative foraging grounds. Therefore, any in-combination effects are predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures which will further reduce the potential for in-combination effects on prey availability (see Volume 2 Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3)). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of elevated underwater sound from changes in prey availability with respect to the construction of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1, 2 and 3.

Table 1.12: Integrity matrix for Annex II marine mammals of the North Channel SAC.

European Site: North Channel SAC Distance to Morgan Array Area: 63.78 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×a		×a	×a		×a	×b	×b	×b	×c	×c	×c

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the North Channel SAC. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the 143 dB re 1 μPa^2s SEL_{ss} unweighted noise threshold. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of North Channel SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully

recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Channel SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Channel SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Channel SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2 (Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective

EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the North Channel SAC to the Morgan Generation Assets (64 km), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with this SAC) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity on the North Channel SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project

are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Channel SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Channel SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the

Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the North Channel SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.13: Integrity matrix for Annex II marine mammals of the Strangford Lough SAC

European Site: Strangford Lough SAC Distance to Morgan Array Area: 98. 4km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. Harbour seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The Interim Population Consequences of Disturbance (iPCoD) Model (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the harbour seal feature to be present within the impact zone of UXO when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (less than one animal), but this would not manifest to population level effects. Disturbance from elevated underwater sound

during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the harbour seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There will be no adverse effects leading to auditory injury for harbour seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for harbour seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the Morgan Generation Assets vicinity and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – piling at other projects may result in disturbance of Annex II harbour seal features of the SAC, however the numbers presented are inconsequential in the context of the harbour seal reference population. Furthermore, harbour seal also have a large

foraging range (up to 273 km reported in Carter *et al.*, 2022) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for harbour seal also concluded that there is no potential for a long-term effect on this species when all Tier 1 and Tier 2 projects (for which quantitative information was available) were included. With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as Noise Abatement Systems (NAS), temporal and spatial piling restrictions, piling methods, soft start) which will be outlined in the Underwater Sound Management Strategy (Document Reference J13) impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the magnitude of the impact from all projects in terms of PTS is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. TTS was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of TTS is reversible. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC as a result of elevated underwater sound from UXO clearance with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - For pre-construction site investigation surveys any in-combination effects are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination elevated underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – For underwater sound from vessels and other vessel activity any in-combination effects are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a

result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Strangford Lough SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects.

Table 1.14: Integrity matrix for Annex II marine mammals of the Murlough SAC.

European Site: Murlough SAC Distance to Morgan Array Area: 98.4 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. Harbour seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The iPCoD modelling (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the harbour seal feature to be present within the impact zone of UXO when tertiary measures is applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<1 animal), but this would not manifest to population level effects. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with

high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the harbour seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There will be no adverse effects leading to auditory injury for harbour seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for harbour seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the Morgan Generation Assets vicinity and considering the distance to the SAC it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – piling at other projects may result in disturbance of Annex II harbour seal features of the SAC, however the numbers presented are inconsequential in the context of the harbour seal reference population. Furthermore, harbour seal also have a large foraging range (up to 273 km reported in Carter *et al.*, 2022) and could therefore move to alternative foraging grounds

during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for harbour seal also concluded that there is no potential for a long-term effect on this species when all Tier 1 and Tier 2 projects (for which quantitative information was available) were included. With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as NAS, temporal and spatial piling restrictions, piling methods, soft start) which will be outlined in the Underwater Sound Management Strategy (Document Reference J13) impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the magnitude of the impact from all projects in terms of PTS is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. TTS was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of TTS is reversible. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC as a result of elevated underwater sound from UXO clearance with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - For pre-construction site investigation surveys any in-combination effects are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Murlough SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – For underwater sound from vessels and other vessel activity any in-combination effects are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the

Murlough SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects.

Table 1.15: Integrity matrix for Annex II marine mammals of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC.

European Site: Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC Distance to Morgan Array Area: 119.7 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Bottlenose dolphin	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). For bottlenose dolphin, there would be no risk of injury from SEL_{cum}, however SPL_{pk} leading to injury would be experienced out to 39 m (at full hammer energy) and the threshold was not exceeded for the first hammer strike. With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to bottlenose dolphin and grey seal features during piling activities. For both bottlenose dolphin and grey seal there was no spatial overlap between the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. The iPCoD modelling demonstrated that over the duration of the impact, up to 25 years after the start of piling, there would be no long-term effects on the bottlenose dolphin or grey seal reference population. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for bottlenose dolphin and grey seal features to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes

at an individual level (<1 bottlenose dolphin and <6 grey seal), but this would not manifest to population level effects, demonstrated by the small proportion of the Celtic and Irish Sea (CIS) Management Unit (MU) potentially affected. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal or bottlenose dolphin population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for bottlenose dolphin and grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with bottlenose dolphin and grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for bottlenose dolphin and grey seal associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II bottlenose dolphin and grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and Oslo Paris Convention (OSPAR) III region. The iPCoD modelling for grey seal also concluded that there is no potential for a long-term effect on this species for all three Scenarios (for which quantitative information was available). For bottlenose dolphin, the assessment concluded that there could be potential reductions to lifetime reproductive success to some individuals in the Irish Sea (IS) MU population as a result of cumulative piling of Tier 1 and Tier 2 projects, as disturbance in offshore areas during piling could lead to a longer duration over which individuals may be displaced from key areas. Specifically cumulative piling of Tier 1 and Tier 2 projects could contribute to a reduction in IS MU population size for bottlenose dolphin. It should however be noted that recovery is anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects. Based on the iPCoD modelling, although there are potential reductions to lifetime reproductive success to some individual animals in the Irish Sea MU, these changes are not sufficient to significantly affect the population trajectory over a generational scale (i.e. the trajectory falls within natural variation); however, there may be a small reduction in population size for the impacted population. With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing Marine Mammal Observers (MMOs), Passive Acoustic Monitoring (PAM) and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone

and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice; therefore, impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2 Chapter 4 Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the

source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.16: Integrity matrix for Annex II marine mammals of the West Wales Marine/Gorllewin Cymru Forol SAC.

European Site: West Wales Marine/Gorllewin Cymru Forol SAC Distance to Morgan Array Area: 121 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the West Wales Marine/Gorllewin Cymru Forol SAC. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the 143 dB re 1 μPa^2s SEL_{ss} unweighted noise threshold. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to

moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2

(Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the West Wales Marine/Gorllewin Cymru Forol SAC to the Morgan Generation Assets (121 km), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with this SAC) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term

duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-

combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.17: Integrity matrix for Annex II marine mammals of The Maidens SAC.

European Site: European Site: The Maidens SAC Distance to Morgan Array Area: 142.0 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to grey seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and no potential spatial overlap with the SAC. Grey seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The iPCoD modelling (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the grey seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the grey seal feature to be present within the impact zone of UXO when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<6 animals), but this would not manifest to population level effects. Disturbance from elevated underwater sound during

UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three

scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and OSPAR III region. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species for all three Scenarios (for which quantitative information was available). With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing MMOs, PAM and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3)

described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on The Maidens SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Maidens SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.18: Integrity matrix for Annex II marine mammals of the Cardigan Bay/Bae Ceredigion SAC.

