

# MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

## HRA Stage 1 Screening Report

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Image of an offshore wind farm

**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**

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## MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

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## MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

### Glossary

Term	Meaning
Applicant	Morgan Offshore Wind Limited.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Morgan Generation Assets.
European sites	A Special Area of Conservation (SAC), possible SAC (pSAC), or candidate SAC, (cSAC), a Special Protection Area (SPA) or potential SPA (pSPA), a site listed as a site of community importance (SCI).
Evidence Plan Expert Working Group (EWG)	Expert working groups set up with relevant stakeholders as part of the Evidence Plan process.
Evidence Plan Process	The Evidence Plan process 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.
Inter-array cables	Cables which connect the wind turbines to each other and to the offshore substation platforms (OSPs). Inter-array cables will carry the electrical current produced by the wind turbines to the offshore substation platforms (OSPs).
Interconnector cables	Cables that may be required to interconnect the offshore substation platforms (OSPs) in order to provide redundancy in the case of cable failure elsewhere.
Intertidal area	The area between Mean High Water Springs (MHWS) and Mean Low Water Springs.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for a DCO to apply for 'deemed marine licences' as part of the DCO process.
Maximum design scenario (MDS)	The scenario within the design envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.
Morgan Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables and Offshore Substation Platforms (OSPs) forming part of the Morgan Offshore Wind Project will be located.
Morgan Offshore Wind Project	The Morgan Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities.
Morgan Scoping Report	The Morgan Scoping Report that was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan Generation Assets.
National Policy Statement (NPS)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023.
Non-statutory consultee	Organisations that an Applicant may choose to consult in relation to a project who are not designated in law but are likely to have an interest in the project.
Offshore Wind Leasing Round 4	The Crown Estate auction process which allocated developers preferred bidder status on areas of the seabed within Welsh and English waters.

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Term	Meaning
Relevant Local Planning Authority	The Relevant Local Planning Authority is the Local Authority in respect of an area within which a project is situated, as set out in section 173 of the Planning Act 2008. Relevant Local Planning Authorities may have responsibility for discharging requirements and some functions pursuant to the DCO, once made.
Statutory consultee	Organisations that are required to be consulted by an applicant pursuant to the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
The Secretary of State for Energy Security and Net Zero	The decision maker with regards to the application for development consent for the Morgan Generation Assets.
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.

## Acronyms

Term	Meaning
BDMPS	Biologically Defined Minimum Population Scales
CRM	Collision Risk Modelling
CTV	Crew Transfer Vessel
DCO	Development Consent Order
EC	European Commission
EDR	Effective Deterrence Range
<b>EIA</b>	Environmental Impact Assessment
EMF	Electromagnetic Field
EnBW	Energie Baden – Württemberg
EU	European Union
EWG	Expert Working Group
FCS	Favourable Conservation Status
HNDR	Holistic Network Design Review
HRA	Habitats Regulations Assessment
IMO	International Maritime Organisation
IMWWG	Inter-agency Marine Mammal Working Group
iPCoD	Interim Population Consequences of Disturbance Model
IROPI	Imperative Reasons of Overriding Public Interest
ISAA	Information to Support an Appropriate Assessment
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide



## MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Term	Meaning
LSE	Likely Significant Effect
MARPOL	International convention for the prevention for the pollution from ships
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MPCP	Marine Pollution Contingency Plan
MU	Management Unit
NGESO	National Grid Electricity System Operator
NMFS	National Marine Fisheries Service
NPS	National Policy Statement
NRW	National Resources Wales
NSIP	Nationally Significant Infrastructure Project
NWWT	North West Wildlife Trusts
OSP	Offshore Substation Platform
OSPAR	Oslo-Paris
OTNR	Offshore Transmission Network Review
PEIR	Preliminary Environmental Information Report
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCI	Site of Community Interest
SCOS	Special Committee on Seals
SD	Standard Deviation
SNCB	Statutory Nature Conservation Committee
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
TCE	The Crown Estate
TWT	The Wildlife Trusts
UWSMS	Underwater Sound Management Strategy
UXO	Unexploded Ordnance
VHF	Very High Frequency
ZoI	Zone of Influence

## MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

### Units

Unit	Description
dB	Decibel
GW	Gigawatt
MW	Megawatt
nm	Nautical mile
km	Kilometre
km <sup>2</sup>	Square kilometre
kn	Knots
m	Metre
mm	Millimetre
mg/l	Milligrams per litre
m/s	Metres per second
LAT	Lowest Astronomical Tide
μPa	Micropascal

# **1 Habitats Regulations Assessment stage 1 screening**

## **1.1 Introduction**

### **1.1.1 Overview**

1.1.1.1 Morgan Offshore Wind Limited (the Applicant), a joint venture of bp Alternative Energy Investments Ltd. (hereafter referred to as bp) and Energie Baden-Württemberg AG (hereafter referred to as EnBW) is developing the Morgan Offshore Wind Project: Generation Assets (hereafter Morgan Generation Assets). The Morgan Generation Assets is a proposed wind farm located in the east Irish Sea.

1.1.1.2 In February 2021, EnBW and bp were selected by The Crown Estate (TCE) as Preferred Bidder for two 60-year leases in Offshore Wind Leasing Round 4. The Applicant entered into agreement for lease for the Morgan Offshore Wind Project in early 2023.

1.1.1.3 This report documents the conclusions of the Habitats Regulations Assessment (HRA) Stage 1 Screening for LSE that has been undertaken for the Morgan Generation Assets.

1.1.1.4 The Morgan Generation Assets is an offshore generating station with a capacity of greater than 100 MW located wholly in English waters, it is a Nationally Significant Infrastructure Project (NSIP) as defined by section 15(3) of the Planning Act 2008 (as amended) (the 2008 Act). As such, there is a requirement to submit an application for a Development Consent Order (DCO) to the Planning Inspectorate to be decided by the Secretary of State for the Department for Energy Security and Net Zero. A Marine Licence is required before carrying out any licensable marine activity under the Marine and Coastal Access Act 2009. Marine licences can be deemed under the DCO for licensable activities in English waters.

### **1.1.2 Morgan and Morecambe Offshore Windfarms: Transmission Assets**

1.1.2.1 The Morgan Generation Assets has been scoped into the Pathways to 2030 workstream under the Offshore Transmission Network Review (OTNR). The OTNR aims to consider, simplify and wherever possible facilitate collaborative approach to offshore wind projects connecting to the UK National Grid. Under the OTNR, the National Grid Electricity System Operator (NGESO) is responsible for assessing options to improve the coordination of offshore wind generation connections and transmission networks and has undertaken a Holistic Network Design Review (HNDR). In July 2022, the UK Government published the 'Pathway to 2030 Holistic Network Design' documents, which set out the approach to connecting 50 GW of offshore wind to the National Grid (NGESO, 2022). A key output of the HNDR process was the conclusion that the Morgan Generation Assets and the Morecambe Offshore Windfarm should work collaboratively in connecting their two wind farms to the National Grid electricity transmission network at Penwortham in Lancashire. Although the projects are being developed by separate companies, which means it is not feasible for all aspects of both projects to be consented under a single application, the Applicant intends to deliver a coordinated grid connection with the Morecambe Offshore Windfarm, including the sharing of offshore and onshore export cable corridors and grid connection location at Penwortham.

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- 1.1.2.2 Given the grid connection arrangements, the consenting strategy for the Morgan Generation Assets and the Morecambe Offshore Windfarm Generation Assets is as follows:
- A stand-alone DCO application to consent the construction, operations and maintenance, and decommissioning of the generation assets of the Morgan Offshore Wind Project
  - A stand-alone DCO application to consent the construction, operations and maintenance, and decommissioning of the generation asset of the Morecambe Offshore Windfarm Generation Assets
  - A separate application to consent the construction, operations and maintenance and decommissioning of the transmission assets required to enable the export of electricity from both the Morgan Generation Assets and the Morecambe Offshore Windfarm Generation Assets to the National Grid entry point at Penwortham.
- 1.1.2.3 In order to achieve this, the Applicant, together with the applicant for the Morecambe Offshore Windfarm Generation Assets, has requested, and been granted, a direction from the Secretary of State under section 35 of the 2008 Act to pursue a transmission assets consent (covering both projects' offshore and onshore transmission infrastructure) through the DCO process.
- 1.1.2.4 Key reasons for selecting this approach to consenting the projects' transmission assets are that it:
- Allows for better consideration of potential impacts (including cumulative impacts)
  - Ensures more efficient use of stakeholder resources
  - Provides a formal structure for the projects to collaborate and align on transmission design, assessment and mitigation approach
  - Streamlines the consenting process with a single permission and approval timeline
  - Aligns with the National Policy Statements (NPSs) for delivering major energy infrastructure (Overarching Energy (EN-1) (Department for Energy Security and Net Zero, 2023). More detail on the NPSs can be found in Volume 1, Chapter 2: Policy and legislative context of the Environmental Statement (Document Reference F1.2).
- 1.1.2.5 This HRA Stage 1 Screening for LSE therefore solely relates to the Morgan Generation Assets.
- 1.1.3 Habitats Regulations Assessment**
- 1.1.3.1 This document has been produced to inform the HRA process for the Morgan Generation Assets. It provides information to enable the screening of the Morgan Generation Assets with respect to its potential to have a LSE on certain European sites, listed in paragraph 1.1.3.3. The scope of this document covers all relevant European sites and relevant qualifying interest features. European sites have been 'screened out' where no LSE from the Morgan Generation Assets have been predicted. Where LSE could not be ruled out at this stage the European sites have been 'screened in' and assessed further.
- 1.1.3.2 The requirement and process for the consideration of potential impacts of plans and projects on European sites have followed the European Union's (EU) Habitats Directive (Directive 92/43/EEC). In terrestrial areas of the UK and territorial waters out

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to 12 nm, the land and marine aspects of Habitats Directive and certain elements of the Wild Birds Directive (Directive 2009/147/EC) are transposed into UK law through The Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. In waters beyond 12 nm, The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) apply, which transpose the Habitats and Birds Directives into national law. These regulations are together referred to as the Habitats Regulations.

- 1.1.3.3 The Habitats Regulations require that an HRA must be carried out on all plans and projects that are likely to have significant effects on European sites, which include Special Areas of Conservation (SAC), candidate SAC, Sites of Community Importance (SCI), Special Protection Areas (SPAs), and as a matter of policy, possible SAC, potential SPAs and Ramsar sites (listed under the Ramsar Convention on Wetlands of International Importance – where also designated as a European site). It should be noted that in France SCIs are equivalent to SACs and are afforded the same protection under the Habitats Directive. Therefore, for the purposes of this assessment screened in French SCIs have been assessed in the same way as SACs.
- 1.1.3.4 In this report, and in accordance with guidance issued by the UK Government on the changes made by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, the term ‘European site’ has been retained to refer to the above sites protected in European Member States, England and Wales (Defra, 2021). However, where these sites are located in the UK, they no longer form part of the EU’s Natura 2000 ecological network and now form part of the National Site Network. European sites are defined in full in section 1.3.
- 1.1.3.5 HRA is a multi-stage process which helps to determine LSE, assesses adverse impact on the integrity of a European site, and examines alternative solutions and provides justification of Imperative Reasons of Overriding Public Interest, as required. The Defra (2021) guidance describes that the process can have up to three stages as outlined below:
- Screening (for which this HRA Stage 1 Screening Report applies) - the first stage involves a screening for LSE which is a simple assessment to check or screen if, in the absence of mitigation, a proposal:
    - Is directly connected with or necessary for the conservation management of a European site
    - Risks having a significant effect on a European site on its own or in combination with other proposals
  - Appropriate Assessment - the second stage is an Appropriate Assessment, which must be carried out if it is decided that there is a risk of a LSE on a European site or if there is not enough evidence to rule out a risk (as required by Article 6(3) of the Habitats Directive). The Appropriate Assessment should assess the LSEs of a proposal on the integrity of the site and its conservation objectives and consider ways to avoid or reduce (mitigate) any potential for an ‘Adverse Effect on the Integrity of the site’
  - Derogations - the third stage is known as a derogation (as outlined in Article 6(4) of the Habitats Directive) where, in certain circumstances, a proposal that has failed the integrity test may be allowed to go ahead. To decide if the proposal qualifies for a derogation, three legal tests must be applied. All three tests must be passed in sequence for a derogation to be granted:



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- There are no feasible alternative solutions that would be less damaging or avoid damage to the site
- The proposal needs to be carried out for imperative reasons of overriding public interest
- The necessary compensatory measures can be secured.

### 1.1.4 Purpose of the report

1.1.4.1 This document represents the Applicant's HRA Stage 1 Screening under the Habitats Regulations for the Morgan Generation Assets (as described in section 1.1.6). It comprises the screening stage and therefore provides information to enable the screening of the Morgan Generation Assets with respect to its potential to have an LSE on European sites.

1.1.4.2 The screening exercise presented in this report has been based on the baseline environment, as determined by site-specific surveys undertaken for the Morgan Generation Assets, and an understanding of the proposed activities associated with the Morgan Generation Assets. This HRA Stage 1 Screening Report has been updated to include refinements to the Morgan Generation Assets since the Preliminary Environmental Information Report (PEIR) was published. It has also been updated with the results of further site-specific surveys for the Morgan Generation Assets, and additional consultation which has been undertaken since PEIR.

1.1.4.3 In summary, the purpose of this report is:

- To identify the relevant European sites which may include features (Annex I habitats, Annex II species and ornithological features) which may be sensitive or vulnerable to potential impacts arising from the construction, operations and maintenance and decommissioning of the Morgan Generation Assets and for which there is a pathway for effect
- To identify the features of the relevant European sites and the potential impacts arising from the Morgan Generation Assets which have the potential to result in an LSE, either alone or in combination with other plans or projects, so that they can be taken forward for Appropriate Assessment.

### 1.1.5 Structure of the report

1.1.5.1 The structure of this HRA Stage 1 Screening Report is as follows:

- Section 1.1.8 – a brief summary of the HRA process and legislative framework including implications of the UK's departure from the EU
- Section 1.3 – the initial identification of European sites and features which have the potential to be affected by the Morgan Generation Assets
- Section 1.4 – HRA screening tables and the determination of the potential for LSEs to arise with regard to the designated features of the European sites under consideration
- Section 1.5 – a summary of the approach to the in-combination assessment
- Section 1.6 – a summary of the European sites and features for which the screening process has identified potential for LSEs.

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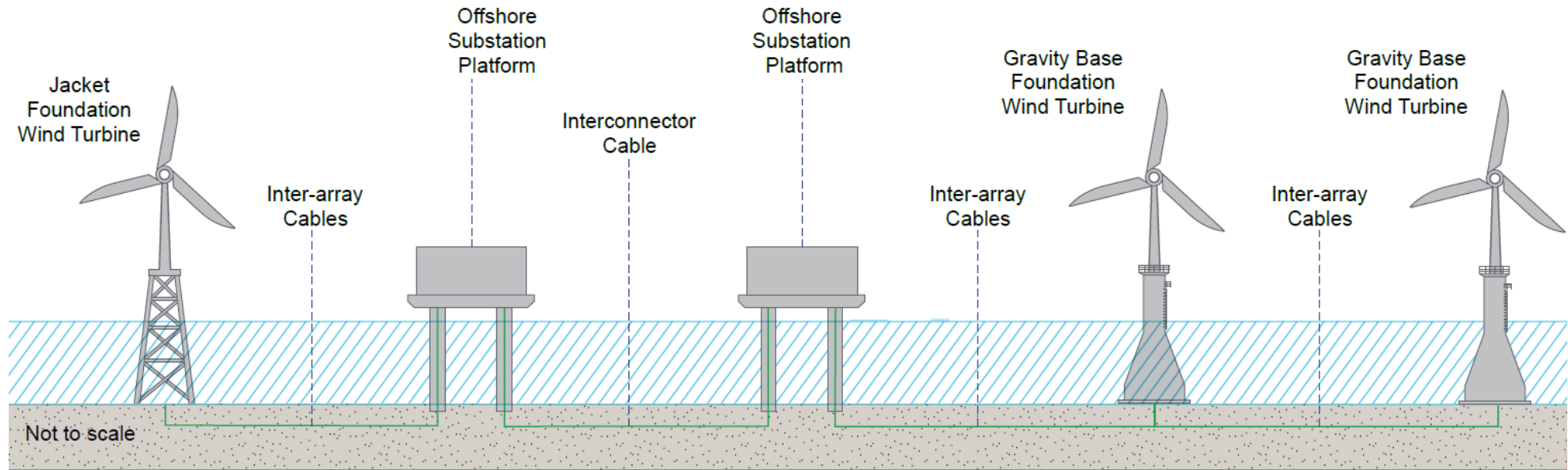
### 1.1.6 Project overview

- 1.1.6.1 An overview of the Morgan Generation Assets is outlined in the paragraphs below, and the full project description is provided in Volume 1, Chapter 3: Project description of the Environmental Statement (Document Reference F1.3).
- 1.1.6.2 The Morgan Array Area (i.e. the area within which the offshore wind turbines (up to 96) will be located) is 280 km<sup>2</sup> in area and is located 22.22 km (12 nm) from the Isle of Man coastline, 37.2 km (20.1 nm) from the northwest coast of England and 58.5 km (31.6 nm) from the Welsh coastline (Anglesey) (when measured from Mean High Water Springs (MHWS)). The Morgan Array Area is located wholly within English offshore waters (beyond 12 nm from the English coast).
- 1.1.6.3 The Morgan Generation Assets will be comprised of up to 96 wind turbines. The offshore infrastructure will also include up to 390 km of inter-array cables and 60 km of inter-connector cables. The key components of the Morgan Generation Assets include:
- Offshore wind turbines
  - Foundations (for wind turbines and Offshore Substation Platforms (OSPs))
  - OSPs
  - Scour protection
  - Cable protection
  - Inter-array cables linking the individual wind turbines to the OSPs
  - High Voltage Alternating Current transmission system including:
    - OSPs and their foundations
    - Offshore interconnector cable(s).
- 1.1.6.4 The key components of the Morgan Generation Assets are shown in Figure 1.1 and presented in Table 1.1.
- 1.1.6.5 The Applicant intends to commence construction of the Morgan Generation Assets in 2026 and for it to be fully operational by 2030 in order to help meet the UK Government renewable energy targets.
- 1.1.6.6 Although the TCE lease for the Morgan Generation Assets is 60 years, the design life of the Morgan Generation Assets is likely to be 35 years.

**Table 1.1: Key parameters for the Morgan Generation Assets.**

Parameter	Value
Morgan Array Area (km <sup>2</sup> )	280
Average water depth (m LAT)	-38.27
Maximum number of wind turbines	96
Maximum blade tip height above LAT (m)	364
Maximum number of OSPs	4
Maximum length of inter-array cables (km)	390
Maximum length of interconnector cables (km)	60

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**Figure 1.1: Key components of the Morgan Generation Assets infrastructure.**

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### 1.1.7 Relevant consultations

- 1.1.7.1 The Applicant facilitated the Evidence Plan Process for the Morgan Generation Assets. Evidence plans are formal mechanisms to agree what information the Applicant needs to supply to the Planning Inspectorate as part of an application for development consent. This also helps to ensure compliance with the Habitats Regulations and helps ensure Applicants provide sufficient information as part of their DCO application.
- 1.1.7.2 An evidence plan steering group was established for the Morgan and Mona Offshore Wind Projects. It was determined appropriate to have a joint evidence plan process across the Morgan and Mona Offshore Wind Projects to ensure common issues and cumulative/in-combination issues are appropriately addressed. The steering group comprised the Applicant, the Planning Inspectorate, National Resources Wales (NRW), Natural England, the Joint Nature Conservation Committee (JNCC) and the Marine Management Organisation (MMO) as the key regulatory bodies and Statutory Nature Conservation Body (SNCBs). The steering group met at key milestones throughout the Environmental Impact Assessment (EIA) process.
- 1.1.7.3 In addition, Expert Working Groups (EWGs) were established to discuss topic specific issues with relevant stakeholders. EWG meetings were held at key stages in the EIA process, to provide the opportunity for stakeholders to provide feedback and advice at an early stage. EWGs were established for the following topics:
- Physical processes, benthic ecology and fish and shellfish ecology
  - Marine mammals
  - Offshore ornithology.
- 1.1.7.4 A summary of the details of the key consultation on HRA screening is presented in Table 1.2.
- 1.1.7.5 The Scoping Opinion from the Planning Inspectorate was received on 22 July 2022 for the Morgan Generation Assets. These scoping responses were taken into account in the topic specific Environmental Statement chapters and have in turn been accounted for in this HRA Stage 1 Screening also. Table 1.2 also presents relevant Scoping responses which were identified as being directly applicable to this HRA Stage 1 Screening.

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**Table 1.2: Summary of key consultation on HRA screening for the Morgan Generation Assets.**

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
<b>Scoping Response</b>				
July 2022	Planning Inspectorate	Scoping Opinion	<ul style="list-style-type: none"> <li>Scoping Opinion for Morgan Generation Assets. It was advised that impacts from sediment-bound contaminants should be included within the Environmental Statement chapter for fish and shellfish receptors.</li> </ul>	<p>Feedback has been incorporated into the EIA, this HRA Stage 1 Screening Report sections 1.3.3 and 1.4.3. Feedback has also been incorporated into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).</p>
July 2022	Natural England and the MMO	Scoping Opinion	<ul style="list-style-type: none"> <li>Natural England advised that the consideration of LSE should include any functionally linked habitat outside of the designated site, including important habitat for mobile species that are qualifying features</li> <li>Should a LSE on an internationally designated site be identified or uncertain, the competent authority should undertake an Appropriate Assessment of the implications for the site in view of its conservation objectives</li> <li>The Morgan Generation Assets should have regard to the outcome of plan level HRA, and consider the NPS updates</li> <li>Natural England advised that the regional study area for each marine mammal receptor should be based on the relevant Management Unit (MU) for that receptor, insofar as the study area or MUs should be used to determine the appropriate reference population, Special Areas of Conservation (SACs) that should be screened in for consideration and for cumulative impacts spatial screening extent</li> <li>Carter <i>et al.</i> (2020) should also be used as a source of telemetry data for seals, which can inform the movements and origins of seals in the study area</li> <li>Recommendation of using updated SNCB guidance on CRM; further discussions on the methodology including parameterisation of models can be discussed at the Offshore Ornithological EWG</li> </ul>	<p>Feedback has been incorporated into the EIA, this HRA Stage 1 Screening Report and HRA Stage 2 ISAA Part 2 and Part 3 Assessments (Document Reference E1.2; E1.3). The recommendations for the screening of sites and designated species have been applied to sections 1.3.2, 1.3.3, 1.3.4 and 1.3.5. Comments relating to the assessment of these sites and designated features have been applied to sections 1.4.3, 1.4.4 and 1.4.5.</p> <p>This HRA Stage 1 Screening Report has regard to The Crown Estate Plan-Level HRA (described in section 1.2.4.</p> <p>Specific marine mammal MUs have been used as the initial screening extent for SACs in section 1.3.4.</p> <p>Tracking studies have been used to evidence connectivity in</p>



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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<ul style="list-style-type: none"> <li>For offshore ornithology, tracking studies should be used where available to evidence connectivity, or lack thereof, they should also be used to aid screening where possible.</li> </ul>	the initial screening of SPAs in section 1.3.5.
<b>Steering Group Meetings</b>				
<b>November 2021</b>	NRW, Natural England, MMO, JNCC and the Planning Inspectorate.	Steering Group meeting	<ul style="list-style-type: none"> <li>Meeting purpose was to set up and establish the Evidence Plan process and to gain feedback on the EWGs.</li> </ul>	N/A
<b>July 2022</b>	NRW, Natural England, MMO, JNCC and the Planning Inspectorate.	Steering Group meeting	<ul style="list-style-type: none"> <li>LSE Methodology circulated to members of the Steering Group to gain feedback and agreement on the methodology to be used</li> <li>Methodology approach presented included the process for identifying European sites and species where there is the potential for a LSE. The process and associated buffers used to screen in sites was presented for Annex I habitats (offshore and coastal), Annex II diadromous fish, Annex II marine mammals, Annex I habitats (onshore), Annex II species (onshore) and ornithology (onshore and offshore)</li> <li>NRW responses: <ul style="list-style-type: none"> <li>NRW agreed with the LSE Screening Methodology criteria that have been provided with respect to marine and coastal physical processes, benthic ecology</li> <li>NRW note that with reference to TCE Round 4 HRA principles, specifically section 3.6.17 – 3.6.23 Migratory Fish and Freshwater pearl mussel, and Figure 3.1 Proposed regional boundaries for Atlantic salmon (from ABPmer (2014), cited in ABPmer (2018)), that a 100 km buffer is used for most diadromous fish except Atlantic Salmon and Fresh Water Pearl Mussel, which use a 'Regional Areas Approach'</li> <li>NRW advised that TCE Round 4 HRA principles are adopted in their original form, or that further justification is provided if they are not</li> <li>NRW advised that all ornithological designated sites with named features whose foraging ranges fall within the mean maximum foraging range +1 Standard Deviation (SD) (Mean Max +1SD) in Woodward <i>et al</i> 2019, should be scoped in</li> </ul> </li> </ul>	Feedback received on the methodology has been considered and incorporated into section 1.2.6 and 1.3 of this HRA Stage 1 Screening report.