European Site: Cardigan Bay/Bae Ceredigion SAC Distance to Morgan Array Area: 188.1 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Bottlenose dolphin	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). For bottlenose dolphin, there would be no risk of injury from SEL_{cum}, however SPL_{pk} leading to injury would be experienced out to 39 m (at full hammer energy) and the threshold was not exceeded for the first hammer strike. With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to bottlenose dolphin and grey seal features during piling activities. For both bottlenose dolphin and grey seal there was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. The iPCoD modelling demonstrated that over the duration of the impact, six years post impact and up to 25 years after the start of piling, there would be no long-term effects on the bottlenose dolphin or grey seal reference population. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for bottlenose dolphin and grey seal features to be present within the impact zone of UXO when tertiary measures is applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<1 bottlenose dolphin and <6 grey seal), but this would not manifest to population level effects,

demonstrated by the small proportion of the CIS MU potentially affected. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal or bottlenose dolphin population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for bottlenose dolphin and grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with bottlenose dolphin and grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for bottlenose dolphin and grey seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II bottlenose dolphin and grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and OSPAR III region. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species for all three Scenarios (for which quantitative information was available). For bottlenose dolphin the assessment concluded that there could be potential reductions to lifetime reproductive success to some individuals in the IS MU population as a result of cumulative piling of Tier 1 and Tier 2 projects, as disturbance in offshore areas during piling could lead to a longer duration over which individuals may be displaced from key areas. Specifically cumulative piling of Tier 1 and Tier 2 projects could contribute to a reduction in IS MU population size for bottlenose dolphin. It should however be noted that recovery is anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects. Based on the iPCoD modelling, although there are potential reductions to lifetime reproductive success to some individual animals in the Irish Sea MU, these changes are not sufficient to significantly affect the population trajectory over a generational scale (i.e. the trajectory falls within natural variation); however, there may be a small reduction in population size for the impacted population. With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing MMOs, PAM and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the

detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2 Chapter 4 Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to

disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.19: Integrity matrix for Annex II marine mammals of the Pembrokeshire Marine/Sir Benfro Forol SAC.

European Site: Pembrokeshire Marine/Sir Benfro Forol SAC Distance to Morgan Array Area: 237.3 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

f. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to grey seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and no potential spatial overlap with the SAC. Grey seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The iPCoD modelling (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the grey seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Pembrokeshire Marine/Sir Benfro Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

g. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the grey seal feature to be present within the impact zone of UXO when tertiary measures is applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<6 animals), but this would not manifest to population level effects. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with

high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Pembrokeshire Marine/Sir Benfro Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

h. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

i. **Underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Pembrokeshire Marine/Sir Benfro Forol SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

j. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three

scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and OSPAR III region. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species for all three Scenarios (for which quantitative information was available). With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing MMOs, PAM and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Pembrokeshire Marine/Sir Benfro Forol SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3)

described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2 Chapter 4 Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.20: Integrity matrix for Annex II marine mammals of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC.

European Site: Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC Distance to Morgan Array Area: 300.5 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the unweighted sound threshold value of 143 dB re 1 μPa^2s SEL_{ss}. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual

level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2

(Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC to the Morgan Generation Assets (300.5 km), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with this SAC) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term

duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so

a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.21: Integrity matrix for Annex II marine mammals of the Lundy SAC.

European Site: Lundy SAC Distance to Morgan Array Area: 335.1 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to grey seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. Grey seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The iPCoD modelling (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the grey seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Lundy SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the grey seal feature to be present within the impact zone of UXO when tertiary measures is applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<6 animals), but this would not manifest to population level effects. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do

contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Lundy SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Lundy SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Lundy SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2

ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and OSPAR III region. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species for all three Scenarios (for which quantitative information was available). With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing MMOs, PAM and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Lundy SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Lundy SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the

Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Lundy SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2 Chapter 4 Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Lundy SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.22: Integrity matrix for Annex II marine mammals of the Isles of Scilly Complex SAC.

European Site: Isles of Scilly Complex SAC Distance to Morgan Array Area: 464.9 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to grey seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. Grey seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The iPCoD modelling (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the grey seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Isles of Scilly Complex SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the grey seal feature to be present within the impact zone of UXO when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<6 animals), but this would not manifest to population level effects. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do

contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Isles of Scilly Complex SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Isles of Scilly Complex SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC, it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Isles of Scilly Complex SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments

(Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and OSPAR III region. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species for all three Scenarios (for which quantitative information was available). With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing MMOs, PAM and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Isles of Scilly Complex SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Isles of Scilly Complex SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site

investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Isles of Scilly Complex SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2 Chapter 4 Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets are likely to also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Isles of Scilly Complex SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.23: Integrity matrix for Annex II marine mammals of the Rockabill to Dalkey Island SAC.

European Site: Rockabill to Dalkey Island SAC Distance to Morgan Array Area: 123.4 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP (Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the Rockabill to Dalkey Island SAC. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the unweighted sound threshold value of 143 dB re 1 μPa^2s SEL_{ss}. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to

moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2 (Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan

Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the Rockabill to Dalkey Island SAC to the Morgan Generation Assets (123.4 km), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with this SAC) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and

effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for

Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Rockabill to Dalkey Island SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.24: Integrity matrix for Annex II marine mammals of the Saltee Islands SAC.

European Site: Saltee Islands SAC Distance to Morgan Array Area: 259.5 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Grey seal	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to grey seal from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 26 m (at hammer initiation) and 130 m (at full hammer). With the implementation of primary, tertiary measures adopted as part of the Morgan Generation Assets and the implementation of the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to grey seal during piling activities. There was no overlap with the strong disturbance (160 dB re 1 µPa SPL_{rms}) contour and the SAC. Grey seal close to the coast could experience mild disturbance but it is unlikely to cause a barrier to movement due to large foraging ranges which could provide alternative grounds during piling. The iPCoD modelling (see Volume 2, Chapter 4: Marine Mammals of the Environmental Statement) predicts that there will be no long-term effects on the grey seal population due to elevated underwater sound from piling. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Saltee Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is potential for the grey seal feature to be present within the impact zone of UXO when tertiary measures is applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. It is predicted that there may be measurable changes at an individual level (<6 animals), but this would not manifest to population level effects. Disturbance from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level with high recoverability. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) do

contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. Therefore, it is predicted that there will not be significant disturbance to the grey seal population (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Saltee Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. Following the implementation of standard guidance mitigation measures (JNCC, 2017), there will be no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition, pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with grey seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Saltee Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2) indicate that the maximum range for grey seal for risk of PTS does not exceed the threshold for marine mammals for all vessels and vessel activities. As this underwater sound will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with elevated underwater sound due to vessel use and other activities for Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets and considering the distance to the SAC it is unlikely to cause significant behavioural disturbance to marine mammals. Only a small area will be affected when compared to available foraging habitat in the Irish Sea. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Saltee Islands SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance underwater sound during piling –** The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios (Scenario 1, Scenario 2 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments