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<p>and included in the screening process. However, there is the possibility that using this approach could miss out some colonies, therefore a sense check will also need to be done to ensure that all colonies where there is a potential for LSE are included at the screening stage. Assessments should always be based upon the best and most up to date evidence available. Potential impacts on wintering bird features and the potential impacts on birds migrating to and from designated sites, along with estuarine SPA and SSSI features which could be affected by collision risk on migration, should also be included in scoping and screening. Due to the location of the proposed work it is likely that all Welsh SPAs and SSSIs with marine or estuarine bird features should be scoped in at this stage, until surveys are complete and data analysis has been finalised</p> <ul style="list-style-type: none"> <li>• JNCC responses: <ul style="list-style-type: none"> <li>– JNCC were content with the LSE Screening Methodology with respect to Annex I habitats offshore and Annex II marine mammals</li> <li>– JNCC advised the following with regard to species-specific foraging ranges for the identification of SPAs: <ul style="list-style-type: none"> <li>– Manx shearwater foraging range mean max + 1SD is 1,346.8 ± 1,018.7 km</li> <li>– Black-headed gull foraging range max is 18.5 km</li> <li>– Common tern foraging range mean max + 1SD is 18 ± 8.9 km</li> <li>– Roseate tern foraging range max is 24 km</li> <li>– For razorbill they advised the use of the foraging range within Appendix 1 of Woodward <i>et al</i> 2019 which excludes data from Fair Isle where the foraging range may have been unusually high as a result of reduced prey availability during the study year. Razorbill foraging range mean max + 1SD is 73.8 km ± 48.4 km and max is 191 km</li> <li>– For guillemot they advised the use of the foraging range within Appendix 1 of Woodward <i>et al</i> 2019 which excludes data from Fair Isle where the foraging range may have been unusually high as a result of reduced prey availability</li> </ul> </li> </ul> </li> </ul>	

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<p>during the study year. Guillemot foraging range mean max + 1SD is 55.5 km ± 39.7 km and max is 135 km</p> <ul style="list-style-type: none"> <li>– Black guillemot foraging range max of 8 km</li> <li>• In section 1.2.7.15, the JNCC noted the SNCB advice on the spatial extent of displacement impacts to seabirds and diver species other than red-throated diver is 4 km, and the spatial extent of displacement impacts to red-throated diver is 10 km, making the potential ZoI at least 10 km</li> <li>• No comment was made by Natural England on this approach during the Steering Group meeting.</li> </ul>	
<p><b>February 2023</b></p>	<p>NRW, Natural England, MMO, JNCC and the Planning Inspectorate</p>	<p>Steering Group meeting</p>	<ul style="list-style-type: none"> <li>• Approach to LSE screening for SPAs: <ul style="list-style-type: none"> <li>– The Applicant presented an updated HRA methodology as a result of feedback on the original approach to screening of SPAs, noting that the approach for the Environmental Statement will be as previously set out</li> <li>– The updated HRA methodology would look to screen SPAs and qualifying features out, where it can be demonstrated that there will be 0 mortalities (i.e. through Collision Risk Modelling (CRM), displacement or apportioning e.g. fulmar and Manx shearwater and CRM</li> <li>– The Applicant proposed to undertake a ‘two step’ integrity test. The first step would be to undertake a high level initial assessment within the ISAA, using the apportioning paper to present where there is no risk of adverse effects on integrity on an SPA and not including a detailed assessment against the conservation objectives for each low risk SPA (e.g. using a brief, tabulated approach to concluding no adverse effects on integrity). As The Mona Offshore Wind Project and Morgan Generation Assets have been suitably located; seabirds numbers across the sites area are generally low therefore a large number of SPAs are expected to fall into this low risk category, that is, most if not all of the SPAs and features which were screened out at LSE in the Environmental Statement</li> <li>– In the second step, a more detailed assessment would then be undertaken on the SPAs where there is a greater risk of</li> </ul> </li> </ul>	<p>Feedback received on the methodology has been considered and incorporated into section 1.3.5 and 1.4.5 and of this report and updates to the HRA Stage 2 ISAA – Part 3 SPA Assessments (Document Reference E1.3).</p>

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			<p>adverse effects on integrity (likely to be limited to in-combination effects)</p> <ul style="list-style-type: none"> <li>NRW responded that they would consider what has been proposed. Initial thoughts were that this is a good way of working through the SPAs but requires further discussion with their ornithologists. NRW also wanted this to be discussed at the offshore ornithology EWG</li> <li>No comment was made by Natural England on this approach during the Steering Group meeting.</li> </ul>	
<p><b>June 2023</b></p>	<p>NRW, Natural England, MMO, JNCC and the Planning Inspectorate</p>	<p>Steering Group meeting</p>	<ul style="list-style-type: none"> <li>Updated approach for LSE screening and the ISAA methodology for the Final Application which included a change in approach to screening for SPAs (discussed in the Offshore Ornithology EWG). This information was a repeat of the previous steering group; for details see information provided for the February 2023 steering group meeting</li> <li>Stakeholder responses received: <ul style="list-style-type: none"> <li>NRW agreed with the updated HRA methodology for the project alone assessment. It should be acknowledged that this methodology has been agreed for the Mona Offshore Wind Project and Morgan Generation Assets project only and advice may differ for other offshore wind farm projects. The methodology set out in the note sent to the EWG does not address impacts to non-breeding birds. NRW advised the use of Furness (2015) to identify potential connectivity in the non-breeding season. Relevant sites should then be considered in the Appropriate Assessment, which would most likely be at the Step 1 phase. NRW disagreed that the updated HRA methodology is appropriate for the in-combination assessment. Sites with less than 1% baseline mortality should still be considered for the in-combination assessment. Step 1 of the integrity test relies on the magnitude of impact. This does not take into account conservation objectives that aren't linked to the magnitude of impact e.g. distribution of features. For these features, this approach may not be suitable. Given the project location the approach is considered satisfactory but it is noted that for assessments against conservation objectives that are not</li> </ul> </li> </ul>	<p>Feedback received on the methodology has been considered and incorporated into section 1.3.5 and 1.4.5 and of this HRA Stage 1 Screening report and updates to the HRA Stage 2 ISAA – Part 3 SPA Assessments (Document Reference E1.3).</p>

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<p>linked to the abundance of features (e.g. distribution of features within the site or availability of habitat) this would not be satisfactory</p> <ul style="list-style-type: none"> <li>- Natural England had similar comments to NRW, as the projects have high connectivity and low magnitude of effect it would end up screening in a lot of sites with a very small impact so Natural England are broadly content with the updated approach. There are two concerns which are regarding the screening of non-breeding birds and screening out sites with less than 1% mortality for in-combination effects</li> <li>- JNCC were also aligned with NRW and Natural England's comments and agreed with the HRA methodology with regard to the alone assessment but disagreed with the methodology for the in-combination assessment. JNCC did not agree that sites are not further considered in-combination where the predicted impact from the project alone is &lt;1% of the baseline mortality. While &gt;1% may be insignificant in the context of a project alone, this additional level of mortality should be included in an assessment of in-combination impacts</li> <li>• Natural England provided comments on the Morgan Generation and the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (Transmission Assets) applications to ensure a whole project assessment is undertaken.</li> </ul>	



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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
November 2023	NRW, Natural England, MMO, JNCC and the Planning Inspectorate	Steering Group meeting	<ul style="list-style-type: none"> <li>Updated approach to LSE Screening for breeding birds, which has been based on feedback from Natural England and NRW (and discussed in the Offshore Ornithology EWG)</li> <li>Updated approach to the template for the ISAA, to be split into three sections (discussed in the HRA Stage 2 ISAA – Part 2 and Part 3 (Document Reference E1.2; E1.3))</li> <li>The Planning Inspectorate comments:               <ul style="list-style-type: none"> <li>Queried whether the Natural England project determining numbers for CRM for older projects will be available for the examination period. This was followed up in the Offshore Ornithology EWG</li> <li>Agreement that in principle the format of the HRA Stage 2 ISAA would be helpful. Further advise on this will be provided by the Planning Inspectorate</li> </ul> </li> <li>Other SNCB comments:</li> <li>The MMO, Natural England and NRW generally agree with the structure of the HRA Stage 2 ISAA in principle.</li> </ul>	<p>These comments have been expanded on in the Offshore Ornithology EWG, and incorporated into section 1.3.5 and 1.4.5 of the HRA Stage 1 Screening.</p> <p>Comments on the structure of the ISAA have been addressed in all Parts of the HRA Stage 2 ISAA (Document Reference E1.1; E.12; E1.3).</p>

### Expert Working Groups

#### Benthic, Fish and Shellfish and Physical Processes

February 2022	Natural England, NRW, MMO, JNCC and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to discuss benthic survey feedback, preliminary results and desktop data sources</li> <li>Physical Processes baseline characterisation: Site specific data and desktop data sources</li> <li>Fish and Shellfish baseline characterisation: Site specific and desktop data sources.</li> </ul>	<p>Discussion outputs have been incorporated into this HRA Stage 1 Screening (section 1.3.2, 1.3.3 and 1.4.3), in relation to the screening and assessment of SACs.</p> <p>Discussion outputs have also been incorporated into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).</p>
April 2022	Natural England, NRW and JNCC	Email	<ul style="list-style-type: none"> <li>Benthic subtidal survey scope of work was consulted on to gain feedback on the methodology.</li> </ul>	<p>Advice was incorporated into the Benthic Ecology Survey Scope of Work. This scope of work informed the benthic and</p>

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
				fish and shellfish baselines and subsequent screening of sites in section 1.3.2 and 1.3.3, the outputs of which informed section 1.4.3.
<b>November 2022</b>	Natural England, NRW, MMO, JNCC and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>• Baseline characterisation</li> <li>• Baseline populations</li> <li>• Approach to HRA screening.</li> </ul>	Discussion on benthic ecology, physical processes and fish and shellfish. Discussion outputs have been incorporated into this HRA Stage 1 Screening (section 1.3.2, 1.3.3 and 1.4.3) and HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).
<b>July 2023</b>	Natural England, NRW, MMO, JNCC, Isle of Man Government, Cefas and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>• Statutory consultation responses for Fish and Shellfish Ecology, including discussions on the approach to underwater sound thresholds</li> <li>• Fish and Shellfish Ecology updated baseline and results of 2022 benthic surveys.</li> </ul>	Discussion outputs have been incorporated into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2). The approach to underwater sound thresholds for fish and shellfish have informed the screening of this impact in section 1.3.3 and 1.4.3.
<b>December 2023</b>	MMO, TWT, Cefas, NRW, JNCC, Natural England, IoM.	EWG meeting	<ul style="list-style-type: none"> <li>• Provided the updates on the revised underwater sound assessment for Morgan Generation Assets. These involved removal of monopiles from the design envelope, reduced maximum hammer energy, and reduced hammer energies associated with concurrent piling scenarios.</li> <li>• Presented an overview of the outputs from updated underwater sound modelling for Morgan Generation, showing contour plots for SPL<sub>Lpk</sub> and SEL<sub>ss</sub> for Annex II diadromous fish species.</li> <li>• The highly precautionary nature of the assessment was highlighted including the short-term nature of the piling phase,</li> </ul>	Discussion outputs, including updated sound modelling for Annex II diadromous fish and Annex II marine mammals is considered in section 1.3.3 and 1.4.3 (and sections 1.3.4 and 1.4.4 for marine mammals; see marine mammal EWGs). The determination of sites for Appropriate Assessment has been made based on the updated assessment. These sites are listed in Table 1.110.

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<p>the high degree of intermittency and the use of the maximum potential hammer energies in the sound modelling.</p> <ul style="list-style-type: none"> <li>Quantative consideration of piling at multiple projects will be considered in the cumulative and in-combination assessments.</li> <li>At PEIR concerns were raised with respect to bottlenose dolphin populations. Hence, the Applicant is looking to agree an approach to managing underwater sound impacts post consent, for which an Underwater Sound Management Strategy (UWSMS) is being produced.</li> <li>The UWSMS would allow the projects to focus on underwater sound for multiple receptors (fish and marine mammals). An outline UWSMS will be submitted with the application (Document Reference J13) and then developed post-consent to include further environmental information. It will also set out potential mitigation options which could be employed if there are any residual concerns about cumulative impacts of underwater sound.</li> </ul>	<p>The assessment of Adverse Effects On Integrity (both alone and in-combination) is presented in the HRA Stage 2 ISAA – SAC Assessments (Document Reference E1.2). The UWSMS is also outlined in this document.</p>
<b>Marine Mammals</b>				
<b>December 2021</b>	NRW, Natural England, MMO, JNCC, Cefas and The Wildlife Trusts (TWT).	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to introduce the Morgan Generation Assets and to establish the EWG</li> <li>Overview of approach to baseline characterisation and study areas and ongoing surveys and preliminary findings</li> <li>Position on the use of Marine Mammal Management Units (MUs) for impact assessment or screening, and advice on applying these marine mammal MUs during Appropriate Assessment was provided in NRW's position statement.</li> </ul>	<p>Feedback has been incorporated into the EIA.</p> <p>Marine mammal MUs have been used when screening for LSE in section 1.3.4 of the HRA Stage 1 Screening Report, which has informed the assessment of LSE in section 1.4.4.</p> <p>The use of marine mammal MUs has also been carried forward into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).</p>
<b>July 2022</b>	NRW, Natural England, MMO, JNCC, Cefas and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Discussion of actions from first EWG meeting, Scoping Opinion discussion and underwater sound methodology</li> </ul>	<p>Feedback has been incorporated into the screening of sites in this HRA Stage 1</p>

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<ul style="list-style-type: none"> <li>LSE Methodology presented and discussed to the EWG for agreement on the methodology to be used.</li> </ul>	<p>Screening Report and informed those sites taken forward to the Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).</p>
<b>November 2022</b>	NRW, Natural England, MMO, JNCC, Cefas and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Baseline characterisation</li> <li>Baseline populations</li> <li>Approach to HRA screening.</li> </ul>	<p>Discussion outputs on marine mammals have been incorporated into the screening of sites in this HRA Stage 1 Screening Report (section 1.3.4 and 1.4.4) and those sites taken forward to the Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).</p>
<b>February 2023</b>	NRW, Natural England, MMO, JNCC, Cefas, DEFA, Isle of Man Government and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Only first year of data from digital aerial surveys was available to feed into Morgan Generation PEIR. Surveys end March 2023</li> <li>Interim baseline information (a summary per species of data) and underwater sound modelling outputs</li> <li>Reference populations and densities</li> <li>Approach to cumulative assessment and results</li> <li>Interim Population Consequences of Disturbance Model (iPCoD) modelling (project-alone and cumulative) and results.</li> </ul>	<p>Full two years of survey data and discussion outputs have been incorporated into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2). This includes the use of these data sources in the Appropriate Assessment of LSE.</p>
<b>June 2023</b>	TWT, Manx Whale and Dolphin Watch, Isle of Man Government.	EWG meeting	<ul style="list-style-type: none"> <li>Summary of main statutory consultation relevant to marine mammals and how this will be addressed moving from PEIR to the final application</li> <li>Discussion on use of Effective Deterrence Range (EDR) approach and including the unweighted sound threshold of 143 dB re 1µPa (or 103 dB re 1µPa Very High Frequency (VHF)-weighted) to represent the minimum fixed sound threshold at which significant disturbance could occur for the Environmental Statement. These thresholds are used to inform the overlap between the SAC and the sound contours for the project</li> <li>Discussion of additional data to be added into the assessment.</li> </ul>	<p>Discussion outputs on the approach to the assessment of marine mammals, have been incorporated into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2). This includes the use of this approach into the Appropriate Assessment of LSE.</p>

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September 2023	NRW, Natural England, MMO, JNCC,	Technical note to the SNCBs after the EWGs	<ul style="list-style-type: none"> <li>• RPS produced a technical note to seek feedback on the following topics:               <ul style="list-style-type: none"> <li>– Design of aerial surveys with respect to marine mammals and use of an appropriate buffer around Mona and Morgan Array Areas</li> <li>– Regional Marine Mammal Study Area (MMSA) for use in the impact assessment and cumulative impacts assessment</li> <li>– Consideration of OSPAR Region III or maximum foraging range for grey seal CEA</li> <li>– Species-specific MUs and additional information provided by telemetry studies used for screening of European sites with Annex II marine mammals features for HRA Stage 1 Screening</li> </ul> </li> <li>• The approach was accepted through the EWG process, and therefore the same approach has been carried forward for the final HRA, as follows:               <ul style="list-style-type: none"> <li>– For harbour porpoise all sites within the Celtic and Irish Seas MU will be considered</li> <li>– For bottlenose dolphin only projects within the Irish Sea MU will be considered</li> <li>– For grey seal all SACs in the Wales MU, North West England MU, Southwest Scotland and Northern Ireland MU will be screened for LSE. Additional information set out in Carter <i>et al.</i>, 2022 and telemetry data presented in the PEIR (Wright and Sinclair, 2022), indicates some potential connectivity with the Isles of Scilly Complex SAC, Lundy SAC, The Maidens SAC and Saltee Islands SAC and are therefore included</li> <li>– For harbour seal, the Wales and North West England MU was used, alongside consideration of connectivity presented in Carter <i>et al.</i> (2022) and telemetry data in the PEIR which screened in Strangford Lough SAC and Murlough SAC</li> <li>– There are no SACs within Isle of Man waters</li> </ul> </li> </ul>	The MUs outlined have been used for the identification of European sites with Annex II marine mammal features in section 1.3.4, in the HRA Stage 1 Screening Report The approach to the assessment has also been incorporated into the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<ul style="list-style-type: none"> <li>• Agreement on sound modelling clarifications for HRA, including the removal of dose-response approach to area-based assessment</li> <li>• Use EDRs for HRA and dose response for EIA</li> <li>• The approach to assessment will use an unweighted sound threshold of 143 dB re 1µPa (or 103 dB re 1µPa VHF-weighted) will be used to represent the minimum fixed sound threshold at which significant disturbance could occur for the final application in addition to the EDR approach. The use of an unweighted threshold of 143 dB re 1µPa relates to harbour porpoise only. For all other marine mammal species considered in HRA the National Marine Fisheries Service (NMFS) level-B harassment threshold of 160 dB SPL<sub>rms</sub> will be applied for piling alongside the relevant EDR (NMFS, 2005)</li> <li>• Densities and reference populations</li> <li>• IPCoD modelling.</li> </ul>	
<p><b>December 2023</b></p>	<p>NRW, JNCC, Natural England, Cefas, TWT</p>	<p>EWG meeting</p>	<ul style="list-style-type: none"> <li>• Assessment updates were provided. This included monopiles being removed from the project design and the assessment now considers pin piling as the only form of piles, the maximum hammer energy has been reduced since PEIR, and changes to the assessment of concurrent pling.</li> <li>• The densities and management units that form the regional marine mammal study area were agreed via the Final Agreements with MM EWG technical note sent to the EWG in September. Further detail has been added on haul out connectivity for grey seals throughout the regional marine mammal study area.</li> <li>• The approach for seals utilised the SMRU telemetry data provided for Morgan Generation and applied a 5 km buffer around each haul out site. This has allowed for the quantification of grey seal connectivity within the regional marine mammal study area to add context to the assessment of barrier effects.</li> <li>• Updates to the CEA screening region for seals. The assessment used the combination of four seal MUs as the GSRP and this has been assessed alongside the OSPAR</li> </ul>	<p>Updates to the screening region and assessment for seals have been included in section 1.3.4 and 1.4.4, for the relevant grey seal and harbour seal SACs.</p> <p>The approach to the in-combination assessment is outlined in section 1.5.</p> <p>Further details of the in-combination assessment have been provided in the HRA Stage 2 ISAA – SAC Assessments (Document Reference Number E1.2). This included the projects screened in for the in-combination assessment.</p> <p>The UWSMS is outlined in the HRA Stage 2 ISAA – SAC Assessments (Document Reference Number E1.2).</p>



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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<p>Region III. Following S42 and EWG feedback, OSPAR Region III has been used as extended screening area for grey seal – for offshore wind projects only to allow a proportionate approach to assessment. The list of cumulative project has now been updated, including changes to the Tiers of some projects. This has been updated in the assessment.</p> <ul style="list-style-type: none"> <li>• Although White Cross sits approximately 7 km outside of the GSRP, since the underwater sound contours extend up to 12 km, the project has been considered in the in-combination assessment.</li> <li>• In addition to primary and tertiary measures adopted, the project has committed to the development of an UWSMS to reduce any significant impacts from underwater sound. This was following concerns raised at PEIR with respect to bottlenose dolphin populations. Hence, the Applicant is looking to agree an approach to managing underwater sound impacts post consent, for which an UWSMS is being produced.</li> <li>• The approach to the assessment of injury and disturbance during UXO clearance for use in the HRA Stage 2 ISAA was presented.</li> <li>• Morgan Generation updated IPCoD assessment for bottlenose dolphin and grey seal was presented, for use in the assessment of Adverse Effects On Integrity in the HRA Stage 2 ISAA.</li> <li>• Updates to the HRA methodology for the ISAA, including updates to sound thresholds.</li> <li>• Discussion of Morgan S42 comments, including of the use of expert judgement to define appropriate thresholds for the percentage of a reference population.</li> </ul>	<p>The detailed assessment of Adverse Effects On Integrity, for marine mammals is presented in the HRA Stage 2 ISAA – SAC Assessments (Document Reference E1.2) for the sites outlined in Table 1.110 (summary of sites determined to have a potential LSE). The assessment of UXO clearance has been screened in for these sites according to the information presented in section 1.4.4. The updated approach to iPCoD modelling for the relevant marine mammal species has also been used in the HRA Stage 2 ISAA – SAC Assessments (Document Reference E1.2).</p> <p>The use of appropriate thresholds for the percentage of a reference population will be updated following any guidance available on which to base a threshold; the Applicant welcomes the use of this in its assessment. If guidance becomes available, this will be considered for use in the HRA Stage 2 ISAA.</p>
<b>Offshore Ornithology</b>				
<b>December 2021</b>	NRW, Natural England, MMO, JNCC, TWT, Royal Society for the Protection of Birds (RSPB)	EWG meeting	<ul style="list-style-type: none"> <li>• Meeting to introduce the Morgan Generation Assets and to establish the EWG</li> <li>• Discussion of ongoing surveys, preliminary findings and the approach to baseline characterisation.</li> </ul>	Discussion outputs have been incorporated into the HRA Stage 2 ISAA Part 3 SPA

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
				Assessments (Document Reference E1.3).
<b>July 2022</b>	Natural England, NRW, MMO, JNCC, RSPB and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to agree the approach to baseline characterisation, CRM and displacement</li> <li>Opportunity for discussion of the Scoping Opinion</li> <li>LSE Methodology presented and discussed to the EWG for agreement on the methodology to be used.</li> </ul>	Discussion outputs have been incorporated into this HRA Stage 1 Screening (section 1.3.5 and 1.4.5) and Stage 2 ISAA Part 3 Assessments (Document Reference E1.3).
<b>November 2022</b>	Natural England, NRW, MMO, JNCC, RSPB and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Baseline characterisation</li> <li>Baseline populations</li> <li>Approach to HRA screening.</li> </ul>	Discussion outputs have been incorporated into this HRA Stage 1 Screening (section 1.3.5 and 1.4.5) and Stage 2 ISAA Part 3 SPA Assessments (Document Reference E1.3).
<b>February 2023</b>	Natural England, NRW, MMO, Isle of Man, RSPB and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Further project updates around avian flu in 2023 survey results</li> <li>LSE methodology updates as described above under the June 2023 Steering Group Meeting.</li> </ul>	Feedback was included within the method note sent to consultees on the LSE methodology.
<b>June 2023</b>	Natural England, JNCC, NRW, MMO, and Isle of Man.	EWG meeting	<ul style="list-style-type: none"> <li>Discussion on statutory consultation comments and clarifications required</li> <li>LSE methodology updates.</li> </ul>	<p>The statutory consultation comments have been incorporated within this HRA Stage 1 Screening report.</p> <p>An updated HRA methodology note was shared with the consultees (Natural England, NRW, MMO, Isle of Man, RSPB and TWT) post meeting.</p>
<b>August 2023</b>	Natural England	Letter response to the updated HRA methodology note	<ul style="list-style-type: none"> <li>Natural England retain concerns regarding the approach to non-breeding season LSE screening. Natural England do not consider it appropriate to consider breeding season foraging ranges to identify sites for consideration in the non-breeding season</li> <li>Natural England advise that the Applicant reviews the approach taken in the Morecambe Offshore Windfarm Generation Assets PEIR. In this case, potential connectivity</li> </ul>	Comments noted and the approach proposed by Natural England for screening of non-breeding birds has been adopted in section 1.3.5 of this HRA Stage 1 Screening report.