(Document Reference E1.2). For Scenario 1, Scenario 2 and Scenario 3, piling at other projects may result in disturbance of Annex II grey seal features of the SAC. However, the number of grey seal impacted as presented in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2) is inconsequential in the context of the grey seal reference population and OSPAR III region. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species for all three Scenarios (for which quantitative information was available). With the implementation of relevant measures adopted as part of the Morgan Generation Assets (such as soft start, limitation on maximum hammer energy, employing MMOs, PAM and ADDs) as well as additional measures to be reviewed as a part of the Underwater Sound Management Strategy (Document Reference J13) post-consent (such as NAS, temporal and spatial piling restrictions, piling methods), the impacts on the SAC from the Morgan Generation Assets alone will be reduced and therefore reducing the potential for the Morgan Generation Assets to contribute to any in-combination effect. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of Saltee Islands SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) identified the impact from all scenarios in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Behavioural disturbance (using TTS as a proxy) was predicted to be of regional spatial extent, very short-term duration, intermittent and both the impact itself (i.e. risk of injury during the detonation event) and effect of disturbance is reversible. Therefore, the effects of behavioural disturbance as a result of increases in underwater sound from UXO clearance are not considered likely to lead to any long-term effects on any individuals. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of the Morgan Generation Assets and the Mona Offshore Wind Project, the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore impact ranges and number of animals within the impact range in reality is likely to be much lower. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Saltee Islands SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site

investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Saltee Islands SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). As a result of the Morgan Generation Assets and other plan/projects, there will be a relatively high increase to the vessel traffic in the area (see Volume 2 Chapter 4 Marine mammals of the Environmental Statement (Document Reference F2.4); however, vessel activity is expected to be localised to each project, reducing the potential for in-combination effects. For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three of Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 is predicted to be of local to regional spatial extent, medium term duration, intermittent and are considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Saltee Islands SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.25: Integrity matrix for Annex II marine mammals of the Roaringwater Bay and Islands SAC.

European Site: Roaringwater Bay and Islands SAC Distance to Morgan Array Area: 472.9 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the Roaringwater Bay and Islands SAC. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the unweighted sound threshold value of 143 dB re 1 μPa^2s SEL_{ss}. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to

moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2 (Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan

Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the Roaringwater Bay and Islands SAC to the Morgan Generation Assets (472.9 km), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with this SAC) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and

effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** - The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets are also likely to implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for

Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Roaringwater Bay and Islands SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.26: Integrity matrix for Annex II marine mammals of the Blasket Islands SAC.

European Site: Blasket Islands SAC Distance to Morgan Array Area: 589.6 km															
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** - Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2 and MMMP, Document Reference J17) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the Blasket Islands SAC. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the unweighted sound threshold value of 143 dB re 1 μPa^2s SEL_{ss} unweighted noise threshold. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SAC (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the Underwater Sound Management Strategy (Document Reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to

moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to the SAC, it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

   i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2 (Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan

Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective EDRs for any of these projects with this SAC. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the Blasket Islands SAC to the Morgan Generation Assets (589.6 km), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with this SAC) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO

clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios (Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration,

intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the Blasket Islands SAC as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

Table 1.27: Integrity matrix for the 17 French sites for harbour porpoise.

European Site: 17 French SCI sites (Mers Celtiques – Talus du golfe de Gascogne SCI, Abers – Côte des legends SCI, Ouessant-Molène SCI, Côte de Granit rose-Sept-Iles SCI, Anse de Goulven, dunes de Keremma SCI, Tregor Goëlo SCI, Côtes de Crozon SCI, Chaussée de Sein SCI, Cap Sizun SCI, Récifs du talus du golfe de Gascogne SCI, Anse de Vauville SCI, Cap d'Erquy-Cap Fréhel SCI, Baie de Saint-Brieuc – Est SCI, Banc et récifs de Surtainville SCI, Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI, Estuaire de la Rance SCI, Baie du Mont Saint-Michel SCI) Distance to Morgan Array Area: See HRA Stage 1 Screening Report (Document Reference E1.4)														
Qualifying features	**Elevated underwater sound during piling**			**Elevated underwater sound during UXO clearance**			**Elevated underwater sound during pre-construction site investigation surveys**			**Elevated underwater sound due to vessel use and other (non-piling) sound producing activities**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Harbour porpoise	×a		×a	×b		×b	×c		×c	×d	×d	×d	×e	×e	×e

a. **Injury and disturbance from elevated underwater sound during piling** – Sound modelling outputs (including sound contours presented in Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4)) demonstrated without the use of an ADD, there would be no risk of injury to harbour porpoise from SEL_{cum}, however SPL_{pk} leading to injury could be experienced out to 130 m (at hammer initiation) and 652 m (at full hammer). With the implementation of primary and tertiary measures adopted as part of the Morgan Generation Assets including the MMMP (outlined in the HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2) as part of the Underwater Sound Management Strategy (Document reference J13), it is predicted that there will be no residual risk of injury to harbour porpoise during piling activities associated with the construction phase. The range of effect will be localised within the Morgan Array Area, with no potential spatial overlap with the 17 French SCIs. Assessments for disturbance due to elevated underwater sound from piling included both the EDR approach alongside the unweighted sound threshold value of 143 dB re 1 μPa^2s SEL_{ss}. Both assessments concluded that there will be no significant disturbance of harbour porpoise within the SCIs (see HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generated from piling.

b. **Injury and disturbance from elevated underwater sound during UXO clearance** - Although there is the potential for harbour porpoise to be present within the impact zone of UXO, when tertiary measures are applied, including the MMMP as part of the

Underwater Sound Management Strategy (Document reference J13), it is predicted that marine mammals will be deterred from the injury zone, reducing risk of PTS and disturbance. Disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with anticipated changes measurable only at individual level. Tertiary measures (including visual and acoustic monitoring, use of an ADD and soft start changes) may contribute to moving away responses by marine mammals but effects will be in the short term, and it is anticipated that features will fully recover. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound during UXO clearance.

c. **Injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – During pre-construction site investigation surveys sonar-based systems have strong directivity and will be of short-term duration and intermittent. There are no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets. In addition to this, given the distance from the Morgan Generation Assets to these SCIs (see HRA Stage 1 Screening Report (Document Reference E1.4)), it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within these SCIs and with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Therefore, only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within these SCIs (see HRA Stage 2 ISAA Part 2 – SAC assessments, Document Reference E1.2). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs during construction or decommissioning phases of the Morgan Generation Assets as a result of injury and disturbance from elevated underwater sound generation from pre-construction site investigation surveys.

d. **Injury and disturbance from elevated underwater sound from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – Sound modelling results presented within the HRA Stage 2 ISAA Part 2 - SAC assessments, Document Reference E1.2), indicate that the threshold for PTS was not exceeded for marine mammals for all vessels and vessel activities. As the underwater sound associated with vessels will be short term in duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with elevated underwater sound due to vessel use and other activities for the Morgan Generation Assets. Activities and vessel movements will also be restricted to the Morgan Array Area, with large vessels producing low frequency sounds, likely following existing shipping routes. With this slight increase in traffic in the vicinity of the Morgan Generation Assets it is unlikely to cause significant behavioural disturbance to marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs during construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets as a result of elevated underwater sound from vessels and other vessel activities.

e. **In-combination effects:**

i. **In-combination assessment for injury and disturbance from elevated underwater sound during piling** – the in-combination assessment for elevated underwater sound from piling focusses on disturbance only. The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from piling under three scenarios described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). Using the EDR approaches, for Scenario 1 (both the Morgan Generation Assets together with the Transmission Assets), Scenario 2 (Morgan Generation Assets, Transmission Assets and Morecambe Generation Assets), and Scenario 3 (Morgan Generation Assets, Transmission Assets and Tier 1, Tier 2 and Tier 3 Projects), there is no overlap of the respective EDRs for any of these projects with any of the 17 French SCIs. In parallel with the EDR approach, the sound threshold of unweighted 143 dB re 1 μPa^2s SEL_{ss} was also applied. Given the distance from the 17 French SCIs to the Morgan Generation Assets (See HRA Stage 1 Screening Report (Document Reference E1.4)), there will be no overlap with the of 143 dB re 1 μPa^2s SEL_{ss} sound contours or the 15 km EDR. Therefore, the maximum area for disturbance is the same for these Scenarios, as for the project alone assessment (i.e. no spatial overlap with these SCIs) and so, the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season will not be exceeded. In terms of injury, as for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS would be expected to be localised to within the boundaries of the respective projects (i.e. for the three Scenarios). It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs as a result of elevated underwater sound from piling with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under all Scenarios.

ii. **In-combination assessment for injury and disturbance from elevated underwater sound during UXO clearance** - The in-combination effects assessment considered the impact of injury from elevated underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For Scenario 1, the impact in terms of injury (PTS) is predicted to be of local to regional spatial extent, very short-term duration and intermittent. Although there is the potential for harbour porpoise to be present within the impact zone of UXO, in line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. For Scenario 3 (Morgan Generation Assets together with the Transmission Assets and relevant Tier 1, Tier 2 and Tier 3 projects), the construction of the Morgan Generation Assets, together with construction phase of the Transmission Assets, Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, Project Erebus and White Cross Offshore Windfarm (Tier 1 Projects) may lead to in-combination effects of injury from elevated underwater sound during UXO clearance. However, with the implementation of mitigation measures applied for all projects (i.e. use of low order clearance only for Project Erebus, MMMPs for Awel y Môr, Mona Offshore Wind Project and White Cross), the residual risk of injury will be low. The in-combination effects assessment also considered the impact of disturbance from elevated

underwater sound during UXO clearance under two scenarios (Scenario 1 and Scenario 3). For Scenario 1, disturbance (using TTS as a proxy) from elevated underwater sound during UXO clearance is considered to be short term and reversible, with ranges similar to those from the Morgan Generation Assets alone, so there is potential for in-combination effects from this impact. However, given the nature of the impact, it is it is anticipated that these effects will be temporary and reversible; the in-combination impacts from Scenario 1 are expected to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the detonation event only) and effect of behavioural disturbance is reversible. For Scenario 3, similarly, since elevated underwater sound due to UXO clearance is of regional spatial extent, short term, intermittent and that the disturbance ranges at each assessed project are unlikely to spatially or temporally overlap, the potential for behavioural disturbance of harbour porpoise resulting from the Morgan Generation Assets in-combination with the projects assessed under Scenario 3 is unlikely to be significant. It was also concluded in the HRA Stage 2 ISAA Part 2 – SAC Assessments (Document Reference E1.2) that no Tier 2 or Tier 3 projects assessed under Scenario 3 would contribute to an in-combination effect on marine mammals. The in-combination impacts of underwater sound from UXO clearance during the Morgan Generation Assets in-combination with other projects/plans will also be reduced through the use of mitigation measures for each project, including the Underwater Sound Management Strategy (Document Reference J13). As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs as a result of elevated underwater sound from UXO clearance with respect to the construction and decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iii. **In-combination assessment for injury and disturbance from elevated underwater sound during pre-construction site investigation surveys** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound from pre-construction site investigation surveys under two scenarios (Scenario 1 and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For pre-construction site investigation surveys any in-combination effects (injury and disturbance) are predicted to have local to regional spatial extent, with medium term duration and to occur intermittently. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for injury from in-combination elevated underwater sound. Furthermore, for both Scenarios, the in-combination impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs as a result of elevated underwater sound from pre-construction site investigation surveys with respect to the construction or decommissioning of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenario 1 and Scenario 3.

iv. **In-combination assessment for injury and disturbance from elevated underwater sound due to vessel use and other (non-piling) sound producing activities** – The in-combination effects assessment considered the impact of disturbance from elevated underwater sound generated from vessels and other vessel activity under three scenarios

(Scenario 1, Scenario 2, and Scenario 3) described in the HRA Stage 2 ISAA Part 2 – SAC assessments (Document Reference E1.2). For all three Scenarios, the potential in-combination impact of elevated underwater sound from vessel use and other activities leading to injury is predicted to be of local to regional spatial extent, medium term duration and intermittent. PTS thresholds for this impact would not be exceeded or would be very localised (<10 m) from the source, so a low potential for impact with respect to auditory injury was concluded for all three Scenarios. For disturbance, the in-combination impact of elevated underwater sound from vessel use and other activities leading to disturbance effects for Scenario 1, Scenario 2 and Scenario 3 are predicted to be of local to regional spatial extent, medium term duration, intermittent and considered to be highly reversible effects. Any projects/plans which may act in-combination with the Morgan Generation Assets will also implement measures such as an MMMP which will further reduce the potential for in-combination underwater sound effects. As a result, it is concluded beyond reasonable scientific doubt that there is no risk of an Adverse Effect on the Integrity of the 17 French SCIs as a result of elevated underwater sound from sound from vessels and other vessel activity with respect to the construction, operations and maintenance or decommissioning phases of the Morgan Generation Assets in-combination with other plan/projects assessed under Scenarios 1, 2 and 3.

1.2.3 Integrity matrices for offshore ornithological features

Table 1.28: Integrity matrix for offshore ornithological features of the Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar/Duddon Estuary Ramsar.