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			(and thus, LSE if there is an impact pathway) has only been assumed for cases where the contribution of an SPA population is thought to represent >1% of the Biologically Defined Minimum Population Scales (BDMPS) population. This provides a proportionate and sensible screening approach to reduce the site/species combinations for consideration, while ensuring those that may be at risk are properly considered.	
<b>August 2023</b>	NRW	Email response to the updated HRA methodology note	<ul style="list-style-type: none"> <li>NRW generally advise that for seabird species covered by Furness (2015) all sites within the relevant species-specific BDMPS region are screened in at the LSE stage due to connectivity during the non-breeding season and there being potential impact pathways</li> <li>NRW suggest that the Applicant considers the approach taken in the Morecambe Offshore Windfarm Generation Assets PEIR where potential connectivity has been assumed for SPA populations that contribute &gt;1% of the BDMPS population</li> <li>In addition, NRW advise that where the Morgan Generation Assets within the broad migration fronts (as defined in Wright <i>et al.</i>, 2012) of non-breeding waterbird features of sites and there is hence potential for collision, these sites should also be screened in for LSE and taken through to the HRA Stage 2 ISAA – Part 3 SPA Assessments (Document Reference E1.3). The relevant Welsh sites were identified in NRW's response to the PEIR. NRW note that it is likely that once the predicted collision risk impacts have been apportioned to the individual sites, these sites could most likely be considered at Step 1 of the HRA Stage 2 ISAA – Part 3 SPA Assessments (E1.3).</li> </ul>	<p>Comments noted and the approach proposed by NRW for screening of non-breeding birds has been adopted in section 1.3.5 of this HRA Stage 1 Screening report.</p> <p>Sites presented within the screening assessment also now include the sites specifically requested by NRW in the statutory consultation response (see section 1.3.5).</p>
<b>September 2023</b>	NRW	Email response on regional population approach	<ul style="list-style-type: none"> <li>NRW requested that the regional population during the breeding season is calculated in a different way than was previously presented.</li> </ul>	A new approach is presented within this HRA Stage 1 Screening report whereby the proportion of adult and immature birds is calculated from Horswill and Robinson (2015). This proportion is then used to calculate how many immatures are present in the

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
				<p>breeding season, relative to the total breeding population (within mean max +1SD foraging range) of the Morgan Array Area.</p> <p>This approach is to be discussed at the EWG06 and has not been accepted by NRW.</p>
<p><b>October 2023</b></p>	<p>JNCC, NRW, IoM, MMO, RSPB, Natural England, The Wildlife Trust</p>	<p>EWG meeting</p>	<ul style="list-style-type: none"> <li>• The approach on breeding birds for HRA Stage 1 LSE screening was agreed across the board. This includes: <ul style="list-style-type: none"> <li>– Where the apportioning shows 0 birds impacted on a SPA, the projects will screen those birds out at LSE</li> <li>– This approach does not apply to SPAs where the conservation objectives are not related to populations impacted by displacement/collision risk, for example Liverpool Bay. The approach to these sites is unaffected and they will be fully assessed as was done for PEIR</li> </ul> </li> <li>• For birds during the non-breeding season the approach which has been adopted is based on Natural England and NRW feedback and involves starting with the BDMPS areas, and for SPAs in foraging ranges or breeding colonies, where a non-breeding population of a SPA contributes less than 1% of the BDMPS, this SPA/feature is screened out. Where the SPA population represents more than 1% of the BDMPS, it's screened in. That way the key SPAs in the region are screened in for birds during the non-breeding season</li> <li>• Presented the approach for Step 1 and Step 2 Adverse Effects On Integrity tests</li> <li>• Presented on the approach for in-combination effects</li> <li>• Updated baseline between PEIR and the Environmental Statement for Morgan now includes 24 months of survey data and the array area has reduced. The auk ID rates have been improved and species level has been applied throughout any abundance metric estimation. Results on updated baseline presented</li> </ul>	<p>The updated approach to LSE screening has been presented within the assessment in this HRA Stage 1 Screening Report in section 1.3.5 and 1.4.5.</p> <p>The technical note shared in the EWG (Morgan and Mona HRA Updated Methodology F03) is the method presented within this document.</p>

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			<ul style="list-style-type: none"> <li>Formalised HRA methodology note is to be issued to the EWG following the meeting to formalise agreement.</li> </ul>	
<b>December 2023</b>	Natural England, JNCC, NRW, IoM, MMO, RSPB, TWT	EWG meeting	<ul style="list-style-type: none"> <li>Updates to the calculation of regional baseline for the alone and in-combination assessment, which was detailed in the technical note sent to the EWG. Outlined the approach to be the most precautionary (lowest) number of birds to be presented in the HRA.</li> <li>Morgan Generation updates to HRA presented including the following:</li> <li>Within the breeding foraging range of the Morgan Array Area (mean-max 127.0 km ± 109), there are six SPAs with Lesser Black Backed Gulls (LBBG) as a feature in the breeding season. Only the Ribble and Alt Estuaries SPA, Morecambe Bay and Duddon Estuary SPA and Bowlands Fells SPA have mortality from collisions over 0.0 with mortality from collisions of 0.1 (with an avoidance rate of 0.994) for all three. The leads to an increase in baseline mortality of 0.02% for the Ribble and Alt Estuaries SPA and &lt;0.01% for the other two SPAs (with an avoidance rate of 0.994). Therefore, LSE has been screened out for all SPAs for LBBG with the exception of these three SPAs.</li> </ul>	<p>The alone and in-combination assessment for offshore ornithology is presented In the HRA Stage 2 ISAA – SPA Assessments (Document Reference E1.3).</p> <p>The assessment of LSE for birds is presented in section 1.3.5 and 1.4.5. The sites which are outlined in the summary have screened out LBBG based on the justification provided. The determination of LSE for offshore ornithology is presented in section 1.4.5.</p>

### S42 Consultation

#### Annex II diadromous fish

<b>June 2023</b>	Natural England	Statutory consultation	<ul style="list-style-type: none"> <li>Natural England broadly agreed that the relevant sites have been screened in and noted that correct features and pathways have been identified. They were broadly in agreement on the LSE conclusions subject to further modelling and with the HRA methodology used.</li> </ul>	Physical processes have not been identified as a pathway for impact for SACs designated with fish species. Increases in SSC and associated sediment deposition was identified as a potential impact on Annex II diadromous fish but was screened out in the HRA Stage 1 Screening Report and has not been considered in the HRA Stage 2 ISAA – Part 2 SAC
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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
June 2023	Natural England	Statutory consultation	<ul style="list-style-type: none"> <li>Natural England noted that physical processes modelling will be refined in the Environmental Statement, for inclusion as a potential pathway to impact for SACs designated with Annex II fish species.</li> </ul>	<p>Assessments (Document Reference E1.2).</p> <p>Physical processes modelling for Morgen Generation Assets was conducted during PEIR. However, those modelling results were not available at the time of writing the HRA Stage 1 Screening Report which was submitted with PEIR and a precautionary buffer of 15 km was applied. Therefore, the revised HRA Stage 1 Screening Report has been updated using the results of the PEIR modelling to refine the ZoI for the impact of increases in SSC and sediment deposition on Annex II diadromous fish. This has not changed the results of the sites screened in. These updates are made in section 1.4.3.</p>
<b>Annex II marine mammals</b>				
June 2023	Natural England	Statutory consultation	<ul style="list-style-type: none"> <li>Natural England agreed with the marine mammal sites screened in for determination of LSE, with the potential impact pathways identified for marine mammal sites and with the LSE conclusions presented in the LSE matrices.</li> </ul>	<p>No changes to the approach applied to marine mammals screening in the HRA Stage 1 Screening report published with PEIR have been made in this HRA Stage 1 Screening.</p>
June 2023	NRW	Statutory consultation	<ul style="list-style-type: none"> <li>NRW recommend that barrier effects are scoped into the LSE in section 1.4.4 Assessment of LSE for Annex II marine mammals.</li> </ul>	<p>Barrier effects are considered within the underwater sound impact assessment in line with Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4). Additional</p>



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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
				detail has been provided to cover this impact for each SAC assessed in section 1.4.4.
June 2023	NRW	Statutory consultation	<ul style="list-style-type: none"> <li>NRW tentatively agree to the conclusion of no LSE from vessel collision risk in section 1.4.5.8 Assessment of LSE for Annex II marine mammals, however advises that the increase in the number of vessels versus the baseline should be quantified.</li> </ul>	Comment noted, a quantitative assessment of the uplift in the number of vessels has been provided in this HRA Stage 1 Screening report. Additional information included in paragraphs 1.4.4.23 and 1.4.4.39.
June 2023	NRW	Statutory consultation	<ul style="list-style-type: none"> <li>NRW has recommended that the Assessment of potential Adverse Effect on Integrity: Annex II marine mammals, is amended for clarification. For grey seal, NRW previously advised the use of the OSPAR Region III MU as per NRW's Position Statement on the use of marine mammal MUs for screening and assessment in HRA for SACs with marine mammal features. NRW agreed with the proposal to use the combined Wales MU, Northwest England MU, SW Scotland and Northern Ireland MU for grey seal in parallel with the OSPAR Region III MU. NRW recommended that any similar statements within the document be amended. NRW also agreed that the foraging ranges from Carter <i>et al.</i> (2022) would be a suitable alternative as these also capture the movement ranges of grey seal.</li> </ul>	This HRA Stage 1 Screening report now considers European sites within the OSPAR Region III Interim MU designated for grey seal, however telemetry data from Wright and Sinclair (2022) has then been used to identify those SACs with potential connectivity to the Morgan Generation Assets.
<b>Offshore ornithology</b>				
June 2023	RSPB	Statutory consultation	<ul style="list-style-type: none"> <li>The RSPB specified that the Bowland Fells SPA should be considered for assessment in the LSE Screening.</li> </ul>	This HRA Stage 1 Screening report now considers the suggested site in section 1.3.5.
June 2023	Barrow Offshore Windfarm / Burbo Bank Extension Wind Farm / Burbo Bank Wind Farm /	Statutory consultation	<ul style="list-style-type: none"> <li>The consultees specified that it is important to ensure that all environmental impacts of your project are properly and fully assessed including any potential cumulative or in combination effects with the consultees interests. They outlined the impact upon Whooper Swan as an example, as it has been the subject of studies in relation to Barrow and these studies have</li> </ul>	The potential for impacts on SPAs at which whooper swan is a qualifying feature are considered in sections 1.3.5, 1.4.5 and Appendix A.3

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Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
	West of Duddon Sands Windfarm / Walney Extension Windfarm (Walney 3 and 4) / Walney Offshore Windfarms (Walney 1 and 2) / Ørsted		<p>shown Whooper Swan transits through or close to the proposed development.</p> <ul style="list-style-type: none"> <li>This comment also applies to cumulative and in-combination effects with other nearby windfarms.</li> </ul>	
<b>June 2023</b>	West of Duddon Sands Windfarm	Statutory consultation	<ul style="list-style-type: none"> <li>The West of Duddon Sands Windfarm outlined they would welcome the opportunity to discuss further the following cumulative and in-combination impacts, including the impacts on wintering populations of pink-footed geese.</li> </ul>	Potential connectivity between pink-footed goose and the Morgan Generation Assets is based on the migratory polygons associated with Wright <i>et al.</i> (2012) as described in Section 1.3.5.
<b>General comments</b>				
<b>June 2023</b>	North West Wildlife Trusts (NWWT)	Statutory consultation	<ul style="list-style-type: none"> <li>The NWWT specified a number of designated sites to be considered for assessment in the LSE screening (SACs and SPAs).</li> </ul>	These sites considered for screening are listed in section 1.3 for marine mammals, Annex I habitats and Annex II diadromous fish. All of the sites listed have been considered in the HRA Stage 2 ISAA Part 2 and Part 3 (Document Reference E1.2; E1.3).
<b>June 2023</b>	NWWT	Statutory consultation	<ul style="list-style-type: none"> <li>The NWWT expect a full consideration of transboundary effects and cumulative impacts across border, given the proximity to Welsh waters and Isle of Man and potential for significant impacts on the marine environment.</li> </ul>	A separate transboundary assessment has been completed as part of the Environmental Statement, which includes the European sites which have been considered for potential LSE in section 1.3 of the HRA Stage 1 Screening report.

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June 2023	Natural England	Statutory consultation	<ul style="list-style-type: none"> <li>Natural England recommends the Tier system for use in the HRA Stage 2 ISAA, as outlined in the Best Practice Guidance Phase III.</li> </ul>	The recommended tier system is similar to the one used for the ISAA and EIA but each tier is split further. However, it would not lead to significant changes as some tier recommended would have not project considered (e.g. on-going construction).

## 1.1.8 Changes to this HRA Stage 1 Screening Report since PEIR

1.1.8.1 The key changes to this HRA Stage 1 Screening Report for the final application since the draft HRA Stage 1 Screening Report that accompanied the PEIR was published are detailed below:

- Updates to the Morgan Generation Assets Project Design Envelope, including updates to the Morgan Array Area and project parameters outlined in Table 1.1
- Inclusion of detailed physical processes modelling to facilitate more accurate screening conclusions of European sites with Annex I habitats and Annex II fish features in section 1.4.3
- Inclusion of further benthic site-specific survey data information to justify screening conclusions for LSE for Annex II fish features (see paragraph 1.4.3.19)
- Inclusion of vessel uplift values to quantify the increase in the number of vessels versus baseline values for the Morgan Array Area to justify screening conclusions for LSE for Annex II marine mammals in section 1.4.4
- Change to the approach for the screening of SPAs as agreed with the Offshore Ornithology EWG:
  - Breeding birds – all sites and features where mortalities associated with collision or displacement are predicted to be more than zero (>0) are now screened in for further assessment in the HRA Stage 2 ISAA – Part 3 SPA Assessments (Document Reference E1.3)
  - Non-breeding birds – LSE has been assumed for cases where the contribution of an SPA population is thought to represent >1% of the Biologically Defined Minimum Population Scales (BDMPS) population and the inclusion of the additional Welsh sites NRW identified in their response to the PEIR (see Table 1.2).

## 1.2 The Habitats Regulations Assessment process

### 1.2.1 Legislative context

1.2.1.1 The Habitats Directive together with the Birds Directive provides the EU's legal framework for the protection of wild fauna and flora and birds and establishes a network of internationally important sites, designated for their ecological status. This network of designated sites is comprised of the following:

- SACs which are designated under the Habitats Directive and promote the protection of flora, fauna and habitats
- SPAs which are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds.

1.2.1.2 In terrestrial areas of the UK and territorial waters out to 12 nm, the land and marine aspects of Habitats Directive and certain elements of the Birds Directive are transposed into UK law through The Conservation of Habitats and Species Regulations 2017 (as amended). In waters beyond 12 nm, The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) apply, which transpose the Habitats and Birds Directives into national law.

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1.2.1.3 The UK is no longer an EU Member State. Notwithstanding, the Habitats Directive as implemented by the Habitats Regulations continues to provide the legislative framework for HRA in the UK. The HRA process implemented under the Habitats Regulations continues to apply (subject to minor changes effected by the EU Exit Regulations) and the UK is bound by HRA judgments handed down by The Court of Justice of the European Union prior to 31 to December 2020<sup>1</sup>. The objective of the Habitats Regulations is to conserve, at a Favourable Conservation Status (FCS), those habitats and species listed in Annexes I and II of the Habitats Directive and Annex I of the Wild Birds Directive. Post EU-Exit, the Habitats Regulations continue to refer to Annexes I and II of the Habitats Directive and Annex I of the Birds Directive and as such, reference is made to the Annexes of the Habitats and Birds Directives in this report.

### 1.2.2 European sites post EU exit

1.2.2.1 The Europe-wide network of nature conservation areas that are the subject of the HRA process was established under the Habitats Directive. The Habitats Directive establishes a network of internationally important sites, designated for their ecological status. European sites located within an EU Member State combine to create a Europe-wide network of designated sites known the Natura 2000 network. In the UK, since exiting the EU, these are now referred to as European sites and together with other designated sites, these form part of the National Site Network.

### 1.2.3 The process

1.2.3.1 HRA is generally recognised as a progressive, staged process built around the wording of Article 6(3) of the Habitats Directive, with the outcome at each stage defining the requirement for and scope of the next. Compliance with the requirements of the Directive can be demonstrated if the stages are followed in the correct and particular sequence. These stages are summarised in Figure 1.2.

1.2.3.2 Article 6(3) of the Habitats Directive requires that:

*“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and if appropriate, after having obtained the opinion of the general public”.*

1.2.3.3 As outlined in paragraph 1.2.3.1, HRA is a multi-stage process which identifies LSE, assesses any adverse effect on integrity of a European site, and considers the derogations (as required). The Defra (2021) guidance describes that the process can have up to three stages as outlined below:

- Screening – the first stage involves a screening for LSE which is a simple assessment to check or screen if, in the absence of mitigation, a proposal:

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<sup>1</sup> The UK Supreme Court may depart from binding pre-EU Exit case law if they consider it 'right to do so' and the Inner House of the Court of Session may depart from such case law in certain circumstances

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- is directly connected with or necessary for the conservation management of a European site
- risks having a significant effect on a European site on its own or in combination with other proposals
- Appropriate Assessment – the second stage is an appropriate assessment, which must be carried out if it is decided that there is a risk of a LSE on a European site or if there is not enough evidence to rule out a risk. The appropriate assessment should assess the LSEs of a proposal on the integrity of the site and its conservation objectives and consider ways to avoid or reduce (mitigate) any potential for an ‘adverse effect on the integrity of the site’
- Derogations – the third stage is known as a derogation where, in certain circumstances, a proposal that has failed the integrity test may be allowed to go ahead. To decide if the proposal qualifies for a derogation, three legal tests must be applied. All three tests must be passed in sequence for a derogation to be granted:
  - There are no feasible alternative solutions that would be less damaging or avoid damage to the site
  - The proposal needs to be carried out for IROPI
  - The necessary compensatory measures can be secured.

1.2.3.4 This report considers the first ‘screening for LSE’ step in the HRA process which encompasses the ‘screening’ stage shown in Figure 1.2.

1.2.3.5 The Habitats Regulations make it clear that the person applying for the consent of the plan or project must provide such information as the Competent Authority may reasonably require for the purposes of the assessment. It is intended that this report and the subsequent HRA Stage 2 ISAA (Document Reference E1.1; E1.2; E1.3) provides this information.

1.2.3.6 To determine whether an appropriate assessment is required it must first be ascertained whether or not the plan/project is directly connected with or necessary to the management of the European site. As this is not the case for the Morgan Generation Assets, it must therefore be determined whether the plan or project, either alone or in-combination with other plans and projects, is likely to have a significant effect on a European site(s). This constitutes the HRA screening stage which removes from the assessment protected features of European sites which have no connectivity to the Morgan Generation Assets or those where the impacts are immaterial or inconsequential and the conservation objectives for the site’s qualifying interests would not be undermined (i.e. they are non-significant). All other European sites, including those where there is reasonable doubt as to the magnitude and nature of the relevant impact(s), are passed through to the next stage (appropriate assessment).

1.2.3.7 The Habitats Regulations establish management objectives for the national site network. These are called the network objectives. The objectives in relation to the National Site Network are to:

- Maintain or restore certain habitats and species listed in the Habitats Directive to FCS
- Contribute to ensuring the survival and reproduction of certain species of wild bird in their area of distribution and to maintaining their populations at levels which correspond to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements.