European Site: Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar/Duddon Estuary Ramsar Distance to Morgan Array Area: 31.3 km						
European site qualifying feature	**Coilision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Lesser black-backed gull		× a			× b	
Herring gull		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Collision risk** –

The predicted collision risk for lesser black-backed gull represents less than a 0.05% increase in the baseline mortality of the relevant reference populations for the SPA from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to collision risk for lesser black-backed gull from this SPA for the Morgan generation Assets alone.

The predicted impact for herring gull represents less than a 1.0% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to collision risk for herring gull from this SPA for the Morgan generation Assets alone.

The conclusions for lesser black-backed gull and herring gull for Morgan Generation Assets alone are also considered applicable to the breeding seabird assemblage of the SPA of which lesser black-backed gull and herring gull are constituent features for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for lesser black-backed gull, it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

The in-combination collision risk impact applicable to herring gull at the SPA is considered to represent less than a 1.0% increase in the baseline mortality of the SPA population. However, there are several reasons, including a lack of connectivity between birds from the SPA and projects considered in-combination, why these figures are considered to be unrealistically high. The predicted impact magnitude is considered to represent less than a 1% increase in baseline mortality of the SPA population when taking into account the best available evidence in relation to parameters incorporated into collision risk modelling, the approach to apportioning and the as-built scenarios deployed for projects considered in-combination that provide significantly lower collision impacts than assessed as part of the project-specific applications. On this basis, there is considered to be no adverse effect on the herring gull feature of the SPA from Morgan Generation Assets alone in-combination with other plans and projects. As a result, it is concluded beyond reasonable scientific that there is no potential for adverse effect on site integrity in relation to collision risk for herring gull from this SPA.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the lesser black-backed gull and herring gull features of the SPA from the Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which lesser black-backed gull and herring gull are constituent features.

Table 1.29: Integrity matrix for offshore ornithological features of the Ribble and Alt Estuaries SPA.

European Site: Ribble and Alt Estuaries SPA Distance to Morgan Array Area: 51.0 km						
European site qualifying feature	**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Lesser black-backed gull		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Collision risk** –

The predicted collision risk for lesser black-backed gull represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to collision risk for lesser black-backed gull from this SPA for the Morgan Generation Assets alone.

The conclusion reached for lesser black-backed gull is also considered applicable to the breeding seabird assemblage of the SPA of which lesser black-backed gull is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from the Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for lesser black-backed gull it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the lesser black-backed gull feature of the SPA from the Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which lesser black-backed gull is a constituent feature.

Table 1.30: Integrity matrix for offshore ornithological features of the Bowland Fells SPA.

European Site: Bowland Fells SPA Distance to Morgan Array Area: 70.0 km						
European site qualifying feature	**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Lesser black-backed gull		× a			× b	

a. **Collision risk** – The predicted collision risk for lesser black-backed gull represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to collision risk for lesser black-backed gull from this SPA for the from the Morgan Generation Assets alone.

b. **In-combination effects** – As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for lesser black-backed gull it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the lesser black-backed gull feature of the SPA from Morgan Generation Assets in-combination with other plans and projects.

Table 1.31: Integrity matrix for offshore ornithological features of the Copeland Islands SPA.

European Site: Copeland Islands SPA Distance to Morgan Array Area: 112.3 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Manx shearwater		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The predicted displacement impact for Manx shearwater represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure for Manx shearwater from this SPA for the Morgan Generation Assets alone.

b. **In-combination effects** – As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for Manx shearwater it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the Manx shearwater feature of the SPA from Morgan Generation Assets in-combination with other plans and projects.

Table 1.32: Integrity matrix for offshore ornithological features of the Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA.

European Site: Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA Distance to Morgan Array Area: 128.7 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Manx shearwater		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The predicted displacement impact for Manx shearwater represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for Manx shearwater from this SPA for the Morgan generation Assets alone.

b. **In-combination effects** – As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for Manx shearwater it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the Manx shearwater feature of the SPA from Morgan Generation Assets in-combination with other plans and projects.

Table 1.33: Integrity matrix for offshore ornithological features of the Lambay Island SPA.

European Site: Lambay Island SPA Distance to Morgan Array Area: 130.4 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× a			× a			× d	
Herring gull (non-breeding season)					× b			× d	
Guillemot (non-breeding season)		× c						× d	
Razorbill (non-breeding season)		× c						× d	
Breeding seabird assemblage		× a, b, c			× a, b, c			× d	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts, for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with the collision risk impact, for kittiwake from this SPA for the Morgan generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from the Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone.

b. **Collision risk**

The predicted collision risk for herring gull represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there

is no potential for adverse effect on site integrity in relation to collision risk impacts for herring gull from this SPA for the Morgan generation Assets alone.

There is considered to be no adverse effect on the herring gull feature of the SPA from the Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which herring gull is a constituent feature for Morgan Generation Assets alone.

c. **Disturbance and displacement from airborne sound and the presence of vessels and infrastructure**

The predicted displacement impact for guillemot and razorbill represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill from this SPA for the Morgan generation Assets alone.

There is considered to be no adverse effect on the guillemot and razorbill features of the SPA from the Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot and razorbill are constituent features for Morgan Generation Assets alone.

d. **In-combination effects** –

As the impact from Morgan generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for all features it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake, herring gull, guillemot and razorbill features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake, herring gull, guillemot and razorbill are constituent features.

Table 1.34: Integrity matrix for offshore ornithological features of the Ireland's Eye SPA.

European Site: Ireland's Eye SPA Distance to Morgan Array Area: 138.6 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impact, for kittiwake represents less than a 1.0% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to the disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk impact, for kittiwake from this SPA for Morgan Generation Assets alone.

b. **In-combination effects** –

The predicted in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for kittiwake represents less than a 1.0% increase in the baseline mortality of the SPA population. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for kittiwake from this SPA for the Morgan Generation Assets in-combination with other plans and projects.

The predicted in-combination collision risk impact for kittiwake is considered to represent less than a 1.0% increase in the baseline mortality of the SPA population. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to the collision risk impact for kittiwake from this SPA for the Morgan Generation Assets in-combination with other plans and projects.

The predicted in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure, combined with in-combination collision risk impact, for kittiwake is considered to represent less than a 1% increase in baseline mortality of the relevant SPA populations when taking into account the best available evidence in relation to parameters incorporated into both collision and displacement analyses and the as-built scenarios deployed for projects considered in-

combination that provide significantly lower collision impacts than assessed as part of the project-specific applications. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure collision risk impact for kittiwake from this SPA for Morgan Generation Assets in-combination with other plans and projects.

Table 1.35: Integrity matrix for offshore ornithological features of the Howth Head Coast SPA.

European Site: Howth Head Coast SPA Distance to Morgan Array Area: 139.3 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –** The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 1.0% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

b. **In-combination effects** – The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with the collision risk impact, for kittiwake is considered to represent less than a 1.0% increase in the baseline mortality of the SPA population. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to the in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure, combined with in-combination collision risk impact for kittiwake from this SPA for Morgan Generation Assets in-combination with other plans and projects.