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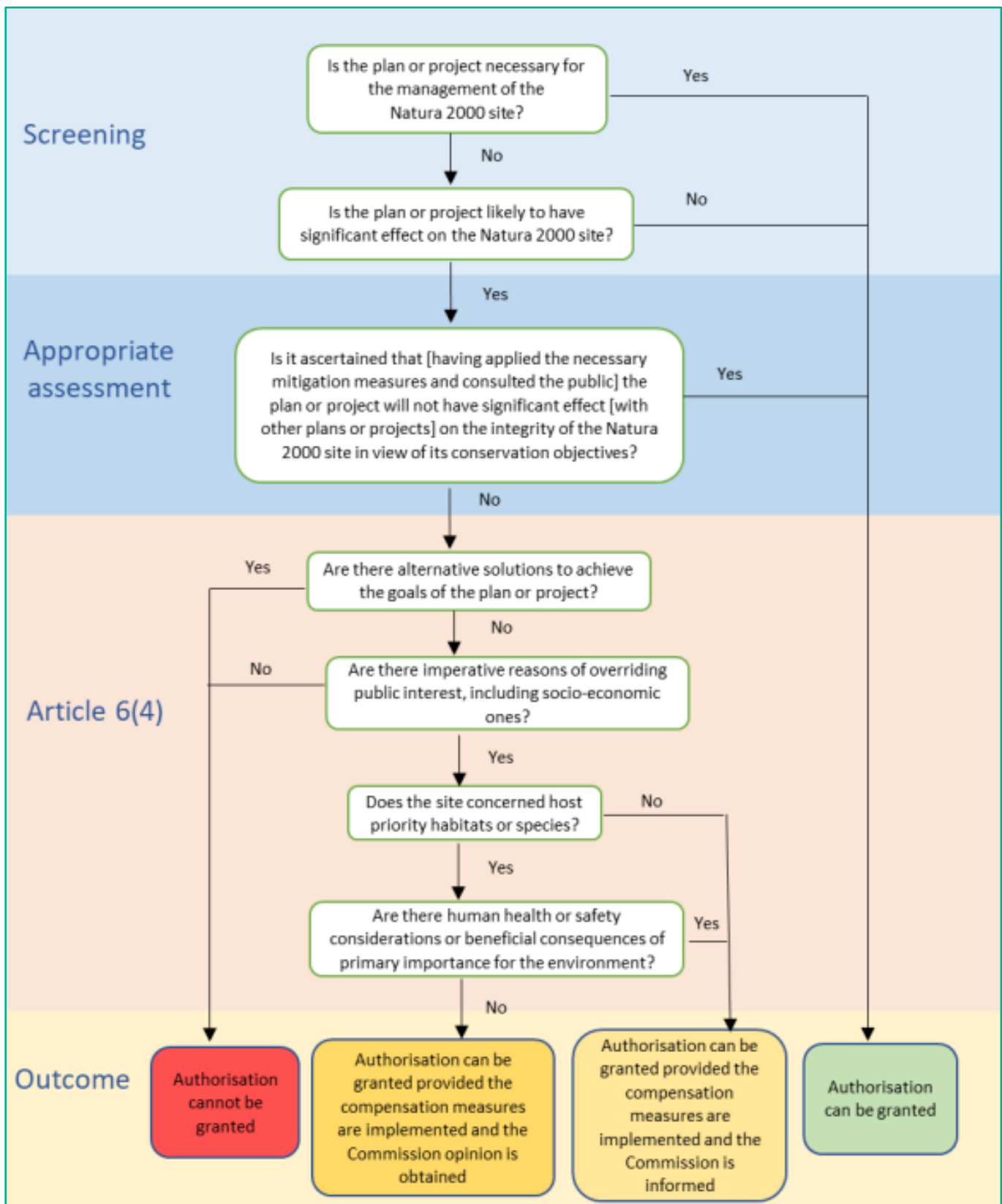


Figure 1.2: Stages in the Habitats Regulations Appraisal Process (Taken from European Commission, 2021).

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### 1.2.4 The Crown Estate Plan-Level HRA

- 1.2.4.1 TCE, in its role as Competent Authority, conducted a Round 4 Plan-Level HRA. The Plan-Level HRA assessed the potential impacts of the six potential offshore wind projects identified through the Round 4 tender process (the 'Round 4 plan'), including the Morgan Generation Assets, on the National Site Network.
- 1.2.4.2 The Plan-Level HRA process involved engagement and consultation with an EWG consisting of relevant UK statutory marine planning authorities, SNCBs and relevant non-governmental organisations.
- 1.2.4.3 TCE's Plan-Level HRA concluded that the possibility of an Adverse Effect on Site Integrity as a result of the Round 4 Plan could not be ruled out for two protected sites forming part of the National Site Network. The two protected sites, and relevant features, are: 1) Sandbank features of the Dogger Bank SAC alone and in-combination; and 2) black-legged kittiwake *Rissa tridactyla* feature of the Flamborough and Filey Coast SPA in-combination only. It should be noted, however, that the Morgan Generation Assets was not required to be considered in the appropriate assessment for either of these sites. Therefore, no Adverse Effect on Site Integrity was identified for the Morgan Generation Assets in the Plan-Level HRA.
- 1.2.4.4 On the basis of these conclusions, TCE considered derogation and concluded that: a) there are no alternative solutions to deliver the Round 4 objectives; b) there are clear imperative reasons of overriding public interest to proceed under the government's targets for offshore wind and net zero; and c) the Round 4 plan provides a robust framework for the delivery of compensatory measures. TCE therefore considered that the three derogation tests have been met and the Secretary of State has since agreed that TCE can proceed with the plan.
- 1.2.4.5 The Plan-Level HRA notes that TCE expects developers to undertake project-specific environmental assessments, including a detailed project-level HRA, as part of their application for development consent. This document comprises Stage 1 of the HRA, which carries out the screening of the Morgan Generation Assets with respect to its potential to have an LSE on European sites. This HRA Screening document has taken into account the information and approach taken by the Plan Level HRA as set out below.
- 1.2.4.6 TCE also established a Steering Group including government and SNCBs to oversee the development and delivery of strategic environmental compensation plans for each of the two affected sites. As projects progress before and during the planning process, developers will be required to work with the Steering Group – which will consult with the Round 4 HRA Expert Working Group - to develop detailed individual site compensation plans.

### 1.2.5 Legislation and guidance

- 1.2.5.1 The HRA Stage 1 Screening Report has drawn upon a number of information sources, HRA principles, regulations and guidance documents, including:
- The Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017
  - EC (2002) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg

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- EC (2006) Nature and Biodiversity Cases Ruling of the European Court of Justice
- EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EE. Clarification on the Concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission
- EC (2018) Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC'
- EC (2020) Guidance document on wind energy developments and EU nature legislation. European Commission Notice Brussels (2020) 7730 final
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission Notice Brussels C (2021) 6913 final
- Defra (2021) Policy paper - Changes to the Habitats Regulations 2017, Published 1 January 2021
- Joint Defra, Welsh Government, Natural England and Natural Resources Wales guidance (2021) 'Habitat's regulations assessments: protecting a European site'
- The Planning Inspectorate Advice Note Nine: Rochdale Envelope (The Planning Inspectorate, 2018)
- The Planning Inspectorate Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2022)
- The Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2019)
- The Habitats Regulations Assessment Handbook (DTA Publications Limited, 2016)
- The Crown Estate Plan Level HRA (The Crown Estate, 2022)
- Natural England (2022). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase III: Expectations for data analysis and presentation at examination for offshore wind applications
- Feedback received from the Morgan Generation Assets Evidence Plan Process.

### 1.2.6 Process for identifying sites and features

- 1.2.6.1 To facilitate the identification of the European sites and features to be considered in the HRA screening for the Morgan Generation Assets, a pre-screening of sites has been undertaken. This is considered to be appropriate due to the spatial scale of the Morgan Generation Assets, the wide-ranging nature of many of the features of European sites which may be affected (i.e. birds and marine mammals) and therefore the number of European sites which could potentially be affected.
- 1.2.6.2 The criteria adopted for the initial identification of European sites are outlined in Table 1.3. This approach takes account of the location of the European sites (including Ramsar Sites) in relation to the Morgan Generation Assets, the anticipated Zone of

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- Influence (Zol) of potential impacts associated with the Morgan Generation Assets, and the ecology and distribution of qualifying interest features.
- 1.2.6.3 Table 1.3 outlines the order of consideration given to the criteria used for the identification of the list of sites to be taken forward for determination of LSE. Initial consideration is given to whether there is a physical overlap between the Morgan Generation Assets and any European sites; all sites with an overlapping boundary are screened in to be taken forward for determination of LSE.
- 1.2.6.4 Pre-screening criterion 2 next identifies any European sites, not already screened in using criterion 1, where there is an overlap between the Morgan Generation Assets and the range of any qualifying mobile species of the site. All sites where the Morgan Array Area overlaps with the range of one (or more) of its features, are taken forward for determination of LSE.
- 1.2.6.5 Criterion 3 identifies any European sites, not already screened in by criterion 1 or 2, where the potential Zol of the Morgan Generation Assets overlaps with a European site and/or qualifying interests of the site (as per section 1.2.1). For ornithology receptors, consideration is also given to a range of factors that inform the likely extent to which the different qualifying features will occur at the Morgan Generation Assets.

**Table 1.3: Criteria for initial identification of relevant European sites.**

Order of consideration	Criteria used for initial Identification of relevant European sites
1	The Morgan Array Area overlaps with one or more European or Ramsar sites.
2	European or Ramsar site with qualifying mobile features/species (e.g. birds, Annex II marine mammals, migratory fish, otter) whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area.
3	European or Ramsar sites and/or qualifying interest features located within the potential Zol of impacts associated with the Morgan Generation Assets (e.g. habitat loss/disturbance, sound and risk of collision).

- 1.2.6.6 The outcome of this initial screening will be that sites where there is no potential for LSEs due to lack of potential overlap of receptor-impact pathway to occur are excluded from further consideration in this report. Sites not excluded on the basis of any of the criteria outlined in Table 1.3 (i.e. where there is a potential for a receptor-impact pathway to occur) will be taken forward for determination of LSE in section 1.4.
- 1.2.6.7 It should be noted that the HRA Screening has been updated, as appropriate, during the pre-application phase of the Morgan Generation Assets to account for site-specific survey data, detailed assessments and stakeholder feedback which has added in additional information to justify the inclusion and exclusion of sites in the Appropriate Assessment. Any such updates have been discussed and agreed with the Evidence Plan Steering Group and EWGs as appropriate and are summarised in section 1.1.8.

## 1.3 Identification of European sites and features

### 1.3.1 Overview

- 1.3.1.1 This section provides a list of European sites (including Ramsar Sites), and their features, for which there is the potential for connectivity with the Morgan Generation Assets, using the criteria outlined in Table 1.3, and therefore those which should be taken forward for consideration of LSE in section 1.4.

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1.3.1.2 Due to the nature of the project infrastructure associated with the Morgan Generation Assets (i.e. no Offshore Cable Corridor or Onshore Cable Corridor), it can be concluded that there is no potential connectivity with onshore European sites and these sites are therefore screened out and not considered further in this HRA Stage 1 Screening Report.

1.3.1.3 Therefore, the following offshore receptor groups are considered in turn:

- Annex I habitats (offshore and coastal) (see section 1.3.2)
- Annex II diadromous fish species (see section 1.3.3)
- Annex II marine mammals (see section 1.3.4)
- Offshore ornithological features (see section 1.3.5).

### 1.3.2 Sites designated for Annex I habitats (offshore and coastal)

1.3.2.1 The following section details the results of the stepwise process to identify the European sites with relevant Annex I habitats (offshore and coastal) to be taken forward for detailed determination of LSE based on the methodology and criteria outlined in section 1.2.6 and Table 1.3.

1.3.2.2 The approach adopted will focus on the Annex I benthic habitat qualifying interest features for which there is considered to be a potential for impact as a result of the Morgan Generation Assets. Whilst only these qualifying interest features will be screened in for further consideration, it is acknowledged that the Competent Authority must undertake the HRA screening, and any subsequent appropriate assessment, at the site level and not for individual qualifying interest features.

#### Initial identification for Annex I habitats (offshore and coastal)

##### **Criterion 1**

1.3.2.3 Criterion 1 for the identification of European or Ramsar sites to be taken forward for consideration of LSE considers those sites which overlap with the offshore and coastal boundaries of the Morgan Generation Assets. There are no European sites with relevant qualifying Annex I habitats, up to MHWS, which overlap with the Morgan Array Area.

##### **Criterion 2**

1.3.2.4 Criterion 2 considers European or Ramsar sites with qualifying mobile features/species whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area. There are no European sites which meet this criterion for Annex I benthic habitats and so no sites are screened in for further consideration on this basis.

##### **Criterion 3**

1.3.2.5 Criterion 3 considers European or Ramsar sites and/or qualifying interest features which are located within the potential Zol of impacts associated with the Morgan Generation Assets. There is the potential for indirect effects to sites designated for Annex I habitats as a result of impacts associated with increased Suspended Sediment Concentration (SSC) arising from construction activities or from changes to the hydrodynamic regime as a result of the presence of offshore infrastructure associated with the Morgan Generation Assets.



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- 1.3.2.6 The extent of these impacts is considered likely to extend beyond the Morgan Array Area.
- 1.3.2.7 The Zol for such indirect effects associated with the offshore elements of the Morgan Generation Assets has been defined from the outputs of physical processes modelling undertaken for the PEIR to determine, for example, the location of sediments resuspended during the construction process.
- 1.3.2.8 The Zol used in the HRA Stage 1 Screening Report submitted alongside PEIR was one mean tidal excursion in the vicinity of the Morgan Generation Assets, which equated to approximately 9 km in the northeast and southwest direction and 3 km in the northwest/ southeast direction from the Morgan Array Area; a precautionary approach was adopted for screening, increasing this buffer to 15 km. No additional modelling has been undertaken since PEIR. The reductions in the Morgan Array Area since PEIR (approximately 10%) are modest and lie wholly within the Morgan Potential Array Area assessed for PEIR. Therefore, it was concluded that the representative/indicative layout applied within the modelling studies undertaken for the PEIR were therefore deemed to provide appropriate information to support the physical processes assessment of the Morgan Generation Assets for the Environmental Statement.
- 1.3.2.9 In some cases, the modelling of construction activities extends beyond the revised Morgan Array Area boundary. These areas do however have bathymetry, tidal currents and sediment classifications consistent with those within the Morgan Potential Array Area presented at PEIR due to the close proximity. It is considered that, given these similarities, and that the revised layout represents a modest change in terms of the physical processes assessment, the modelling undertaken for the PEIR remains valid and has therefore been used to inform the physical processes assessment presented for the Environmental Statement.
- 1.3.2.10 However, more details of the modelling undertaken to inform the PEIR and final application have been included in this revised HRA Stage 1 Screening Report, and are also presented in Volume 4, Annex 1.1: Physical processes technical report of the Environmental Statement (Document Reference F4.1.1). These were not available at the time of writing the HRA Stage 1 Screening Report submitted for PEIR and were requested from Natural England to be included, during consultation (see Table 1.2).
- 1.3.2.11 This has modelled the predicted increases in SSC and associated sediment deposition for construction activities including sandwave clearance, drilling for foundation installation and inter-array and interconnector cable installation of which key details are below. A sample of three representative pile installation scenarios were simulated to cover the range of conditions found over the Morgan Array Area in terms of water depth, tidal currents and sediment grading:
- For piling scenario A (drilling for foundation installation), this scenario was modelled over successive neap tidal cycles at a location which exhibits slightly coarser graded material than at other locations modelled. Since current speeds are lower during neap tides, this presents a scenario with a reduced plume envelope and higher SSC for the range of potential operations. The average SSCs were modelled to be typically <30 mg/l at the sites and reduce rapidly with distance from the two discharge locations. Where the plumes converge concentrations are <1mg/l. Areas of increased suspended sediment may occur where material has been deposited on slack tide and subsequently re-suspended. Typically, the plume concentration is <50 mg/l, and reduces with the distance from the site as the sediment is dispersed. Sedimentation depths one day following the end of drilling were modelled, and gave values of <0.1



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mm, demonstrating that the settlement of sediment would be imperceptible to background sediment transport levels.

- For piling scenario B (drilling for foundation installation), this scenario was undertaken during spring tides when peak currents are typically double that of neap tides, so it was anticipated that the extent of the envelope would be greater than for scenario A. Finer sediments and sandwaves were also present at this location. Peak SSCs were found, from modelling, to be circa 50 mg/l and average values are typically less than one fifth of this magnitude. Average sedimentation levels of <0.1 mm were located at the site, and the sedimentation depths after one day following cessation of the two drilling operations were found to be typically less than 0.1 mm, demonstrating that this settlement would be imperceptible from the background sediment transport activity.
- For piling scenario C (drilling for foundation installation), this scenario is orientated in alignment with the tidal current to provide an augmented plume scenario under mean tidal currents. The sediment composition at this location comprised sandy sediments similar to those at scenario B. Peak SSCs were found, from modelling, to be similar to scenario B, and circa 50 mg/l where the plumes coalesce. For peak flood and ebb tides on the first day, the peak values in the centre of the plume envelope were circa 50 mg/l. SSC concentrations reduce as material settles and under these circumstances, peak concentrations are circa 50 mg/l and average values are typically one tenth of this value, with the peaks centred on areas of remobilised material. Similar to the piling scenarios A and B, native material from the sediment cell would be entrained into the baseline sediment transport patterns.
- During sandwave clearance, during the dredging phase, when 3% of the material is spilled at the seabed, the sediment plumes exhibit much lower concentrations. These are typically <50 mg/l along the clearance route. The release phase plume extent is slightly larger than the dredging plume with concentrations reaching 3,000 mg/l at the dumping site. At this site the greatest area of increased SSC, extending a tidal excursion circa 20 km from the site, is also associated with re-mobilisation of the deposited material on subsequent tides with concentrations of 500 to 1,000 mg/l whilst average levels <500 mg/l.
- During installation of the inter-array cables, it is clear that the sediment is dispersed on subsequent tides as the plume envelope illustrates the flood and ebb tidal excursions with peak values of 300 to 500 mg/l. Over the course of the operation, peak SSC concentrations were modelled to be up to 500 mg/l. The sedimentation is greatest at the location of the trenching and may be up to 50 mm in depth where the coarser material has settled within close proximity, circa 100 m. The depths reduce significantly with distance to <0.5 mm.
- During installation of the interconnector cables, the average suspended sediment plume gave rise to average SSCs of <50 mg/l offshore. The instantaneous SSCs for mid flood and ebb tides for day two, day three and day four show increases where sediment is released at the cable location. These show the plume travels east and west on the tide. SSCs along the route range between 50 and 1,000 mg/l, where the greatest levels are located at the source of the sediment release. One day following cessation of the sediment release show the sedimentation level is small, and typically <0.5 mm and the greatest levels of deposition would occur along the trenching route. Although this material is widely dispersed, sediment remains within the cell and would be

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drawn into the baseline transport regime with small increases in bed sediment levels.

- 1.3.2.12 From the physical processes modelling presented in Volume 4, Annex 1.1: Physical processes technical report of the Environmental Statement (Document Reference F4.1.1), some changes in sediment transport were revealed, however these were limited in magnitude and represented an adjustment in the transport path alignment. In all cases of modelling for construction activities, the material released was native to the bed sediments and, although there are periods of increased turbidity, the material was retained in the sediment cell and would be subsequently assimilated into the existing sediment transport regime.
- 1.3.2.13 On the basis of the physical processes modelling, increases in SSC were predicted to occur within a maximum plume envelope of approximately 22 km (i.e. 11 km in either direction), which corresponds with the tidal excursion. On the basis of the modelling outlined above, a precautionary buffer of 12 km has been adopted to screen sites within the Zol of increased SSC, sediment deposition and changes in physical processes.
- 1.3.2.14 Beyond this distance, any increases in SSC and sediment deposition would be so minimal that they would be imperceptible from natural background variation and would therefore not be capable of resulting in anything other than insignificant effects on designated features of a SAC. There are no European sites within the Zol and therefore no sites are screened in for further consideration in this HRA Stage 1 Screening Report.

### **Summary of initial screening of sites for Annex I habitats (offshore and coastal)**

- 1.3.2.15 The initial screening process has identified no European sites with Annex I habitat features to be taken forward for determination of LSE in section 1.4 of this report.

### **1.3.3 Sites designated for Annex II diadromous fish**

- 1.3.3.1 The following sections detail the results of the stepwise process to identify the European sites with relevant Annex II diadromous fish species to be taken forward for detailed determination of LSE based on the methodology and criteria outlined in section 1.2.6 and Table 1.3.
- 1.3.3.2 The approach adopted for this HRA Stage 1 Screening Report focusses on the Annex II diadromous fish qualifying interest features for which there is considered to be a potential for impact as a result of the Morgan Generation Assets. Whilst only these qualifying interest features will be screened in for further consideration, it is acknowledged that the Competent Authority must undertake the HRA screening, and any subsequent appropriate assessment, at the site level and not for individual qualifying interest features.

### **Initial identification for Annex II fish**

#### **Criterion 1**

- 1.3.3.3 Criterion 1 considers European or Ramsar sites which overlap with the Morgan Array Area. As there are no European sites with Annex II diadromous fish species as qualifying features which overlap with the Morgan Array Area, no sites are screened in for further consideration for diadromous fish on the basis of this criterion.

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### Criterion 2

- 1.3.3.4 Criterion 2 considers European or Ramsar sites with qualifying mobile features/species whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area.
- 1.3.3.5 There is the potential for activities associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets to result in impacts on Annex II diadromous fish species at a distance from the European sites for which they are qualifying interest features on the basis that these species are mobile and utilise both freshwater and marine environments throughout their life cycles.
- 1.3.3.6 A precautionary approach to the identification of relevant sites has been adopted in order to capture all sites with the potential for connectivity with the Morgan Generation Assets, and in particular to consider the potential for disruption to migration (i.e. barriers to migration) of diadromous fish (including but not limited to Atlantic salmon) to/from natal rivers (river of origin). For the purposes of HRA screening, a precautionary approach has been adopted using a preliminary buffer of 100 km from the Morgan Array Area for all Annex II diadromous fish species except Atlantic salmon and freshwater pearl mussel where the regional area has been considered (see Figure 1.3). These screening buffers take into account the likely migratory routes and distances for diadromous fish as outlined in ABPmer (2014) (see Figure 1.3), and follow the methodology outlined in the Plan Level HRA (The Crown Estate, 2021) and following feedback from stakeholders.
- 1.3.3.7 Given the location of the Morgan Generation Assets within the east Irish Sea it is unlikely that any SACs located along the west Irish Sea coast would be affected by any of the predicted impacts, for example SACs located on the east Coast of Ireland (e.g. River Slaney SAC and River Boyne and River Blackwater SAC), will be unaffected by the Morgan Generation Assets due to its location within the east Irish Sea not presenting a barrier to migration as shown in Figure 1.3. Similarly, only SACs located along the east Irish Sea coast have been included where the Morgan Generation Assets has the potential to create a barrier to migration for designated Annex II fish features (Figure 1.3).