Table 1.36: Integrity matrix for offshore ornithological features of the Ailsa Craig SPA.

European Site: Ailsa Craig SPA Distance to Morgan Array Area: 142.3 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Gannet		× a			× a			× b	
Kittiwake		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for the kittiwake feature of this SPA for Morgan generation Assets alone.

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of the SPA population for gannet. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for the gannet feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake and gannet features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake and gannet are constituent features for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from the Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for kittiwake and gannet it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake and gannet features of the SPA from the Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake and gannet are constituent features.

Table 1.37: Integrity matrix for offshore ornithological features of the Wicklow Head SPA.

European Site: Wicklow Head SPA Distance to Morgan Array Area: 165.4 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –** The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

b. **In-combination effects** – As the impact from the Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake features of the SPA from Morgan Generation Assets in-combination with other plans and projects.

Table 1.38: Integrity matrix for offshore ornithological features of the Rathlin Island SPA.

European Site: Rathlin Island SPA Distance to Morgan Array Area: 186.1 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× b			× b			× c	
Breeding seabird assemblage		× a, b			× b			× c	
Guillemot (non-breeding season)		× a						× c	
Razorbill (non-breeding season)		× a						× c	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** –

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represent less than a 0.05% increase in the baseline mortality of the SPA population. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for razorbill represent less than a 0.05% increase in the baseline mortality of the SPA population. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the razorbill feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot and razorbill features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake, guillemot and razorbill are constituent features for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk** –

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represent less than a 0.05% increase in the baseline mortality of the SPA population for each feature from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake features of this SPA for the Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for kittiwake, guillemot and razorbill it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake, guillemot and razorbill features of the SPA from the Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake, guillemot and razorbill are constituent features.

Table 1.39: Integrity matrix for offshore ornithological features of the Skomer, Skokholm and the Seas off Pembrokeshire SPA.

European Site: Skomer, Skokholm and the Seas off Pembrokeshire SPA Distance to Morgan Array Area: 252.0 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× c			× c			× d	
Breeding seabird assemblage		× a			× b, c			× d	
Lesser black-backed gull (non-breeding seasons)					× b			× d	
Manx shearwater		× a						× d	
Guillemot (non-breeding season)									
Razorbill (non-breeding seasons)		× a						× d	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure -**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for razorbill represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the razorbill feature of this SPA for Morgan Generation Assets alone.

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for Manx shearwater represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation

Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt, that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the Manx shearwater feature of this SPA for the project alone.

There is considered to be no adverse effect on the guillemot, razorbill and Manx shearwater features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot, razorbill and Manx shearwater is a constituent feature for the Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **Collision risk –**

The predicted collision risk for lesser black-backed gull represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to collision risk for lesser black-backed gull from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the lesser black-backed gull feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which lesser black-backed gull is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represent less than a 0.05% increase in the baseline mortality of the SPA population for each feature from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake features of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone.

d. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for kittiwake, lesser black-backed gull, guillemot, razorbill and Manx shearwater it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake, lesser black-backed gull, guillemot, razorbill and Manx shearwater features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake, lesser black-backed gull, guillemot, razorbill and Manx shearwater are constituent features.

Table 1.40: Integrity matrix for offshore ornithological features of the North Colonsay and Western Cliffs SPA.

European Site: North Colonsay and Western Cliffs SPA Distance to Morgan Array Area: 257.6 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× b			× b			× c	
Guillemot (non-breeding season)		× a						× c	
Breeding seabird assemblage		× b			× b			× c	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure -**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for kittiwake and guillemot it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake feature of the SPA from the Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake and guillemot are constituent features.

Table 1.41: Integrity matrix for offshore ornithological features of the Grassholm SPA.

European Site: Grassholm SPA Distance to Morgan Array Area: 260.3 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Gannet		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk** – The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone . This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet from this SPA for Morgan Generation Assets alone.

b. **In-combination effects** – As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for gannet it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact. As a result, it is concluded beyond reasonable scientific doubt, that there is no potential for adverse effect on the gannet feature of the SPA from Morgan Generation Assets in-combination with other plans and projects.

Table 1.42: Integrity matrix for offshore ornithological features of the Saltee Islands SPA.

European Site: Saltee Islands SPA Distance to Morgan Array Area: 265.9 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Gannet		× a			× a			× c	
Kittiwake		× a			× a			× c	
Guillemot (non-breeding season)		× b						× c	
Razorbill (non-breeding seasons)		× b						× c	
Breeding seabird assemblage		× a, b			× a, b			× c	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for the kittiwake feature of this SPA for Morgan Generation Assets alone.

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of the SPA population for gannet from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for the gannet feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake and gannet features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake and gannet are constituent features for Morgan Generation Assets alone.

b. **Disturbance and displacement from airborne sound and the presence of vessels and infrastructure**

The predicted displacement impact for guillemot and razorbill represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill from this SPA for the Morgan generation Assets alone.

There is considered to be no adverse effect on the guillemot and razorbill features of the SPA from the Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot and razorbill are constituent features for Morgan Generation Assets alone.

c. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for kittiwake, gannet, guillemot and razorbill it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake, gannet, guillemot and razorbill features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake, gannet, guillemot and razorbill are constituent features.

Table 1.43: Integrity matrix for offshore ornithological features of the Mingulay and Berneray SPA.

European Site: Mingulay and Berneray SPA Distance to Morgan Array Area: 370.3 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Guillemot (non-breeding season)		× a			× b	
Razorbill (non-breeding season)		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

The predicted displacement impact for razorbill represents less than a 0.05% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for razorbill from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the razorbill feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which razorbill is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for guillemot and razorbill it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the guillemot and razorbill features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot and razorbill are constituent features.

Table 1.44: Integrity matrix for offshore ornithological features of the Shiant Isles SPA.

European Site: The Shiant Isles SPA Distance to Morgan Array Area: 442.5 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Razorbill (non-breeding season)		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for razorbill represents less than a 0.05% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for razorbill from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the razorbill feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which razorbill is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for razorbill it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the razorbill feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which razorbill is a constituent feature.

Table 1.45: Integrity matrix for offshore ornithological features of the Isles of Scilly SPA/Isles of Scilly Ramsar.

European Site: Isles of Scilly SPA/Isles of Scilly Ramsar Distance to Morgan Array Area: 464.8 km						
European site qualifying feature	**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Lesser black-backed gull (non-breeding season)					× a	
Great black-backed gull (non-breeding season)					× a	
Manx shearwater		× b				
Breeding seabird assemblage		× b			× a	

a. **Collision risk –**

The predicted collision risk for lesser black-backed gull represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt, that there is no potential for adverse effect on site integrity in relation to collision risk for lesser black-backed gull from this SPA for Morgan Generation Assets alone.

The predicted impact for great black-backed gull represents less than a 1.0% increase in the baseline mortality of the SPA population . As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to collision risk for great black-backed gull from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the lesser black-backed gull and great black-backed gull features of the SPA from Morgan Generation Assets alone. These conclusions are also considered applicable to the breeding seabird assemblage of the SPA of which lesser black-backed gull and great black-backed gull are constituent features. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** –

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for Manx shearwater represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the Manx shearwater feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the Manx shearwater feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which Manx shearwater is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **In-combination effects** –

As the impact from the project alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for lesser black-backed gull it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

The in-combination collision risk impact applicable to great black-backed gull at the SPA is considered to represent less than a 1.0% increase in the baseline mortality of the SPA population. However, there are several reasons, including a lack of connectivity between birds from the SPA and projects considered in-combination, why these figures are considered to be unrealistically high. The predicted impact magnitude is considered to represent less than a 1% increase in baseline mortality of the SPA population when taking into account the best available evidence in relation to parameters incorporated into collision risk modelling and the as-built scenarios deployed for projects considered in-combination that provide significantly lower collision impacts than assessed as part of the project-specific applications. On this basis, there is considered to be no potential for adverse effect on site integrity in relation to collision risk for great black-backed gull from this SPA for Morgan Generation Assets alone in-combination with other plans and projects.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the great black-backed gull feature of the SPA from Morgan Generation Assets alone in-combination with other plans and projects. These conclusions are also considered applicable to the breeding seabird assemblage of the SPA of which great black-backed gull is a constituent feature.

Table 1.46: Integrity matrix for offshore ornithological features of the Handa SPA.

European Site: The Handa SPA Distance to Morgan Array Area: 480.2 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Guillemot (non-breeding season)		× a			× b	
Razorbill (non-breeding season)		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted displacement impact for guillemot represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot from this SPA for Morgan Generation Assets alone.

The predicted displacement impact for razorbill represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for razorbill from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot and razorbill features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot and razorbill are constituent features. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for guillemot and razorbill it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the guillemot and razorbill features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot and razorbill are constituent features.

Table 1.47: Integrity matrix for offshore ornithological features of the St Kilda SPA.

European Site: St Kilda SPA Distance to Morgan Array Area: 490.4 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Guillemot (non-breeding season)		× b						× c	
Gannet (non-breeding season)		× a			× a			× c	
Breeding seabird assemblage		× a, b			× a			× c	
Fulmar		× b						× c	
Manx shearwater		× b						× c	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represent less than a 0.05% increase in the baseline mortality of the SPA population for each feature from Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the gannet feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for guillemot represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of

baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for fulmar represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the fulmar feature of this SPA for Morgan Generation Assets alone.

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for Manx shearwater represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the Manx shearwater feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot, fulmar and Manx shearwater features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot, fulmar and Manx shearwater are constituent features. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for guillemot, gannet, fulmar and Manx shearwater it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the guillemot, gannet, fulmar and Manx shearwater features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot, gannet, fulmar and Manx shearwater are constituent features.

Table 1.48: Integrity matrix for offshore ornithological features of the Cape Wrath SPA.

European Site: Cape Wrath SPA Distance to Morgan Array Area: 502.3 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake (non-breeding seasons)		× b			× b			× c	
Guillemot (non-breeding seasons)		× a						× c	
Breeding seabird assemblage		× a, b			× b			× c	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represent less than a 0.05% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

Disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represent less than a 0.05% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake features of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake features of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for guillemot it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

The predicted in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for kittiwake represents less than a 1.0% increase in the baseline mortality of the SPA population. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for kittiwake from this SPA for the Morgan Generation Assets in-combination with other plans and projects.

The predicted in-combination collision risk impact, for kittiwake is considered to represent less than a 1% increase in baseline mortality of the relevant SPA populations when taking into account the best available evidence in relation to parameters incorporated into both collision and displacement analyses, and the as-built scenarios deployed for projects considered in-combination, that provide significantly lower collision impacts than assessed as part of the project-specific applications. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure collision risk impact for kittiwake from this SPA for Morgan Generation Assets in-combination with other plans and projects.

The predicted in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure, combined with in-combination collision risk impact, for kittiwake is considered to represent less than a 1% increase in baseline mortality of the relevant SPA populations when taking into account the best available evidence in relation to parameters incorporated into both collision and displacement analyses and the as-built scenarios deployed for projects considered in-combination that provide significantly lower collision impacts than assessed as part of the project-specific applications. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure collision risk impact for kittiwake from this SPA for Morgan Generation Assets in-combination with other plans and projects.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake and guillemot features of the SPA from the project in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake and guillemot are constituent features.

Table 1.49: Integrity matrix for offshore ornithological features of the Flannan Isles SPA.

European Site: Flannan Isles SPA Distance to Morgan Array Area: 510.8 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Guillemot (non-breeding seasons)		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represent less than a 1.0% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

The predicted in-combination disturbance and displacement from airborne sound, presence of vessels and infrastructure, plus collision risk impact for guillemot is considered to represent less than a 1.0% increase in the baseline mortality of the SPA population populations when taking into account the best available evidence in relation to parameters incorporated into the displacement analyses and the approach to apportioning. On this basis, there is considered to be no potential for adverse effect on site integrity in relation to the disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot from this SPA for Morgan Generation Assets in-combination with other plans and projects.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the guillemot features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

Table 1.50: Integrity matrix for offshore ornithological features of the North Rona and Sula Sgeir SPA.

European Site: North Rona and Sula Sgeir SPA Distance to Morgan Array Area: 567.8 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Gannet (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the gannet feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature for the Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for gannet it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the gannet feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature.

Table 1.51: Integrity matrix for offshore ornithological features of the Buchan Ness to Collieston Coast SPA.

European Site: Buchan Ness to Collieston Coast SPA Distance to Morgan Array Area: 385.7 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population for Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature.

Table 1.52: Integrity matrix for offshore ornithological features of the East Caithness Cliffs SPA.

European Site: East Caithness Cliffs SPA Distance to Morgan Array Area: 449.8 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature.

Table 1.53: Integrity matrix for offshore ornithological features of the Flamborough and Filey Coast SPA.

European Site: Flamborough and Filey Coast SPA Distance to Morgan Array Area: 233.5 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature.

Table 1.54: Integrity matrix for offshore ornithological features of the Forth Islands SPA.

European Site: Forth Islands SPA Distance to Morgan Array Area: 219.9 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Gannet (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the gannet feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for gannet it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the gannet feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature.

Table 1.55: Integrity matrix for offshore ornithological features of the Hermaness, Saxa Vord and Valla Field SPA.

European Site: Hermaness, Saxa Vord and Valla Field SPA Distance to Morgan Array Area: 763.5 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Gannet (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the gannet feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for gannet it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the gannet feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature.

Table 1.56: Integrity matrix for offshore ornithological features of the Rum SPA.