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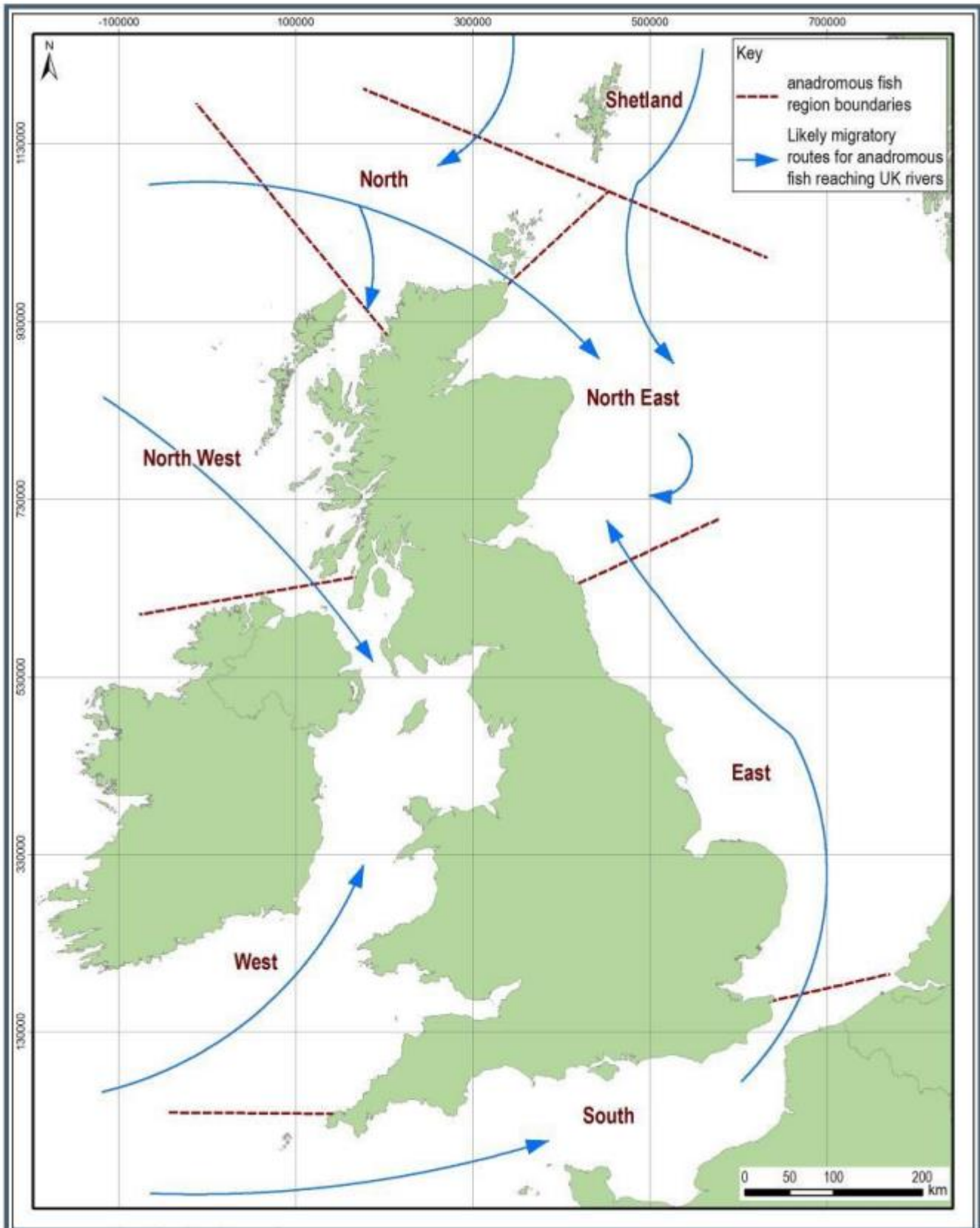


Figure 1.3: Likely migratory routes for anadromous fish reaching UK rivers (ABPmer, 2014).

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1.3.3.8 On this basis, a total of nine European sites have been screened in using this criterion and must, therefore, be taken forward for determination of LSE in section 1.4.3. These are:

- River Ehen SAC
- Dee Estuary/Aber Dyfrdwy SAC
- River Derwent and Bassenthwaite Lake SAC
- River Kent SAC
- Solway Firth SAC
- River Bladnoch SAC
- River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC
- Afon Gwyrfai a Llyn Cwellyn SAC
- River Eden SAC.

### **Criterion 3**

1.3.3.9 Criterion 3 considers European or Ramsar sites and/or qualifying interest features which are located within the potential ZoI of impacts associated with the Morgan Generation Assets (e.g., habitat loss/disturbance, sound and risk of collision). Given the large buffer proposed for criterion 2 above (100 km), the ZoI for key impacts to migratory fish species (i.e., underwater sound, habitat loss and increased SSC) are anticipated to be well within this range. No additional European sites with Annex II diadromous fish as qualifying features, beyond those already identified for criterion 2, are therefore screened in for further consideration on the basis of criterion 3.

### **Summary of initial screening of sites for Annex II diadromous fish**

1.3.3.10 The initial screening process has identified nine European sites with Annex II diadromous fish species as qualifying features to be taken forward for detailed determination of LSE in section 1.4.3 of this report. The sites are listed in Table 1.4 and illustrated in Figure 1.4.



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**Table 1.4: European and Ramsar sites designated for Annex II diadromous fish species taken forward for determination of LSE.**

Note: All distances are measured as the marine route to the site (i.e., not the distance as the crow flies).

<sup>1</sup> The Annex I offshore and coastal Annex I habitats which are also qualifying features of this site are screened out of further assessment on the basis of no receptor-impact pathway.

<sup>2</sup> All terrestrial habitats (i.e., above MHWS) and species have been screened out of further assessment on the basis of no receptor-impact pathway.

<sup>3</sup> Site is also designated for brook lamprey *Lampetra planeri* and bullhead *Cottus gobio* and white-clawed crayfish *Austropotamobius pallipes* (River Eden SAC only), but as these are not diadromous fish species (i.e., confined to the freshwater section of the river and do not migrate to the marine environment) there is no potential for connectivity with the Morgan Generation Assets and the features are screened out.

<sup>4</sup> Otter *Lutra lutra* is also a feature of this site, however this feature has been screened out of further assessment on the basis of no receptor-impact pathway.

<sup>5</sup> Although the freshwater pearl mussel is not a diadromous fish, Atlantic salmon are host species during a critical parasitic phase of the mussel's lifecycle. There could therefore, be an indirect impact upon the freshwater pearl mussel feature of the site if the salmon population is adversely affected.

<sup>6</sup> This site is only designated for freshwater pearl mussel, brown trout *Salmo trutta* is thought to be the host species within the River Kent SAC, however Atlantic salmon are also present within the river (Natural England 2019), the site is therefore screened in.

European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
River Ehen SAC	Atlantic salmon <i>Salmo salar</i> Freshwater pearl mussel <i>Margaritifera margaritifera</i> <sup>5</sup>	62.5	N/A
Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i>	70.1	Estuaries <sup>1</sup> Mudflats and sandflats not covered by seawater at low tide <sup>1</sup> <i>Salicornia</i> and other annuals colonising mud and sand <sup>1</sup> Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> ) <sup>1</sup> Annual vegetation of drift lines <sup>2</sup> Vegetated sea cliffs of the Atlantic and Baltic Coasts <sup>2</sup> Embryonic shifting dunes <sup>2</sup> Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes') <sup>2</sup> Fixed coastal dunes with herbaceous vegetation ('grey dunes') <sup>2</sup> Humid dune slacks <sup>2</sup> <i>Petalwort Petalophyllum ralfsii</i> <sup>2</sup>
River Derwent and Bassenthwaite Lake SAC	Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> River lamprey <i>Lampetra fluviatilis</i>	71.2	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea <sup>2</sup> Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation <sup>2</sup> Marsh fritillary butterfly <i>Euphydryas</i> ( <i>Eurodryas</i> , <i>Hypodryas</i> ) <i>aurinia</i> <sup>2</sup>



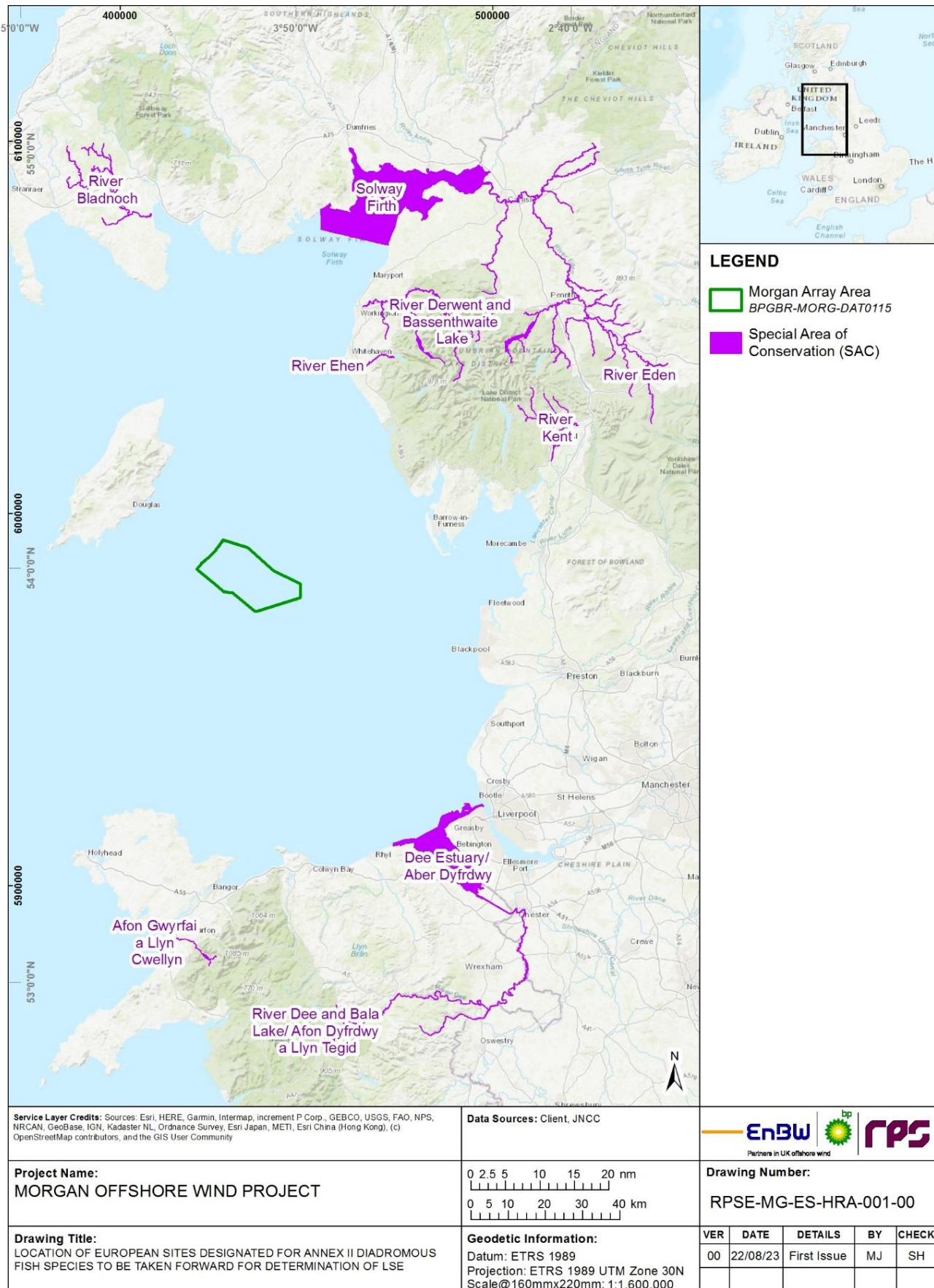
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European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
			Brook lamprey <i>Lampetra planeri</i> <sup>3</sup> Otter <i>Lutra lutra</i> <sup>4</sup> Floating water-plantain <i>Luronium natans</i> <sup>2</sup>
River Kent SAC	Freshwater pearl mussel <i>Margaritifera margaritifera</i> <sup>6</sup>	80.9	Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation <sup>2</sup> White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> <sup>2</sup> Bullhead <i>Cottus gobio</i> <sup>3</sup>
Solway Firth SAC	Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i>	84.7	Sandbanks which are slightly covered by sea water all the time <sup>1</sup> Estuaries <sup>1</sup> Mudflats and sandflats not covered by seawater at low tide <sup>1</sup> <i>Salicornia</i> and other annuals colonizing mud and sand <sup>1</sup> Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> ) <sup>1</sup> Reefs <sup>1</sup> Perennial vegetation of stony banks <sup>2</sup> Fixed coastal dunes with herbaceous vegetation ('grey dunes') <sup>2</sup>
River Bladnoch SAC	Atlantic salmon <i>Salmo salar</i>	89.8	N/A
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> River lamprey <i>Lampetra fluviatilis</i>	92.4	Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation <sup>2</sup> Floating water-plantain <i>Luronium natans</i> <sup>2</sup> Brook lamprey <i>Lampetra planeri</i> <sup>3</sup> Bullhead <i>Cottus gobio</i> <sup>3</sup> Otter <i>Lutra lutra</i> <sup>4</sup>
Afon Gwyrfai a Llyn Cwellyn SAC	Atlantic salmon <i>Salmo salar</i>	117.9	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea <sup>2</sup> Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation <sup>2</sup> Floating water-plantain <i>Luronium natans</i> <sup>2</sup> Otter <i>Lutra lutra</i> <sup>4</sup>

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European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
River Eden SAC	Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> River lamprey <i>Lampetra fluviatilis</i>	125.6	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea <sup>2</sup> Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation <sup>2</sup> Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) <sup>2</sup> White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> <sup>2</sup> Brook lamprey <i>Lampetra planeri</i> <sup>3</sup> Bullhead <i>Cottus gobio</i> <sup>3</sup> Otter <i>Lutra lutra</i> <sup>4</sup>

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**Figure 1.4: Location of European sites for Annex II diadromous fish species to be taken forward for determination of LSE.**

### 1.3.4 Sites designated for Annex II marine mammals

1.3.4.1 Based on data collected during the site-specific digital aerial surveys and information on marine mammal species in the Irish Sea from desk-based studies for the Morgan Generation Assets, the Annex II marine mammal species likely to occur in the vicinity of the Morgan Generation Assets and therefore considered in the HRA screening are:

- Harbour porpoise *Phocoena phocoena*
- Bottlenose dolphin *Tursiops truncatus*
- Grey seal *Halichoerus grypus*
- Harbour seal *Phoca vitulina*.

1.3.4.2 The following species were included in the Morgan Generation Assets Scoping Report and are considered to have the potential to occur within the Morgan Array Area, however these species are listed under Annex IV rather than Annex II of the EC Habitats Directive and therefore do not have SACs designated for them and will be assessed within Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4) and are not considered further within this document:

- Minke whale *Balaenoptera acutorostrata*
- White beaked dolphin *Lagenorhynchus albirostris* (note that this species has also been scoped out of the Environmental Statement as agreed in the marine mammal EWG)
- Short beaked common dolphin *Delphinus delphis*
- Risso's dolphin *Grampus griseus*.

#### Initial identification for Annex II marine mammals

1.3.4.3 The following sections detail the results of the stepwise process to identify the European sites with relevant Annex II marine mammals as qualifying features to be taken forward for detailed determination of LSE based on the methodology and criteria outlined in section 1.2.6 and Table 1.3.

1.3.4.4 The approach adopted for this HRA Stage 1 Screening Report focusses on the Annex II marine mammal qualifying interest features for which there is considered to be a potential for impact as a result of the Morgan Generation Assets. Whilst only these qualifying interest features have been screened in for further consideration in section 1.4, it is acknowledged that the Competent Authority must undertake the HRA screening, and any subsequent appropriate assessment, at the site level and not for individual qualifying interest features.

#### **Criterion 1**

1.3.4.5 Criterion 1 considers European or Ramsar sites which overlap with the Morgan Array Area. There are no sites with Annex II marine mammal species as qualifying features which overlap with the Morgan Array Area, therefore no sites are screened in for further consideration for marine mammals on the basis of this criterion.

#### **Criterion 2**

1.3.4.6 Criterion 2 considers European or Ramsar sites with qualifying mobile species whose range (e.g., foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area. There is the potential for activities associated



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with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets to result in impacts on Annex II marine mammal species at distance from the sites for which they are qualifying interest features on the basis that these are highly mobile species which potentially forage over wide areas. The relevant ranges for the different marine mammal receptors are discussed in the following paragraphs.

### Harbour porpoise

- 1.3.4.7 A precautionary approach to the identification of relevant sites for harbour porpoise has been adopted in order to capture all sites with the potential for connectivity with the Morgan Generation Assets based on criterion 2. On this basis, it has been considered that sites with harbour porpoise as qualifying interest features which are located within the same MU defined by the Inter-agency Marine Mammal Working Group (IMWWG) (2015) as the Morgan Generation Assets will be screened for LSE (Figure 1.5). For harbour porpoise all sites within the Celtic and Irish Seas MU have been considered. A total of 24 European sites for harbour porpoise have been identified to be taken forward for determination of LSE in section 1.4.4 (see Table 1.5 and Figure 1.5).

### Bottlenose dolphin

- 1.3.4.8 A precautionary approach to the identification of relevant sites for bottlenose dolphin has been adopted in order to capture all sites with the potential for connectivity with the Morgan Generation Assets based on criterion 2. On this basis, it has been considered that sites with bottlenose dolphin as qualifying interest features which are located within the same MU defined by IMWWG (2015) as the Morgan Generation Assets will be screened for LSE (Figure 1.5). For bottlenose dolphin therefore all sites within the Irish Sea MU have been considered. A total of two European sites for bottlenose dolphin have been identified to be taken forward for determination of LSE in section 1.4.4 (see Table 1.5 and Figure 1.5).

### Grey seal

- 1.3.4.9 All SACs designated for grey seal located within the same Seal MUs (SCOS, 2020) as the Morgan Generation Assets (i.e. the Wales MU, North West England MU, SW Scotland and Northern Ireland MU) have been screened for LSE (Figure 1.6). Following advice received from NRW during the section 42 consultation (Table 1.2), the OSPAR Region III Interim MU (presented in Figure 1.6) has also been considered to identify any additional sites with grey seal as a qualifying feature, which may have connectivity with the Morgan Generation Assets. More recent sources on seal foraging ranges presented in Carter *et al.* (2022) and telemetry data presented in Appendix 2 Volume 4, Annex 4.1 Marine mammal technical report of the Environmental Statement (Document Reference F4.4.1), (Wright and Sinclair, 2022) have also been considered (see paragraph 1.4.4.9). A total of 20 European sites for grey seal have been identified to be taken forward for determination of LSE in section 1.4.4 (see Table 1.5 and Figure 1.6).

### Harbour seal

- 1.3.4.10 All SACs designated for harbour seal are located within the same Seal MUs (SCOS, 2020) as the Morgan Generation Assets (the Wales and North West England MU) have been considered by the screening (Figure 1.6). In addition, a screening range has been applied to identify sites for inclusion in the assessment of LSE for harbour

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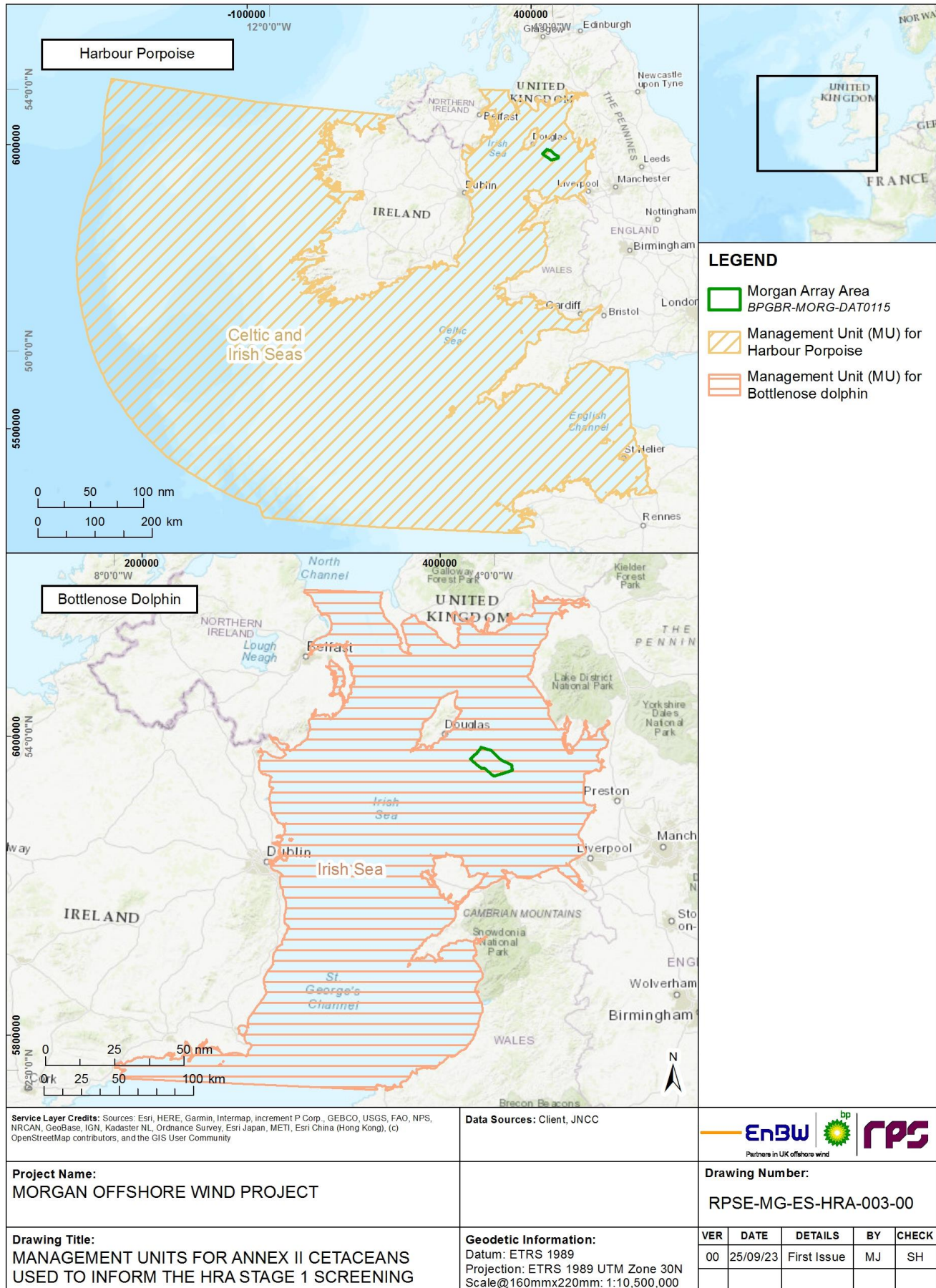
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seal which is based on the typical foraging range of this species. Harbour seal tend to make relatively short foraging trips from haul out sites and the latest Special Committee on Seals (SCOS) report (SCOS, 2020) states that harbour seal typically forage at distances of 40 km to 50 km from haul out sites. However, more recent sources on seal foraging ranges presented in Carter *et al.* (2022) and telemetry data presented in Appendix 2 Volume 4, Annex 4.1 Marine mammal technical report of the Environmental Statement (Document Reference F4.4.1), (Wright and Sinclair, 2022) have also been considered (see paragraph 1.4.4.12).

- 1.3.4.11 The screening process for harbour seal includes any European site where the species is considered as a qualifying feature. Two European sites for harbour seal have been identified to be taken forward for determination of LSE in section 1.4.4 (see Table 1.5 and Figure 1.7).

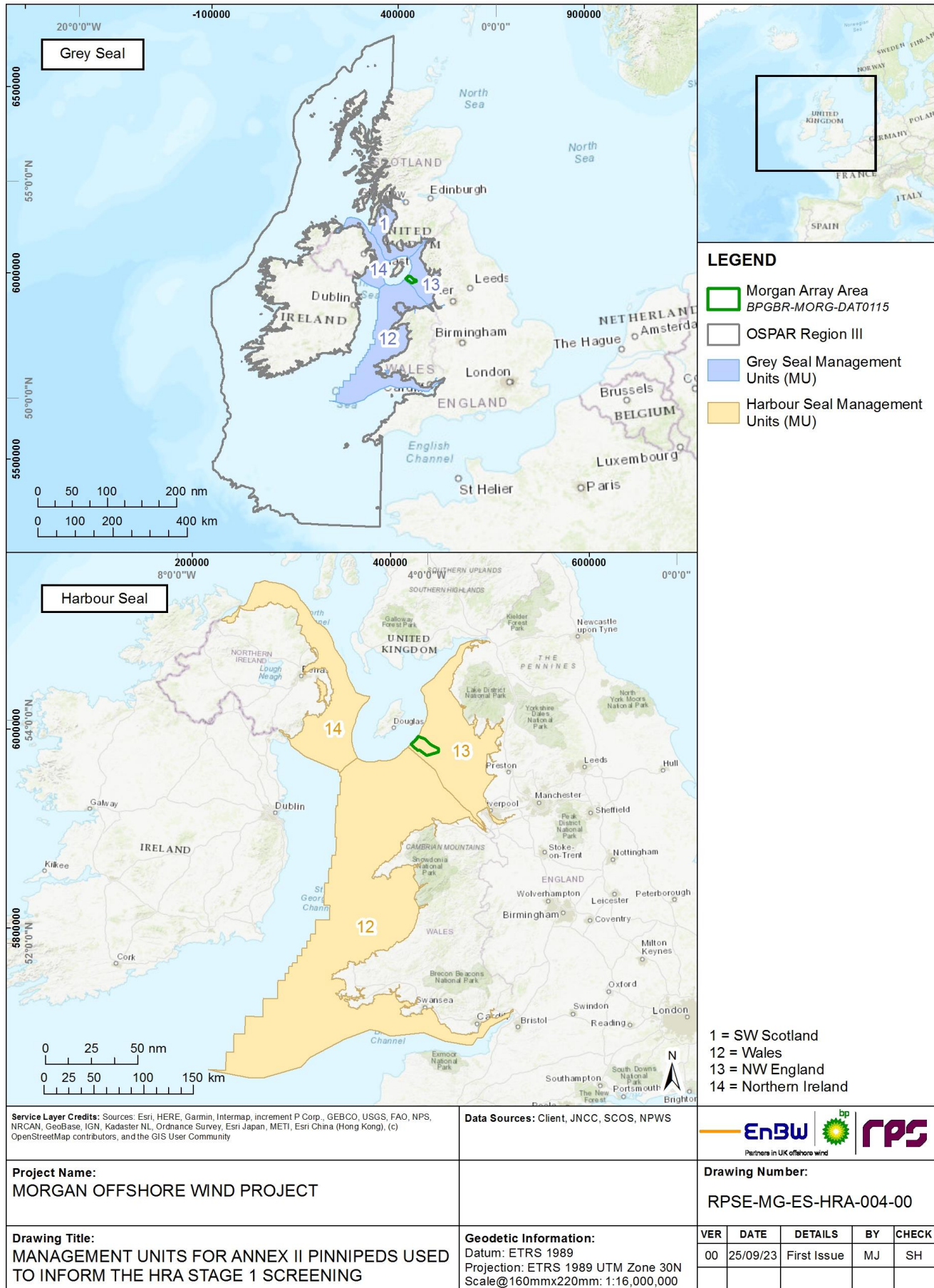


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**Figure 1.5: MUs for Annex II cetaceans used to inform the HRA Stage 1 Screening.**

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**Figure 1.6: MUs for Annex II pinnipeds used to inform the HRA Stage 1 Screening.**



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**Criterion 3**

1.3.4.12 Criterion 3 considers European sites and/or qualifying interest features which are located within the potential Zol of impacts associated with the Morgan Generation Assets (e.g., habitat loss/disturbance, sound and risk of collision). Given the large buffers proposed above for both cetaceans and pinnipeds in criterion 2, the Zol for key impacts to marine mammals (i.e., underwater sound and changes to prey species) are anticipated to be well within this area. No additional European sites have marine mammal species as qualifying features, beyond those already identified for criterion 2; therefore, no additional sites have been screened in for further consideration on the basis of this criterion.

**Summary of initial screening of sites for Annex II marine mammals**

1.3.4.13 The initial screening process has identified 43 European sites with Annex II marine mammals as qualifying features to be taken forward for detailed determination of LSE in section 1.4 of this report. The sites are listed in Table 1.5 and shown in Figure 1.7.

**Table 1.5: European sites designated for Annex II marine mammal species taken forward for determination of LSE.**

Note: All distances are measured as the marine route to the site (i.e., not the distance as the crow flies).

<sup>1</sup> All additional designated features associated with each SAC have been screened out on the basis of distance from the Morgan Generation Assets and so there will be no receptor-impact pathway. Additional Annex II marine mammal features have been screened out on the basis that the SAC is not located within the relevant MU for that species and so there will be no receptor-impact pathway.

European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
<b>UK</b>			
North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>	28.2	N/A
North Channel SAC	Harbour porpoise <i>Phocoena phocoena</i>	64.0	N/A
Strangford Lough SAC	Harbour seal <i>Phoca vitulina</i>	94.7	Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Large shallow inlets and bays Reefs Annual vegetation of drift lines Perennial vegetation of stony banks <i>Salicornia</i> and other annuals colonizing mud and sand Atlantic salt meadows ( <i>Glaucopuccinellietalia maritima</i> )
Murlough SAC	Harbour seal <i>Phoca vitulina</i>	98.4	Fixed coastal dunes with herbaceous vegetation ('grey dunes') Atlantic decalcified fixed dunes ( <i>Calluno-Ulicetea</i> ) Sandbanks which are slightly covered by sea water all the time

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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
			<p>Mudflats and sandflats not covered by seawater at low tide</p> <p>Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)</p> <p>Embryonic shifting dunes</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)</p> <p>Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>)</p> <p>Marsh fritillary butterfly <i>Euphydryas aurinia</i></p>
<p>Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC</p>	<p>Bottlenose dolphin <i>Tursiops truncatus</i></p> <p>Grey seal <i>Halichoerus grypus</i></p>	<p>119.7</p>	<p>Sandbanks which are slightly covered by sea water all the time</p> <p>Estuaries</p> <p>Coastal lagoons</p> <p>Large shallow inlets and bays</p> <p>Reefs</p> <p>Mudflats and sandflats not covered by seawater at low tide</p> <p>Salicornia and other annuals colonizing mud and sand</p> <p>Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)</p> <p>Submerged or partially submerged sea caves</p> <p>Otter <i>Lutra lutra</i></p>
<p>West Wales Marine/Gorllewin Cymru Forol SAC</p>	<p>Harbour porpoise <i>Phocoena phocoena</i></p>	<p>121.0</p>	<p>N/A</p>
<p>The Maidens SAC</p>	<p>Grey seal <i>Halichoerus grypus</i></p>	<p>142.0</p>	<p>Sandbanks which are slightly covered by sea water all the time</p> <p>Reefs</p>
<p>Cardigan Bay/Bae Ceredigion SAC</p>	<p>Bottlenose dolphin <i>Tursiops truncatus</i></p> <p>Grey seal <i>Halichoerus grypus</i></p>	<p>188.1</p>	<p>Sandbanks which are slightly covered by sea water all the time</p> <p>Reefs</p> <p>Submerged or partially submerged sea caves</p> <p>Sea lamprey <i>Petromyzon marinus</i></p> <p>River lamprey <i>Lampetra fluviatilis</i></p>
<p>Pembrokeshire Marine/Sir Benfro Forol SAC</p>	<p>Grey seal <i>Halichoerus grypus</i></p>	<p>237.3</p>	<p>Estuaries</p> <p>Large shallow inlets and bays</p> <p>Reefs</p> <p>Sandbanks which are slightly covered by sea water all the time</p> <p>Mudflats and sandflats not covered by seawater at low tide</p> <p>Coastal lagoons</p>

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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
			Atlantic salt meadows ( <i>Glaucopuccinellietalia maritimae</i> ) Submerged or partially submerged sea caves Shore dock <i>Rumex rupestris</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i>
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour porpoise <i>Phocoena phocoena</i>	300.5	N/A
Lundy SAC	Grey seal <i>Halichoerus grypus</i>	335.1	Reefs Sandbanks which are slightly covered by sea water all the time Submerged or partially submerged sea caves
Treshnish Isles SAC	Grey seal <i>Halichoerus grypus</i>	332.4	Submerged or partially submerged sea caves
Isles of Scilly Complex SAC	Grey seal <i>Halichoerus grypus</i>	464.9	Sandbanks which are slightly covered by sea water all the time Mudflats and sandflats not covered by seawater at low tide Reefs Shore dock <i>Rumex rupestris</i>
Monach Islands SAC	Grey seal <i>Halichoerus grypus</i>	456.1	Machairs Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes)
North Rona SAC	Grey seal <i>Halichoerus grypus</i>	646.6	Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts Submerged or partially submerged sea caves
<b>Republic of Ireland</b>			
Rockabill to Dalkey Island SAC	Harbour porpoise <i>Phocoena phocoena</i>	123.4	Reefs
Lambay Island SAC	Grey seal <i>Halichoerus grypus</i>	130.4	Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts Harbour seal <i>Phoca vitulina</i>
Saltee Islands SAC	Grey seal <i>Halichoerus grypus</i>	259.5	Mudflats and sandflats not covered by seawater at low tide Large shallow inlets and bays

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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
			Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts Submerged or partially submerged sea caves
Horn Head and Rinclevan SAC	Grey seal <i>Halichoerus grypus</i>	329.9	Embryonic shifting dunes Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with <i>Salix repens</i> ssp. <i>argentea</i> <i>Salicion arenariae</i> Humid dune slacks Machairs Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> Geyer's whorl snail <i>Vertigo geyeri</i> Grey seal <i>Halichoerus grypus</i> Petalwort <i>Petalophyllum ralfsii</i> Slender Naiad <i>Najas flexilis</i>
Slieve Tooley/Tormore Island/Loughros Beg Bay SAC	Grey seal <i>Halichoerus grypus</i>	413.6	Vegetated sea cliffs of the Atlantic and Baltic coasts Atlantic salt meadows <i>Glaucopuccinellietalia maritimae</i> Mediterranean salt meadows <i>Juncetalia maritimi</i> Embryonic shifting dunes Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Decalcified fixed dunes with <i>Empetrum nigrum</i> Atlantic decalcified fixed dunes <i>Calluno-Ulicetea</i> Dunes with <i>Salix repens</i> ssp. <i>argentea</i> <i>Salicion arenariae</i> Humid dune slacks Alpine and Boreal heaths Blanket bogs Narrow-mouthed whorl snail <i>Vertigo angustior</i> Otter <i>Lutra lutra</i>
Duvillaun Islands SAC	Grey seal <i>Halichoerus grypus</i>	532.9	Bottlenose dolphin <i>Tursiops truncatus</i>



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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
Inishbofin and Inishshark SAC	Grey seal <i>Halichoerus grypus</i>	576.9	Coastal lagoons Oligotrophic waters containing very few minerals of sandy plains <i>Littorelletalia uniflorae</i> Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths
Inishkea Islands SAC	Grey seal <i>Halichoerus grypus</i>	518.1	Machairs Petalwort <i>Petalophyllum ralfsii</i>
Slyne Head Islands SAC	Grey seal <i>Halichoerus grypus</i>	607.2	Reefs Bottlenose dolphin <i>Tursiops truncatus</i>
Roaring water Bay and Islands SAC	Harbour porpoise <i>Phocoena phocoena</i> Grey seal <i>Halichoerus grypus</i>	472.9	Large shallow inlets and bays Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts European dry heaths Submerged or partially submerged sea caves Otter <i>Lutra lutra</i>
Blasket Islands SAC	Harbour porpoise <i>Phocoena phocoena</i> Grey seal <i>Halichoerus grypus</i>	589.6	Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts European dry heaths Submerged or partially submerged sea caves

**France**

Mers Celtiques - Talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>	558.8	Bottlenose dolphin <i>Tursiops truncatus</i> Fen orchid <i>Liparis loeselii</i> Southern damsel fly <i>Coenagrion mercurial</i> Jersey tiger <i>Euplagia quadripunctaria</i>
Abers - Côte des legends SCI	Harbour porpoise <i>Phocoena phocoena</i>	625.7	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i>
Ouessant-Molène SCI	Harbour porpoise <i>Phocoena phocoena</i>	626.9	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Otter <i>Lutra lutra</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
Côte de Granit rose-Sept-Iles SCI	Harbour porpoise <i>Phocoena phocoena</i>	633.3	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>

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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
			Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Atlantic salmon <i>Salmo salar</i> Sea lamprey <i>Petromyzon marinus</i> Quimper snail <i>Elona quimperiana</i> European <i>Lucanus cervus</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
Anse de Goulven, dunes de Keremma SCI	Harbour porpoise <i>Phocoena phocoena</i>	635.8	Grey seal <i>Halichoerus grypus</i> Fen orchid <i>Liparis loeselii</i> Southern <i>Coenagrion mercuriale</i> Jersey tiger <i>Euplagia quadripunctaria</i>
Tregor Goëlo SCI	Harbour porpoise <i>Phocoena phocoena</i>	656.2	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra planeri</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Atlantic salmon <i>Salmo salar</i> Chabot bullhead <i>Cottus perifretum</i> Quimper snail <i>Elona quimperiana</i> Southern damselfly <i>Coenagrion mercuriale</i> European stag beetle <i>Lucanus cervus</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
Côtes de Crozon SCI	Harbour porpoise <i>Phocoena phocoena</i>	664.4	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Otter <i>Lutra lutra</i>
Chaussée de Sein SCI	Harbour porpoise <i>Phocoena phocoena</i> Grey seal <i>Halichoerus grypus</i>	675.6	Bottlenose dolphin <i>Tursiops truncatus</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>

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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
			Western barbastelle <i>Barbastella barbastellus</i> Qumiper snail <i>Elona quimperiana</i> Southern damselfly <i>Coenagrion mercurial</i> Marsh fritillary <i>Euphydryas aurinia</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
Cap Sizun SCI	Harbour porpoise <i>Phocoena phocoena</i>	684.5	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Qumiper snail <i>Elona quimperiana</i> Southern damselfly <i>Coenagrion mercurial</i> Marsh fritillary <i>Euphydryas aurinia</i> Killarney fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
Récifs du talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>	712.7	Bottlenose dolphin <i>Tursiops truncatus</i>
Anse de Vauville SCI	Harbour porpoise <i>Phocoena phocoena</i>	722.8	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i>
Cap d'Erquy-Cap Fréhel SCI	Harbour porpoise <i>Phocoena phocoena</i>	724.1	Bottlenose dolphin <i>Tursiops truncatus</i> Harbour seal <i>Halichoerus grypus</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Northern crested newt <i>Triturus cristatus</i> European stag beetle <i>Lucanus cervus</i> Shore dock <i>Rumex rupestris</i>

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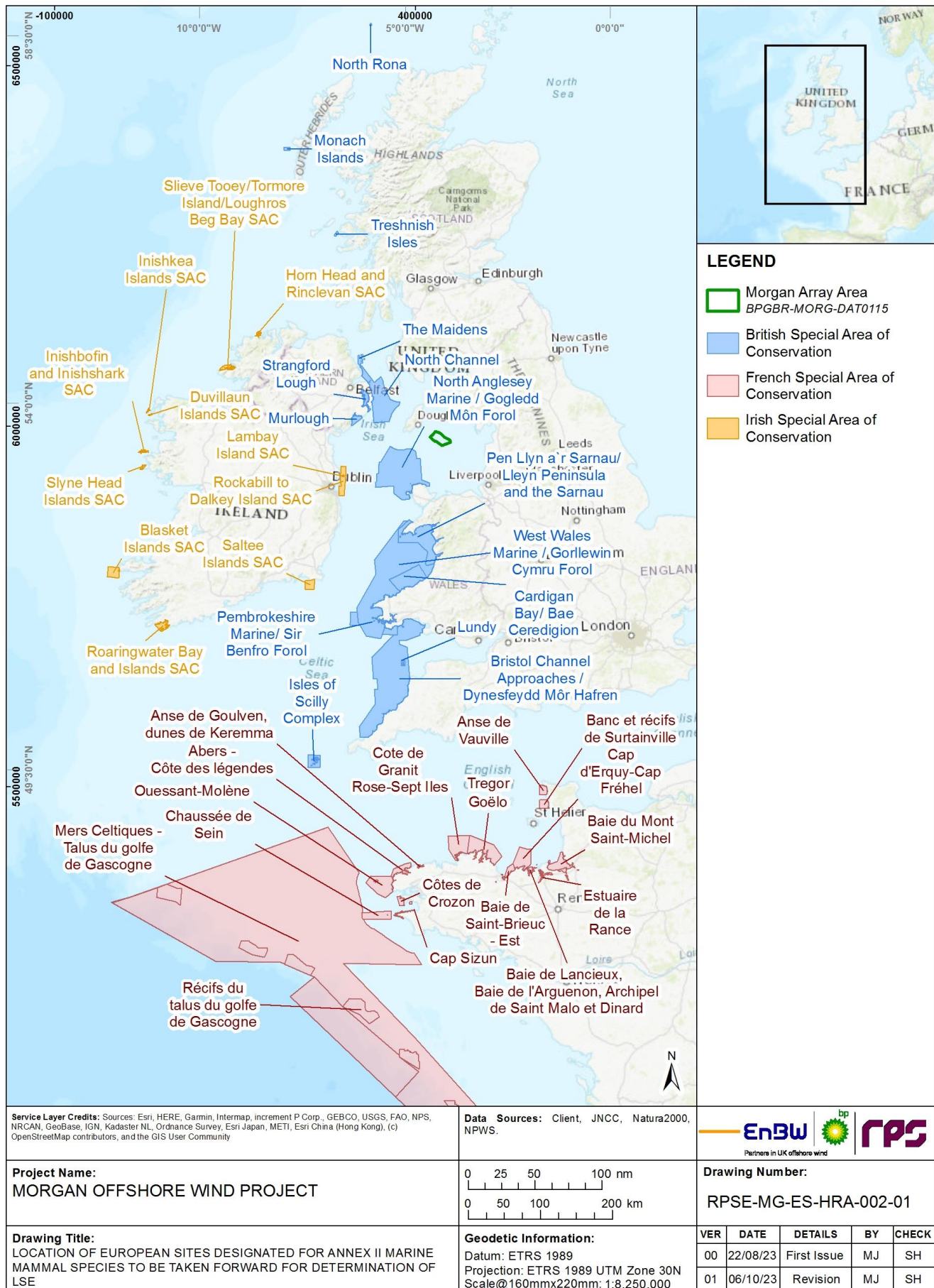
European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
Baie de Saint-Brieuc – Est SCI	Harbour porpoise <i>Phocoena phocoena</i>	724.8	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Bechstein's bat <i>Myotis bechsteinii</i> Otter <i>Lutra lutra</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Shore dock <i>Rumex rupestris</i> Moss grass <i>Coleanthus subtilis</i>
Banc et récifs de Surtainville SCI	Harbour porpoise <i>Phocoena phocoena</i>	726.9	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i>
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI	Harbour porpoise <i>Phocoena phocoena</i>	750.2	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> European stag beetle <i>Lucanus cervus</i> Shore dock <i>Rumex rupestris</i>

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European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
Estuaire de la Rance SCI	Harbour porpoise <i>Phocoena phocoena</i>	763.4	Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Western barbastelle <i>Barbastella barbastellus</i> Common bent-winged bat <i>Miniopterus schreibersii</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> European stag beetle <i>Lucanus cervus</i>
Baie du Mont Saint-Michel SCI	Harbour porpoise <i>Phocoena phocoena</i>	769.0	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Northern crested newt <i>Triturus cristatus</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra planeri</i> Brook lamprey <i>Lampetra fluviatilis</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Atlantic salmon <i>Salmo salar</i> European bullhead <i>Cottus gobio</i>



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**Figure 1.7: Location of European Sites designated for Annex II marine mammal species to be taken forward for the determination of LSE.**



## 1.3.5 Sites designated for offshore ornithological features

### Initial identification for offshore ornithological features

#### Defining the qualifying features and sites: broad-scale considerations

1.3.5.1 Birds present in offshore waters and potentially affected by the construction, operations and decommissioning of the Morgan Generation Assets will be predominantly seabirds (defined for this report as auks, gulls, terns, gannets, skuas, shearwaters, petrels, cormorants and divers) and seaducks. These species have the potential to be present in the vicinity of the Morgan Generation Assets during the breeding and non-breeding seasons (including the spring and autumn passage periods). Other bird species that may be affected by the Morgan Generation Assets include those which may fly through the area of the Morgan Generation Assets during their spring and/or autumn migration (or passage) periods (e.g., waterbirds). Consideration is therefore given to the following bird categories:

- Breeding seabirds in the breeding season (e.g., lesser black-backed gull *Larus fuscus* at the Bowland Fells SPA).
- Breeding seabirds in the non-breeding season (e.g., lesser black-backed gull at the Bowland Fells SPA outside of the breeding season).
- Non-breeding seabirds (e.g., red-throated diver *Gavia stellata* at the Liverpool Bay SPA).
- Migratory seabirds (little gull *Hydrocoloeus minutus*, tern species (Sternidae), petrel species (Hydrobatidae), shearwater species (Procellariidae), skua species (Stercorariidae).
- Migratory waterbirds.

1.3.5.2 Based on the above, it is considered that (in relation to offshore ornithology) the SPAs (and Ramsar sites) which have the potential to be affected by the Morgan Generation Assets are those which:

- Overlap with the location of the Morgan Array Area, or with the area in which potential effects from the Morgan Generation Assets could extend (defined below).
- Include seabird qualifying features that use the waters in and around the Morgan Array Area (e.g., for foraging).
- Include qualifying features which may fly through the area of the Morgan Array Area during migration.

1.3.5.3 The spatial criteria used to identify connectivity for each bird category are presented in Table 1.6 with the areas in which potential effects from the Morgan Generation Assets could extend, defined in Table 1.7.

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**Table 1.6: Spatial criteria used to identify connectivity for each bird category.**

Bird category	Spatial criteria
Breeding seabirds in the breeding season	The Foraging Ranges Screening Tool is applied for relevant breeding seabirds. This tool was developed by NIRAS for NatureScot and applies the recommended screening parameters (i.e., Woodward <i>et al.</i> , 2019, mean maximum foraging range plus 1 SD) as recommended by NatureScot (2023a) and by JNCC as part of the Expert Working Group (EWG05). The Foraging Ranges Screening Tool enables users to define or upload a shapefile of proposed development areas. The tool then identifies where the boundary overlaps with a foraging range(s) and provides a list of sites and features with potential connectivity to the Morgan Generation Assets project.
Marine SPAs	Connectivity is identified with marine SPAs, defined as SPAs that cover a sea area that is used by birds from breeding colonies for foraging, roosting or other behaviours, when connectivity is identified with breeding colony SPAs from which birds that utilise the marine SPAs may originate.
Breeding seabirds in the non-breeding season	Breeding birds from SPAs and Ramsar sites in the non-breeding season are not constrained to specific areas due to the necessity to provision young, and typically disperse to exploit areas far beyond their breeding colonies. During the non-breeding season, therefore, the birds present within the Morgan Array Area may originate from sites that are further away than those considered in the breeding season. Furness (2015) considered how breeding seabirds disperse in the non-breeding season, defining the regions within which those populations would be distributed and for each region a Biologically Defined Minimum Population Scale (BDMPS) was calculated. Screening has applied those BDMPS regions and populations. Where the Morgan Generation Assets overlaps with a BDMPS region, potential connectivity is assumed with the population associated with that region (as defined by Furness, 2015) and the SPAs that contribute to that population.
Non-breeding seabirds in the non-breeding season	Where the Morgan Generation Assets overlaps with the SPA or Ramsar site boundary only.
Migrating seabirds and migratory waterbirds	Migratory waterbirds and seabirds that breed in sites designated as SPA/Ramsar in areas of the UK that are distant from the project have some potential to interact with the Morgan Generation Assets during bi-annual migratory movements. Information has been obtained from relevant data sources to infer potential connectivity, namely; Wright <i>et al.</i> , 2012; WWT and MacArthur Green (2014)

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**Table 1.7: Areas in which potential effects from the Morgan Generation Assets could extend.**

Notes: C (Construction), O&M (Operations and maintenance) and D (Decommissioning).