European Site: Rum SPA Distance to Morgan Array Area: 340.7 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Manx shearwater		× a			× b	
Breeding seabird assemblage		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for Manx shearwater represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for Manx shearwater from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the Manx shearwater feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which Manx shearwater is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for Manx shearwater it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the Manx shearwater feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which Manx shearwater is a constituent feature.

Table 1.57: Integrity matrix for offshore ornithological features of the Sule Skerry and Sule Stack SPA.

European Site: Sule Skerry and Sule Stack SPA Distance to Morgan Array Area: 548.9 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Guillemot (non-breeding season)		× b						× c	
Gannet (non-breeding seasons)		× a			× a			× c	
Breeding seabird assemblage		× a			× a			× c	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet represents less than a 0.05% increase in the baseline mortality of SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for gannet from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the gannet feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which gannet is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure –**

The predicted disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts for guillemot represent less than a 1.0% increase in the baseline mortality of the SPA population from Morgan Generation Assets alone. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the guillemot feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

c. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA populations for guillemot and gannet it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the guillemot and gannet features of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which guillemot and gannet are constituent features.

Table 1.58: Integrity matrix for offshore ornithological features of the Troup, Pennan and Lion's Heads SPA.

European Site: Troup, Pennan and Lion's Heads SPA Distance to Morgan Array Area: 414.7 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature.

Table 1.59: Integrity matrix for offshore ornithological features of the West Westray SPA.

European Site: West Westray SPA Distance to Morgan Array Area: 580.3 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake (non-breeding seasons)		× a			× a			× b	
Breeding seabird assemblage		× a			× a			× b	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk –**

The predicted disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake represents less than a 0.05% increase in the baseline mortality of the SPA population from the Morgan Generation Assets alone. This magnitude of impact is considered not detectable within the population and within the natural variation of baseline survival rates. As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on site integrity in relation to disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision impacts for kittiwake from this SPA for Morgan Generation Assets alone.

There is considered to be no adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets alone. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature for Morgan Generation Assets alone. There are no impact pathways affecting other species that form part of the assemblage at the SPA.

b. **In-combination effects** –

As the impact from Morgan Generation Assets alone represents less than a 0.05% increase in the baseline mortality of the SPA population for kittiwake it is considered that the Morgan Generation Assets will not make a measurable contribution to any existing in-combination impact.

As a result, it is concluded beyond reasonable scientific doubt that there is no potential for adverse effect on the kittiwake feature of the SPA from Morgan Generation Assets in-combination with other plans and projects. This conclusion is also considered applicable to the breeding seabird assemblage of the SPA of which kittiwake is a constituent feature.

Table 1.60: Integrity matrix for offshore ornithological features of the Irish Sea Front SPA.

European Site: Irish Sea Front SPA Distance to Morgan Array Area: 56.7 km						
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**
Manx shearwater		× a			× b	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** –It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure from Morgan Generation Assets alone have been reached for SPAs from which Manx shearwaters forage within the Irish Sea SPA. These conclusions are considered applicable to the Irish Sea Front SPA and therefore no adverse effect is concluded.

b. **In-combination effects –** It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure from Morgan Generation Assets in-combination with other plans and projects have been reached for SPAs from which Manx shearwaters forage within the Irish Sea Front SPA. These conclusions are considered applicable to the Irish Sea Front SPA and therefore no adverse effect is concluded.

Table 1.61: Integrity matrix for offshore ornithological features of the North-west Irish Sea SPA.

European Site: North-west Irish Sea SPA Distance to Morgan Array Area: 88.2 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Kittiwake		× a			× a			× d	
Herring gull (non-breeding season)					× b			× d	
Guillemot (non-breeding season)		× c						× d	
Razorbill (non-breeding season)		× c						× d	

a. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk** – It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure combined with collision risk impacts from Morgan Generation Assets alone have been reached for SPAs from which kittiwake forage within the North-west Irish Sea SPA. These conclusions are considered applicable to the North-west Irish Sea SPA and therefore no adverse effect is concluded.

b. **Collision risk** – It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with collision risk impacts from Morgan Generation Assets alone have been reached for SPAs from which herring gull forage within the North-west Irish Sea SPA. These conclusions are considered applicable to the North-west Irish Sea SPA and therefore no adverse effect is concluded.

c. **Disturbance and displacement from airborne sound and the presence of vessels and infrastructure** – It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure combined with collision risk impacts from Morgan Generation Assets alone have been reached for SPAs from which guillemot and razorbill forage within the North-west Irish Sea SPA. These conclusions are considered applicable to the North-west Irish Sea SPA and therefore no adverse effect is concluded.

d. **In-combination effects –** It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound, presence of vessels and infrastructure and/or collision risk impacts from Morgan Generation Assets in-combination with other plans and projects have been reached for SPAs from which

kittiwake, herring gull, guillemot and razorbill forage within the North-west Irish Sea SPA. These conclusions are considered applicable to the North-west Irish Sea SPA and therefore no adverse effect is concluded.

Table 1.62: Integrity matrix for offshore ornithological features of the Seas off St Kilda SPA.

European Site: Seas off St Kilda SPA Distance to Morgan Array Area: 474.3 km									
European site qualifying feature	**Disturbance and displacement from airborne sound and presence of vessels and infrastructure**			**Collision risk**			**In-combination effects**		
	C	**O&M**	**D**	**C**	**O&M**	**D**	**C**	**O&M**	**D**
Guillemot (non-breeding season)		× a						× c	
Fulmar		× a						× c	
Gannet		× b			× b			× c	

a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure**

It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure from Morgan Generation Assets alone have been reached for SPAs from which guillemots forage within the Seas off St Kilda SPA. These conclusions are considered applicable to the Seas off St Kilda SPA and therefore no adverse effect is concluded.

It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure from Morgan Generation Assets alone have been reached for SPAs from which fulmars forage within the Irish Sea SPA. These conclusions are considered applicable to the Seas off St Kilda SPA and therefore no adverse effect is concluded.

b. **The impact of disturbance and displacement from airborne sound and the presence of vessels and infrastructure, combined with collision risk**

It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure combined with collision risk impacts from Morgan Generation Assets alone have been reached for SPAs from which gannet forage within the Seas off St Kilda SPA. These conclusions are considered applicable to the Seas off St Kilda SPA and therefore no adverse effect is concluded.

c. **In-combination effects –**

It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure from Morgan Generation Assets in-combination with other plans and projects have been reached for SPAs from which fulmar forage within the Seas off St Kilda SPA. These conclusions are considered applicable to the Seas off St Kilda SPA and therefore no adverse effect is concluded.

It was concluded that beyond reasonable doubt that that there is no potential for adverse effect associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure combined with collision risk from Morgan Generation Assets in-combination with other plans and projects have been reached for SPAs from which gannet forage within the Seas off St Kilda SPA. These conclusions are considered applicable to the Seas off St Kilda SPA and therefore no adverse effect is concluded.

1.3 References

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