Impact	Development phase of relevance			Area
	C	O&M	D	
Temporary habitat loss/disturbance and increased SSCs	✓		✓	Footprint of the Morgan Array Area plus a 10 km buffer
Disturbance and displacement from airborne sound and presence of vessels and infrastructure	✓	✓	✓	Footprint of the Morgan Array Area and species-specific buffers based on JNCC <i>et al.</i> (2022).
Changes in prey availability	✓	✓	✓	Footprint of the Morgan Array Area plus a 10 km buffer
Accidental pollution	✓	✓	✓	Footprint of the Morgan Array Area plus a 10 km buffer
Permanent habitat loss/disturbance and increased SSC		✓		Footprint of the Morgan Array Area plus a 10 km buffer
Collision risk		✓		Footprint of the Morgan Array Area only
Barrier to movement		✓		Footprint of the Morgan Array Area and species-specific buffers based on JNCC <i>et al.</i> (2022).

**Breeding seabirds in the breeding season**

**Breeding seabird colony SPAs**

- 1.3.5.4 Seabird species may have large foraging ranges during the breeding season (Table 1.8; Woodward et al., 2019). Therefore, the Morgan Generation Assets could potentially have connectivity with seabird qualifying features from a large number of SPA breeding colonies. The area within which the Morgan Generation Assets are located may be used by these qualifying features when foraging, or when commuting between the colony and foraging areas.
- 1.3.5.5 To determine the breeding seabird colony SPAs which may have connectivity with the Morgan Generation Assets during the breeding season, those SPAs located within a species' mean maximum foraging range plus one SD (unless otherwise specified within Table 1.8) were considered. The foraging ranges used to identify connectivity are consistent with those recommended by JNCC during the Expert Working Group (EWG05) for the project.

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**Table 1.8: Foraging ranges used to identify connectivity between SPA breeding seabird colonies and the Morgan Generation Assets.**

Species	Mean maximum foraging range (km) ± 1SD (unless otherwise stated)
Eider <i>Somateria mollissima</i>	21.5 (Mean-max only)
Kittiwake <i>Rissa tridactyla</i>	156.1 ± 144.5
Black-headed gull <i>Chroicocephalus ridibundus</i>	18.5
Mediterranean gull <i>Ichthyaetus melanocephalus</i>	20 (Mean-max only)
Common gull <i>Larus canus</i>	50 (Mean-max only)
Great black-backed gull <i>Larus marinus</i>	73 (Mean-max only)
Herring gull <i>Larus argentatus</i>	58.8 ± 26.8
Lesser black-backed gull <i>Larus fuscus</i>	127 ± 109
Sandwich tern <i>Thalasseus sandvicensis</i>	34.3 ± 23.2
Little tern <i>Sternula albifrons</i>	5 (Mean-max only)
Roseate tern <i>Sterna dougallii</i>	12.6 ± 10.6
Common tern <i>Sterna hirundo</i>	18.0 ± 8.9
Arctic tern <i>Sterna paradisea</i>	25.7 ± 14.8
Great skua <i>Stercorarius skua</i>	443.3 ± 487.9
Arctic skua <i>Stercorarius parasiticus</i>	2 ± 0.7
Guillemot <i>Uria aalge</i>	55.5 ± 39.7 (Use of mean max+1SD discounting Fair Isle values, as presented in Woodward <i>et al.</i> (2019))
Razorbill <i>Alca torda</i>	73.8 ± 48.4 (Use of mean max+1SD discounting Fair Isle values, as presented in Woodward <i>et al.</i> (2019))
Black guillemot <i>Cephus grylle</i>	4.8 ± 4.3
Puffin <i>Fratercula arctica</i>	137.1 ± 128.3 (excl. Fair Isle data = 119.6±131.2) (as requested by JNCC as part of the EWG)
Red-throated diver <i>Gavia stellata</i>	9 (Mean-max only)
European storm petrel <i>Hydrobates pelagicus</i>	336 (Mean-max only)
Leach's petrel <i>Oceanodroma leucorhoa</i>	657 (Mean)
Fulmar <i>Fulmarus glacialis</i>	542.3 ± 657.9
Manx shearwater <i>Puffinus puffinus</i>	1,346.8 ± 1,018.7
Gannet <i>Morus bassanus</i>	315.2 ± 194.2 (for colonies without site specific maximum values. However, for Grassholm SPA and St Kilda SPA where site specific evidence exceeds this value (509.4 km), 516.7 km and 709 km are used respectively.)
Cormorant <i>Phalacrocorax carbo</i>	25.6 ± 8.3
Shag <i>Phalacrocorax aristotelis</i>	13.2 ± 10.5

1.3.5.6 A number of SPAs located on the west coast of Ireland have breeding features within foraging range (e.g., fulmar, Manx shearwater, Leach's petrel, gannet). However,

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these have been screened out as although the Morgan Generation Assets are within the foraging range of several species (as mentioned above), birds from the west coast colonies are highly unlikely to make frequent movements into the Irish Sea and interact with the Morgan Generation Assets and therefore there is no potential for significant effects to occur to these species from these SPAs.

1.3.5.7 The Screening Tool does not discriminate between land and sea and there are occasions where the foraging range of a feature appears to have connectivity with the Morgan Generation Assets, but this has only occurred because the tool has projected a species foraging range across an intervening land mass. It is highly unlikely that seabirds will traverse significant distances over land in order to forage. In these cases a judgement is made as to whether connectivity would still be indicated if foraging was restricted only to sea areas. The tool identified the following SPA features for which it is considered there is no connectivity with the Morgan Generation Assets in the breeding season:

- Northumberland Marine SPA – fulmar and lesser black-backed gull
- Coquet Island SPA – fulmar and lesser black-backed gull
- Forth Islands SPA – gannet and lesser black-backed gull.

1.3.5.8 The foraging range tool does not differentiate between SPAs designated to protect breeding features (e.g., Coquet Island SPA) and those designated to protect the foraging areas of breeding features from adjacent SPAs (e.g., Northumberland Marine SPA). In these cases it is incorrect to apply an additional foraging to the SPA boundary as this would over-estimate the foraging area utilised by relevant features. In relation to the Morgan Generation Assets the foraging range tool identified connectivity with the Morgan Generation Assets and the following SPAs and associated features:

- Liverpool Bay SPA – common tern
- Anglesey Terns/Morwenoliaid Ynys Môn SPA – Sandwich tern
- Outer Firth of Forth and St Andrew's Bay Complex SPA – Manx shearwater, gannet and kittiwake.

1.3.5.9 Connectivity does not exist between these SPA features and the Morgan Generation Assets, as the Morgan Generation Assets are located beyond the foraging range of these features from the breeding colonies that either form part of the SPA or form part of an adjacent SPA.

1.3.5.10 In addition, any SPAs in the North Sea or on Orkney and Shetland for which connectivity was identified with the Morgan Generation Assets have been excluded from further consideration. These SPAs, in most cases support species that did not occur at the Morgan Generation Assets in the breeding season (e.g., great skua, Leach's petrel (see Table 1.10) or forage over considerable areas and are therefore unlikely to exhibit connectivity with the Morgan Generation Assets, and even if birds were to occur they would not do so in numbers that would result in a Likely Significant Effect. This is relevant to following SPAs and associated features:

- Fowlsheugh SPA – Fulmar
- Buchan Ness to Collieston Coast SPA – Fulmar
- Troup, Pennan and Lion's Heads SPA – Fulmar
- East Caithness Cliffs SPA – Fulmar
- North Caithness Cliffs SPA - Fulmar



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- Hoy SPA – Fulmar and great skua
- Copinsay – Fulmar
- Sule Skerry and Sule Stack – Leach’s petrel
- Rousay – Fulmar
- Calf of Eday - Fulmar
- West Westray - Fulmar
- Fair Isle - Fulmar
- Sumburgh Head - Fulmar
- Foula – Fulmar and great skua
- Noss – Fulmar and great skua
- Ronas Hill - North Roe and Tingon – Great skua
- Fetlar – Fulmar and great skua
- Hermaness, Saxa Vord and Valla Field – Fulmar and great skua.

1.3.5.11 The list of SPAs for which connectivity has been identified when using the generic foraging ranges incorporated into Foraging Ranges Screening Tool is provided in Table 1.9.

**Table 1.9: Seabird connectivity in the breeding season.**

Notes:

<sup>1</sup> Measured as the closest, straight line, distance from the SPA (irrespective of the presence of land masses).

<sup>2</sup> Relevant qualifying features are seabird and seaduck species only, and non-seabird qualifying features of these SPAs (e.g., chough, corncrake etc.) are not listed.

Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>
Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar/Duddon Estuary Ramsar	UK9020326	31.3	Herring gull
	UK11045		Lesser black-backed gull
	UK11022		Sandwich tern
			Breeding seabird assemblage
Ribble and Alt Estuaries SPA / Ribble and Alt Estuaries Ramsar	UK9005103	51.0	Lesser black-backed gull
	UK11057		Breeding seabird assemblage
Bowland Fells	UK9005151	70.0	Lesser black-backed gull
Copeland Islands	UK9020291	112.3	Manx shearwater
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island	UK9013121	128.7	Manx shearwater
Lambay Island	IE0004069	130.4	Lesser black-backed gull

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>
			Kittiwake
			Puffin
			Fulmar
			Breeding seabird assemblage
Ireland's Eye	IE0004117	138.6	Kittiwake
Howth Head Coast	IE0004113	139.3	Kittiwake
Ailsa Craig	UK9003091	142.3	Gannet
			Kittiwake
			Lesser black-backed gull
			Breeding seabird assemblage
Wicklow Head	IE0004127	165.4	Kittiwake
Rathlin Island	UK0030055	186.1	Kittiwake
			Fulmar
			Lesser black-backed gull
			Puffin
			Breeding seabird assemblage
Skomer, Skokholm and the seas off Pembrokeshire/Sgomer, Sgogwm a moroedd Benfro	UK9014051	252.0	Manx shearwater
			Storm petrel
			Kittiwake
			Puffin
			Breeding seabird assemblage
North Colonsay and Western Cliffs	UK9003171	257.6	Kittiwake
			Breeding seabird assemblage
Grassholm	UK9014041	260.3	Gannet
Saltee Islands	IE0004002	265.9	Gannet
			Kittiwake
			Puffin

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>
			Fulmar
			Breeding seabird assemblage
Horn Head to Fanad Head	IE0004194	296.3	Fulmar
			Breeding seabird assemblage
Treshnish Isles	UK9003041	303.8	Storm petrel
Rum	UK9001341	340.7	Manx shearwater
Mingulay and Berneray	UK9001121	370.3	Fulmar
			Breeding seabird assemblage
The Shiant Isles	UK9001041	442.5	Fulmar
			Breeding seabird assemblage
Isles of Scilly SPA/Isles of Scilly Ramsar	UK9020288/UK11033	464.8	Fulmar
			Manx shearwater
			Breeding seabird assemblage
Handa	UK9001241	480.2	Fulmar
			Great skua
			Breeding seabird assemblage
St Kilda	UK9001031	490.4	Fulmar
			Manx shearwater
			Leach's petrel
			Gannet
			Great skua
			Breeding seabird assemblage
Cape Wrath	UK9001231	502.3	Fulmar
			Breeding seabird assemblage
Flannan Isles	UK9001021	510.8	Fulmar
			Leach's petrel
			Breeding seabird assemblage

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>
North Rona and Sula Sgeir	UK9001011	567.8	Fulmar
			Leach's petrel
			Breeding seabird assemblage

1.3.5.12 Consideration has also been given to site-specific tracking data for those species for which connectivity has been identified using generic foraging ranges (Woodward *et al.*, 2019). Gannet are known to exhibit segregation in relation to the foraging areas utilised by birds from different breeding colonies (Wakefield *et al.*, 2013). The area of the Irish Sea in which the Morgan Generation Assets are located is utilised by birds from the Ailsa Craig SPA (Wakefield *et al.*, 2013) and therefore the potential for LSE is identified for gannet at this SPA. However, the Morgan Generation Assets do not appear to be heavily utilised by birds from the Ailsa Craig SPA and on a precautionary basis the potential for LSE is also identified for gannet as a feature of the Saltee Islands SPA and Grassholm SPA. Connectivity has also been identified for gannet as a feature of the St Kilda SPA when using generic foraging range data. However, the tracking data from Wakefield *et al.* (2013) shows no connectivity between the area of the Irish Sea in which the Morgan Generation Assets are located and birds from the St Kilda SPA. Gannet as a feature of the St Kilda SPA is therefore excluded from further consideration.

1.3.5.13 Connectivity has been identified for a total of eleven species that qualify as breeding features of SPAs in their own right or as part of breeding seabird assemblages. To determine if species should be considered further in the breeding season, the abundance of each species during baseline surveys undertaken in the breeding season has been taken into account. Where a species has not been recorded during the breeding season or has been recorded in only small numbers that would not be commensurate with a measurable impact, it is discounted for further consideration in the breeding season only. This appraisal of population importance utilises the conclusions reached in Volume 4, Annex 5.1: Offshore ornithology baseline characterisation report of the Environmental Statement (Document Reference F4.5.1) and expert judgement following recent similar approaches (RPS, 2021). Consideration may still be required however, in other seasons (e.g., where a species occurs on migration or in non-breeding seasons). Table 1.10 identifies which species are taken forward for further consideration.

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**Table 1.10: Abundance of species at the Morgan Generation Assets during the breeding season.**

Notes:

<sup>1</sup> Full UK breeding season from Furness (2015) used for all species except fulmar where the migration-free breeding season has been used.

<sup>2</sup> Population importance is defined in Volume 4, Annex 5.1: Offshore ornithology baseline characterisation report of the Environmental Statement.

Species	Full UK breeding season (Furness (2015) <sup>1</sup>	Monthly occurrence	Abundance <sup>2</sup>	Further consideration
Kittiwake	Mar to Aug	Present in all breeding season surveys	Populations of regional importance in some months	Yes, species present in all breeding season months.
Herring gull	Mar to Aug	Present in 5 of 12 breeding season surveys	Populations of regional importance in some months	Yes, species present in some breeding season months.
Lesser black-backed gull	Apr to Aug	Present in 5 of 10 breeding season surveys	Populations of local importance in some months however may still lead to a measurable effect	Yes, species present in some breeding season months.
Sandwich tern	Apr to Aug	Not recorded during baseline aerial surveys		No, species not recorded during baseline aerial surveys.
Great skua	May to Aug	Not recorded during baseline aerial surveys during the breeding season		No, species not recorded during baseline aerial surveys undertaken in the breeding season.
Puffin	Apr to Aug	Present in 2 of 10 breeding season surveys	Populations of local importance but not considered likely to result in a measurable effect	No, recorded in small numbers in only two months.
Storm petrel	Jun to Oct	Not recorded during baseline aerial surveys		No, species not recorded during baseline aerial surveys.
Leach's petrel	Jun to Oct	Not recorded during baseline aerial surveys		No, species not recorded during baseline aerial surveys.
Fulmar	Apr to Aug	Present in 5 of 10 breeding season surveys	Populations of local importance in some months however may still lead to a measurable effect	Yes, species present in some breeding season months.
Manx shearwater	Apr to Aug	Present in 9 of 10 breeding season months	Populations of local importance in some months however may still lead to a measurable effect	Yes, species present in majority of breeding season months.



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Species	Full UK breeding season (Furness (2015) <sup>1</sup> )	Monthly occurrence	Abundance <sup>2</sup>	Further consideration
Gannet	Mar to Sep	Present in all breeding season surveys	Populations of local importance in some months however may still lead to a measurable effect	Yes, species present in all breeding season months.

1.3.5.14 Following the exercise undertaken in Table 1.10 the following SPAs and associated features are discounted from further consideration in the breeding season:

- Sandwich tern
  - Morecambe Bay and Duddon Estuary SPA / Duddon Estuary Ramsar
- Great skua
  - Handa SPA
  - St Kilda SPA
- Puffin
  - Lambay Island SPA
  - Rathlin Island SPA
  - Skomer, Skokholm and the seas off Pembrokeshire/Sgomer, Sgogwm a moroedd Benfro SPA
  - Saltee Islands SPA
- European storm petrel
  - Skomer, Skokholm and the seas off Pembrokeshire/Sgomer, Sgogwm a moroedd Benfro SPA
  - Treshnish Isles SPA
- Leach's petrel
  - St Kilda SPA
  - Flannan Isles SPA
  - North Rona and Sula Sgeir SPA.

1.3.5.15 Determination of LSE (section 1.4.5) utilises collision and displacement impact magnitudes apportioned to each SPA for which connectivity has been identified to determine if it can be demonstrated that there will be zero mortalities (i.e., zero mortalities will be considered as 0.0, a 0.2 figure will not be rounded down to 0) throughout the annual cycle. Where this can be demonstrated the associated qualifying feature will be screened out of further assessment. This process is described in detail in Appendix A.

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### Marine SPAs

- 1.3.5.16 There are no marine SPAs within 10 km of the Morgan Generation Assets (a deliberate development exclusion zone decision was made by the Applicant to maintain a minimum 10 km buffer from the Liverpool Bay/Bae Lerpwl SPA).
- 1.3.5.17 No other marine SPAs occur within sufficient proximity of the Morgan Generation Assets for direct connectivity to be likely. However, as the boundaries designated for certain SPAs incorporate foraging areas utilised by birds from colonies that either form part of the same SPA or are designated as part of another SPA then connectivity could still exist. Therefore where an LSE is identified for a functionally linked seabird colony SPA and the Morgan Generation Assets, then an LSE is also identified for the SPA designated to protect associated foraging areas (e.g., if an LSE is identified for Manx shearwater as a feature of the Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a moroedd Benfro SPA, then connectivity would also be identified with the Irish Sea Front SPA). Marine SPAs for which there is connectivity with the Morgan Generation Assets are identified in Table 1.11.

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**Table 1.11: Connectivity with Marine SPAs.**

European Site	Site Code	Distance to Morgan Array Area (km)	Relevant Qualifying Features
Irish Sea Front	UK9020328	56.7	Manx shearwater
Northwest Irish Sea	IE004236	88.2	Kittiwake
Seas off St Kilda	UK9020332	474.3	Fulmar
			Gannet

**Breeding seabirds in the non-breeding season**

- 1.3.5.18 To identify connectivity in non-breeding seasons (post-, non- and pre-breeding seasons) the BDMPS areas defined in Furness (2015) are used in HRA screening exercises, as recommended by Natural England (2022). Due to the assumption that birds from multiple colonies are distributed equally throughout the areas associated with the BDMPS populations, this process therefore identifies connectivity between the relevant project and all SPAs for a species within the BDMPS area.
- 1.3.5.19 To ensure that the approach to screening is not overly precautionary a two stage process has been implemented. The first stage considers the results of the baseline aerial surveys to identify if each species was present in non-negligible numbers during the non-breeding seasons of relevance (Table 1.12). Where a species has not been recorded during the non-breeding seasons of relevance or has been recorded in only small numbers that would not be commensurate with a measurable impact, it is discounted for further consideration in the relevant non-breeding seasons only. This appraisal of population importance utilises the conclusions reached in Volume 4, Annex 5.1: Offshore ornithology baseline characterisation report of the Environmental Statement (Document Reference F4.5.1) and expert judgement.

**Table 1.12: Abundance of species at the Morgan Generation Assets during the non-breeding season (i.e. the time period outside of the breeding season).**

Species	Non-breeding seasons (based on seasonal extents defined by Furness (2015))	Monthly occurrence	Abundance	Further consideration
Kittiwake	Post-breeding = Aug to Dec Pre-breeding = Jan to Apr	Recorded in all non-breeding season months	Populations of local importance in some months however may still lead to a measurable effect	Yes, recorded in all non-breeding season months in nearly all months

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<b>Species</b>	<b>Non-breeding seasons (based on seasonal extents defined by Furness (2015))</b>	<b>Monthly occurrence</b>	<b>Abundance</b>	<b>Further consideration</b>
Great black-backed gull	Non-breeding = Sep to Mar	Recorded in 8 of 14 non-breeding season months	Populations of regional importance in some months	Yes, birds in present in most non-breeding season months with relatively high populations in most months
Herring gull	Non-breeding = Sep to Feb	Recorded in 8 of 12 non-breeding season months	Populations of local importance in some months however may still lead to a measurable effect	Yes, birds in present in most non-breeding season months with relatively high populations in most months
Lesser black-backed gull	Post-breeding = Aug to Oct Non-breeding = Nov to Feb Pre-breeding = Mar to Apr	Recorded in 9 of 18 non-breeding season months	Populations of local importance in some months however may still lead to a measurable effect	Yes, abundance in the post-breeding season relatively high
Guillemot	Non-breeding = Aug to Feb	Recorded in all non-breeding season months	Populations of local importance in some months however may still lead to a measurable effect	Yes, recorded in all non-breeding season months in nearly all months
Razorbill	Post-breeding = Aug to Oct Non-breeding = Nov to Dec Pre-breeding = Jan to Mar	Recorded in all but two non-breeding season months	Populations of local importance in some months however may still lead to a measurable effect	Yes, recorded in the majority of non-breeding season months
Puffin	Non-breeding = Aug to Mar	Recorded in 2 of 16 non-breeding season months	Populations of local importance but not considered likely to result in a measurable effect	No, recorded in small numbers in only two months
Fulmar	Post-breeding = Sep to Oct Non-breeding = Nov Pre-breeding = Dec to Mar	Recorded in 9 of 14 non-breeding season months, mainly in the pre-breeding season	Populations of local importance in some months however may still lead to a measurable effect	Yes, species in the majority of months in numbers considered to be more than negligible
Gannet	Post-breeding = Sep to Nov Pre-breeding = Dec to Mar	Recorded in all non-breeding season months except January and February 2023	Populations of local importance in some months however may still lead to a measurable effect	Yes, species in the majority of months in numbers considered to be more than negligible

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- 1.3.5.20 On the basis of low abundance within the baseline aerial survey area, puffin is excluded from further consideration with respect to any SPAs for which connectivity was identified in the non-breeding season only.
- 1.3.5.21 The remaining species of relevance are fulmar, gannet, lesser black-backed gull, herring gull, great black-backed gull, kittiwake, guillemot and razorbill with these species having been recorded in greater abundance during the baseline aerial surveys, in most cases, throughout the species-specific non-breeding seasons.
- 1.3.5.22 Outside of the breeding season, breeding seabirds are not constrained by the necessity to provision young and can, therefore, utilise areas a greater distance from the breeding colony than during the breeding season. Furness (2015) considered how breeding seabirds disperse in the non-breeding season, defining the regions within which those populations would be distributed and for each region a population was calculated with these areas and associated populations termed BDMPS. It is generally assumed that birds are evenly mixed throughout the BDMPS areas meaning that when these spatial areas are used to identify connectivity, connectivity is identified between a project and all SPAs at which the species is a qualifying feature in the UK.
- 1.3.5.23 For the majority of species included in Furness (2015), two BDMPS are defined. These are often split to encompass the North Sea and UK western waters, with the English Channel contained within one or the other depending on the species. For the species considered within the breeding seabirds in the non-breeding season, the BDMPS of interest is the UK western waters or the UK western waters and English Channel. The area affected by the Morgan Generation Assets would represent a negligible proportion of the area available to seabirds in the non-breeding season with many species migrating to areas outside of the Irish Sea. In addition, the seasonal populations of birds that may utilise the Morgan Generation Assets during the non-breeding season are composed of birds from multiple colonies, reducing the impact on any one single colony. The potential for LSE is considered for fulmar, gannet, lesser black-backed gull, herring gull, great black-backed gull, kittiwake, guillemot and razorbill, taking into account the contribution of each SPA at which these species are qualifying features to the relevant total BDMPS population for the UK western waters or the UK western waters and English Channel (from Furness, 2015). This is illustrated in Table 1.13 where the contribution of individual colonies to the total BDMPS populations presented in Furness (2015) is calculated.
- 1.3.5.24 Furness (2015) provides population estimates for UK SPAs, and although for some species the populations presented also incorporate birds from Irish colonies these are combined to provide a total Ireland population. Consideration has therefore been given to features of Irish SPAs, specifically those on the east coast of Ireland, by dividing the population for a relevant feature at a given SPA by the relevant BDMPS population. The population for each species has been taken from the Seabird 2000 census to ensure population estimates are commensurate with the data used in Furness (2015). If counts for a colony are unavailable from Seabird 2000, information on the population from the SPA citation has been used. Where the Irish population has not been included in the BDMPS population any SPA populations of relevance have been added to the BDMPS population presented in Furness (2015) for the calculations for Irish SPAs only.
- 1.3.5.25 The calculations presented in Table 1.13 indicate that many of the SPA populations represent a small proportion of the overall BDMPS population that could interact with the Morgan Generation Assets. Based on the general assumptions that birds within the BDMPS are evenly distributed and mixed, it is considered that there will be no LSE on those SPA populations for which the contribution calculated in Table 1.13 is less



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than 1% (with the caveat that where LSE is identified in the breeding season then impacts will be considered throughout the annual cycle).

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**Table 1.13: The contribution of component SPAs to the relevant BDMPS population for breeding seabirds in the non-breeding season for which connectivity was identified.**

Notes:

All values have been rounded to one decimal point.

Green shaded cells indicate those that surpass 1% of the relevant BDMPS population.

SPA	Percentage contribution to BDMPS population (%)															
	Fulmar			Gannet		Lesser black-backed gull			Herring gull	Great black-backed gull	Kittiwake		Guillemot	Razorbill		
	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Non-breeding	Non-breeding	Post-breeding	Pre-breeding	Non-breeding	Post-breeding	Non-breeding	Pre-breeding
<b>Ailsa Craig</b>				9.9	8.2	0.1	0.2	0.1	0.1		0.1	0.1	0.9			
<b>Aide-Ore Estuary</b>						0.0	0.0	0.0	0.0							
<b>Bowland Fells</b>						2.8	4.4	2.8								
<b>Buchan Ness to Collieston Coast</b>	0.0	0.0	0.0						0.0		0.6	1.1	0.0			
<b>Calf of Eday</b>	0.0	0.1	0.0							0.0	0.0	0.1	0.0			
<b>Canna and Sanday</b>									0.1		0.1	0.2	0.7			
<b>Cape Wrath</b>	0.5	0.5	0.5								1.4	2.4	4.6	0.7	0.5	0.7
<b>Copinsay</b>	0.0	0.1	0.0							0.0	0.0	0.1	0.0			
<b>Coquet Island</b>																
<b>East Caithness Cliffs</b>	0.0	0.5	0.0						0.0	0.0	1.8	3.5	0.0	0.0	0.1	0.0
<b>Fair Isle</b>	0.7	1.1	0.7	0.3	0.4						0.0	0.1	0.0	0.0	0.0	0.0
<b>Farne Islands</b>											0.2	0.3	0.0			
<b>Fetlar</b>	0.2	0.3	0.2													

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SPA	Percentage contribution to BDMPS population (%)															
	Fulmar			Gannet		Lesser black-backed gull			Herring gull	Great black-backed gull	Kittiwake		Guillemot	Razorbill		
	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Non-breeding	Non-breeding	Post-breeding	Pre-breeding	Non-breeding	Post-breeding	Non-breeding	Pre-breeding
<b>Flamborough &amp; Filey Coast</b>	0.0	0.0	0.0	0.0	1.0				0.0		1.7	3.3	0.0	0.0	0.1	0.0
<b>Flannan Isles</b>	1.8	1.8	1.8								0.2	0.3	1.6	0.3	0.2	0.3
<b>Forth Islands</b>	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0		0.1	0.3	0.0	0.0	0.0	0.0
<b>Foula</b>	0.5	0.7	0.5								0.0	0.0	0.1	0.0	0.0	0.0
<b>Fowlsheugh</b>	0.0	0.0	0.0						0.0		0.4	0.8	0.0	0.0	0.0	0.0
<b>Grassholm</b>				14.4	11.9											
<b>Handa</b>	0.5	0.5	0.5								0.2	0.4	6.3	1.7	1.2	1.7
<b>Hermaness, Saxa Vord and Valla Field</b>	0.2	0.3	0.2	1.8	2.2						0.0	0.0	0.0			
<b>Howth Head Coast</b>											0.3	0.5				
<b>Hoy</b>	0.5	0.7	0.5							0.0	0.0	0.0	0.0			
<b>Ireland's Eye</b>									0.2		0.1	0.2	0.2	0.1	0.2	0.1
<b>Isles of Scilly</b>						3.7	3.3	3.7		9.1						
<b>Lambay Island</b>	0.1	0.1	0.1			0.2	0.3	0.2	1.7		0.5	0.9	5.9	0.96	1.7	0.96
<b>Lough Neagh &amp; Lough Beg</b>						0.3	0.5	0.3								
<b>Marwick Head</b>											0.0	0.0	0.0			
<b>Mid-Waterford Coast</b>									0.1							

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SPA	Percentage contribution to BDMPS population (%)															
	Fulmar			Gannet		Lesser black-backed gull			Herring gull	Great black-backed gull	Kittiwake		Guillemot	Razorbill		
	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Non-breeding	Non-breeding	Post-breeding	Pre-breeding	Non-breeding	Post-breeding	Non-breeding	Pre-breeding
Mingulay and Berneray	2.2	2.3	2.2								0.3	0.5	2.3	3.3	2.4	3.3
Morecambe Bay and Duddon Estuary						3.1	4.8	3.1	1.6							
North Caithness Cliffs	0.3	0.5	0.3								0.4	0.9	0.2	0.0	0.0	0.0
North Colonsay and Western Cliffs											0.7	1.3	2.4			
North Rona and Sula Sgeir	1.2	1.3	1.2	3.0	2.8					0.0	0.2	0.3	0.8	0.4	0.3	0.4
Noss	0.1	0.2	0.1	0.7	0.9						0.0	0.0	0.1			
Rathlin Island	0.4	0.4	0.4			0.1	0.1	0.1	0.0		1.0	1.8	15.3	5.0	3.6	5.0
Ribble and Alt Estuaries						5.1	8.0	5.1								
Rousay	0.0	0.0	0.0								0.1	0.2	0.0			
Rum											0.1	0.2	0.3			
Saltee Islands	0.1	0.1	0.1	0.9	0.7	0.1	0.2	0.1	0.1		0.3	0.5	2.1	0.8	1.5	0.8
The Shiant Isles	1.1	1.1	1.1								0.1	0.1	0.9	1.4	1.0	1.4

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SPA	Percentage contribution to BDMPS population (%)															
	Fulmar			Gannet		Lesser black-backed gull			Herring gull	Great black-backed gull	Kittiwake		Guillemot	Razorbill		
	Post-breeding	Non-breeding	Pre-breeding	Post-breeding	Pre-breeding	Post-breeding	Non-breeding	Pre-breeding	Non-breeding	Non-breeding	Post-breeding	Pre-breeding	Non-breeding	Post-breeding	Non-breeding	Pre-breeding
<b>Skerries Islands</b>									0.3							
<b>Skomer, Skokholm and Seas off Pembrokeshire</b>						8.3	9.4	8.3			0.1	0.2	2.6	1.9	1.1	1.9
<b>St Abb's to Fast Castle</b>									0.0		0.1	0.3	0.0	0.0	0.0	0.0
<b>St Kilda</b>	16.0	16.6	16.0	19.7	18.0						0.1	0.2	2.6	0.5	0.4	0.5
<b>Sule Skerry and Sule Stack</b>				1.5	1.4								1.3			
<b>Sumburgh Head</b>	0.0	0.0	0.0								0.0	0.0	0.0			
<b>Troup, Pennan and Lion's Heads</b>	0.0	0.1	0.0						0.0		0.7	1.3	0.0	0.0	0.0	0.0
<b>West Westray</b>	0.0	0.0	0.0								0.5	1.0	0.1	0.0	0.0	0.0
<b>Wicklow Head</b>											0.1	0.2				



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1.3.5.26 Based on the calculations presented in Table 1.13, the following SPAs and associated features are therefore identified as requiring consideration in the determination of LSE stage of screening:

- Ailsa Craig SPA
  - Gannet
- Bowland Fells SPA
  - Lesser black-backed gull
- Buchan Ness to Collieston Coast SPA
  - Kittiwake
- Cape Wrath SPA
  - Kittiwake
  - Guillemot
- East Caithness Cliffs SPA
  - Kittiwake
- Fair Isle SPA
  - Fulmar
- Flamborough and Filey Coast SPA
  - Kittiwake
  - Gannet
- Flannan Isles SPA
  - Fulmar
  - Guillemot
- Forth Islands SPA
  - Gannet
- Grassholm SPA
  - Gannet
- Handa SPA
  - Guillemot
  - Razorbill
- Hermaness, Saxa Vord and Valla Field SPA
  - Gannet
- Isles of Scilly SPA/Ramsar
  - Lesser black-backed gull
  - Great black-backed gull
- Lambay Island SPA
  - Herring gull
  - Guillemot

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- Razorbill
- Mingulay and Berneray SPA
  - Fulmar
  - Guillemot
  - Razorbill
- Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar
  - Lesser black-backed gull
  - Herring gull
- North Colonsay and Western Cliffs SPA
  - Kittiwake
  - Guillemot
- North Rona and Sula Sgeir SPA
  - Fulmar
  - Gannet
- Rathlin Island SPA
  - Kittiwake
  - Guillemot
  - Razorbill
- Ribble and Alt Estuaries SPA / Ribble and Alt Estuaries Ramsar
  - Lesser black-backed gull
- Saltee Islands SPA
  - Guillemot
  - Razorbill
- The Shiant Isles SPA
  - Fulmar
  - Razorbill
- Skomer, Skokholm and Seas off Pembrokeshire SPA
  - Lesser black-backed gull
  - Guillemot
  - Razorbill
- St Kilda SPA
  - Guillemot
  - Fulmar
  - Gannet
- Sule Skerry and Sule Stack SPA
  - Guillemot

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- Gannet
- Troup, Pennan and Lion’s Heads SPA
  - Kittiwake
- West Westray SPA
  - Kittiwake.

**Non-breeding seabirds in the non-breeding season**

1.3.5.27 There are no SPAs designated for non-breeding seabirds in the non-breeding season that have connectivity with the Morgan Generation Assets.

**Migratory seabirds**

1.3.5.28 The identification of connectivity for migratory seabird has utilised the migratory corridors defined in WWT Consulting and MacArthur Green (2014), extending these into English and Welsh waters. Where the species-specific migratory corridor overlaps with the Morgan Generation Assets, then connectivity is identified for that species (Table 1.14).

**Table 1.14: Identification of migratory seabird species for which there is connectivity with the Morgan Generation Assets.**

Species	Latin name	Migratory corridor (km)	Overlap with Morgan Generation Assets (Yes/No)
Little gull	<i>Hydrocoloeus minutus</i>	0-20	No
Sandwich tern	<i>Thalasseus sandvicensis</i>	0-10	No
Little tern	<i>Sternula albifrons</i>	0-10	No
Roseate tern	<i>Sterna dougallii</i>	0-10	No
Common tern	<i>Sterna hirundo</i>	0-10	No
Arctic tern	<i>Sterna paradisaea</i>	0-10	No
Great skua	<i>Stercorarius skua</i>	0-40	Yes
Arctic skua	<i>Stercorarius parasiticus</i>	0-20	No
European storm petrel	<i>Hydrobates pelagicus</i>	0-60	Yes
Leach’s petrel	<i>Oceanodroma leucorhoa</i>	0-60	Yes

1.3.5.29 Volume 4, Annex 5.4: Migratory bird collision risk modelling technical report of the Environmental Statement (Document Reference F4.5.4) calculates collision risk estimates for great skua, European storm petrel and Leach’s petrel. Natural England has recommended the use of a 99% avoidance rate for marine species other than those specifically mentioned in Ozsanlav-Harris *et al.* (2023), which therefore includes great skua, European storm petrel and Leach’s petrel. The predicted collision risk for great skua at a 99% avoidance rate is below 0.01 collisions/annum and therefore great skua is not considered further. Predicted collision for European storm petrel and Leach’s petrel is 0.65 collisions/annum and 1.57 collisions/annum, respectively. The

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UK SPAs at which these two species are qualifying features are identified in Table 1.15 and are progressed to the determination of LSE stage of this screening process.

**Table 1.15: SPAs for European storm petrel and Leach’s petrel progressed to the determination of LSE stage**

Species	SPAs	Site Code
European storm petrel	Auskerry	UK9002381
	Isle of Scilly	UK9020288
	Mousa	UK9002361
	North Rona and Sula Sgeir	UK9001011
	Priest Island (Summer Isles)	UK9001261
	Skomer, Skokholm and the Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro	UK9014051
	St Kilda	UK9001031
	Sule Skerry and Sule Stack	UK9002181
	Treshnish Isles	UK9003041
Leach’s petrel	Flannan Isles	UK9001021
	Foula	UK9002061
	North Rona and Sula Sgeir	UK9001011
	Ramna Stacks and Gruney	UK9002021
	St Kilda	UK9001031
	Sule Skerry and Sule Stack	UK9002181

**Migratory waterbird SPAs (and Ramsar sites)**

- 1.3.5.30 The British Isles are located along the East Atlantic Flyway, a migration route that connects bird species’ breeding sites to wintering sites (Boere *et al.*, 2006). Therefore, the British Isles are of key importance for many over-wintering and migrating birds that move through the area in large numbers during the spring and autumn passage periods. Whilst some bird species will follow the coastline during their migration journey, other groups of species (e.g., waders) will undertake long journeys across open seas, often flying at high altitudes depending on the weather conditions.
- 1.3.5.31 Some wildfowl species are known to follow a coastal route during their migration (when in sight of the land). However, many wildfowl species do undertake open-sea movements to reach their wintering or moulting grounds (e.g., shelduck (*Tadorna tadorna*) (Green *et al.*, 2019)).
- 1.3.5.32 Waterbirds (e.g., wildfowl and waders) may therefore pass through the Morgan Array Area periodically in spring and autumn. Many of these migrants will originate from the Arctic and sub-Arctic regions (e.g., Iceland and Scandinavia) and winter at SPA sites in the UK. Although migration occurs over a broad front and often at high altitude at sea, there is a potential for migratory waterbirds to cross the Morgan Array Area twice per year.
- 1.3.5.33 Volume 4, Annex 5.4: Migratory collision risk modelling technical report of the Environmental Statement (Document Reference F4.5.4) identifies those species that

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may interact with the Morgan Generation Assets whilst on migratory using the migratory polygons associated with Wright *et al.* (2012). It also provides numbers of predicted collisions of migratory waterbird species based on the species/populations identified to be at risk of crossing the Morgan Array Area.

1.3.5.34 Collision risk modelling for migratory waterbirds showed that, at avoidance rate of 98% (the use of which follows SNH (2010)), the numbers of birds predicted to be affected were <1 individual for most species. In all cases the predicted collision risk estimates represented less than 0.1% of the baseline mortality of the biogeographic population (Appendix A) and on this basis all species and associated SPAs are not considered further.

1.3.5.35 However, during consultation with the EWG, a selection of Welsh sites were specifically requested to be included by NRW for the potential impact on onshore ornithology qualifying features which migrate through the Morgan Array Area:

- The Dee Estuary SPA
- The Dee Estuary Ramsar site
- Lavan Sands, Conway Bay/Traeth Lafan SPA
- Dyfi Estuary/Aber Dyfi SPA
- Burry Inlet SPA
- Burry Inlet Ramsar site
- Severn Estuary SPA
- Severn Estuary Ramsar site.

1.3.5.36 Table 1.16 identifies the qualifying features associated with each site and whether each species was identified as having connectivity with the Morgan Generation Assets based on the migratory polygons associated with Wright *et al.* (2012). Any species for which connectivity is not identified by Wright *et al.* (2012) is not considered further.

**Table 1.16: SPAs and associated migratory waterbird features that will be considered further in this screening exercise.**

European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>	Connectivity identified
The Dee Estuary	UK9013011	70.7	Pintail <i>Anas acuta</i>	Yes
			Teal <i>Anas crecca</i>	Yes
			Dunlin <i>Calidris alpina alpina</i>	Yes
			Knot <i>Calidris canutus</i>	Yes
			Oystercatcher <i>Haematopus ostralegus</i>	Yes
			Bar-tailed godwit <i>Limosa lapponica</i>	Yes
			Black-tailed godwit <i>Limosa limosa islandica</i>	Yes
			Curlew <i>Numenius arquata</i>	Yes

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European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>	Connectivity identified
			Grey plover <i>Pluvialis squatarola</i>	Yes
			Shelduck <i>Tadorna tadorna</i>	Yes
			Redshank <i>Tringa totanus</i>	Yes
The Dee Estuary Ramsar	298	70.7	Teal <i>Anas crecca</i>	Yes
			Shelduck <i>Tadorna tadorna</i>	Yes
			Oystercatcher <i>Haematopus ostralegus</i>	Yes
			Curlew <i>Numenius arquata</i>	Yes
			Pintail <i>Anas acuta</i>	Yes
			Grey plover <i>Pluvialis squatarola</i>	Yes
			Knot <i>Calidris canutus</i>	Yes
			Dunlin <i>Calidris alpina alpina</i>	Yes
			Black-tailed godwit <i>Limosa limosa islandica</i>	Yes
			Bar-tailed godwit <i>Limosa lapponica</i>	Yes
Redshank <i>Tringa totanus</i>	Yes			
Traeth Lafan/ Lavan Sands, Conway Bay	UK9013031	70.0	Oystercatcher <i>Haematopus ostralegus</i>	Yes
			Red-breasted merganser <i>Mergus serrator</i>	Yes
			Curlew <i>Numenius arquata</i>	Yes
			Great crested grebe <i>Podiceps cristatus</i>	Yes
			Redshank <i>Tringa totanus</i>	Yes
Dyfi Estuary/Aber Dyfi	UK9020284	148.6	Greenland white-fronted goose <i>Anser albifrons flavirostris</i>	Yes
Burry Inlet	UK9015011	247.2	Pintail <i>Anas acuta</i>	Yes
			Teal <i>Anas crecca</i>	Yes
			Wigeon <i>Anas penelope</i>	Yes
			Shoveler <i>Anas clypeata</i>	Yes
			Turnstone <i>Arenaria interpres</i>	Yes
			Dunlin <i>Calidris alpina alpina</i>	Yes



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European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>	Connectivity identified
			Knot <i>Calidris canutus</i>	Yes
			Oystercatcher <i>Haematopus ostralegus</i>	Yes
			Curlew <i>Numenius arquata</i>	Yes
			Grey plover <i>Pluvialis squatarola</i>	Yes
			Shelduck <i>Tadorna tadorna</i>	Yes
			Redshank <i>Tringa totanus</i>	Yes
Burry Inlet Ramsar	562	247.2	Redshank <i>Tringa totanus</i>	Yes
			Whimbrel <i>Numenius phaeopus</i>	Yes
			Curlew <i>Numenius arquata</i>	Yes
			Greenshank <i>Tringa nebularia</i>	Yes
			Dark-bellied brent goose <i>Branta bernicla</i>	No
			Shelduck <i>Tadorna tadorna</i>	Yes
			Grey plover <i>Pluvialis squatarola</i>	Yes
			Dunlin <i>Calidris alpina alpina</i>	Yes
			Knot <i>Calidris canutus</i>	Yes
			Spotted redshank <i>Tringa erythropus</i>	No (not included in Wright <i>et al.</i> , 2012, however connectivity considered unlikely (Appleton, 2018))
Severn Estuary	UK9015022	258.6	Gadwall <i>Anas strepera</i>	Yes
			European White-fronted Goose <i>Anser albifrons albifrons</i>	No
			Dunlin <i>Calidris alpina alpina</i>	Yes
			Bewick's swan <i>Cygnus columbianus bewickii</i>	Yes
			Shelduck <i>Tadorna tadorna</i>	Yes
			Redshank <i>Tringa totanus</i>	Yes
Severn Estuary Ramsar	67	258.6	Bewick's swan <i>Cygnus columbianus bewickii</i>	Yes

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European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2</sup>	Connectivity identified
			European White-fronted Goose <i>Anser albifrons albifrons</i>	No
			Shelduck <i>Tadorna tadorna</i>	Yes
			Gadwall <i>Anas strepera</i>	Yes
			Dunlin <i>Calidris alpina alpina</i>	Yes
			Redshank <i>Tringa totanus</i>	Yes
			Ringed plover <i>Charadrius hiaticula</i>	Yes
			Teal <i>Anas crecca</i>	Yes
			Pintail <i>Anas acuta</i>	Yes

### Summary of initial screening of sites for offshore ornithological features

1.3.5.37 As detailed above, the initial screening process identified European sites with seabirds or migratory waterbirds as qualifying features to be taken forward for detailed determination of LSE. These sites are identified, together with their distance to the Morgan Generation Assets and the qualifying features of relevance in

1.3.5.38 Table 1.7. The locations of these sites are shown in Figure 1.8.

**Table 1.17: Summary of SPAs progressed to the determination of LSE stage.**

<sup>1</sup> Measured as the closest, straight line, distance from the SPA (irrespective of the presence of land masses).

Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar	UK9020326	31.3	Herring gull <i>Larus argentatus</i>	All seasons
	UK11045		Lesser black-backed gull <i>Larus fuscus</i>	All seasons
	UK11022		Breeding seabird assemblage	As above for relevant species
Ribble and Alt Estuaries SPA / Ribble and Alt Estuaries Ramsar	UK9005103	51.0	Lesser black-backed gull <i>Larus fuscus</i>	All seasons
	UK11057		Breeding seabird assemblage	As above for relevant species
Irish Sea Front SPA	UK9020328	56.7	Manx shearwater <i>Puffinus puffinus</i>	All seasons
Bowland Fells SPA	UK9005151	70.0	Lesser black-backed gull <i>Larus fuscus</i>	All seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Copeland Islands SPA	UK9020291	112.3	Manx shearwater <i>Puffinus puffinus</i>	All seasons
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA	UK9013121	128.7	Manx shearwater <i>Puffinus puffinus</i>	All seasons
Lambay Island SPA	IE0004069	130.4	Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Herring gull <i>Larus argentatus</i>	Non-breeding seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Breeding seabird assemblage	As above for relevant species
Ireland's Eye SPA	IE0004117	138.6	Kittiwake <i>Rissa tridactyla</i>	All seasons
Howth Head Coast SPA	IE0004113	139.3	Kittiwake <i>Rissa tridactyla</i>	All seasons
Ailsa Craig SPA	UK9003091	142.3	Gannet <i>Morus bassanus</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Breeding seabird assemblage	As above for relevant species
Wicklow Head SPA	IE0004127	165.4	Kittiwake <i>Rissa tridactyla</i>	All seasons
Rathlin Island SPA	UK0030055	186.1	Kittiwake <i>Rissa tridactyla</i>	All seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Forth Islands SPA	UK9004171	219.9	Gannet <i>Morus bassanus</i>	Non-breeding seasons
Skomer, Skokholm and the seas off Pembrokeshire/Sgomer, Sgogwm a moroedd Benfro SPA	UK9014051	252.0	Manx shearwater <i>Puffinus puffinus</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	Non-breeding seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
North Colonsay and Western Cliffs SPA	UK9003171	257.6	Kittiwake <i>Rissa tridactyla</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Grassholm SPA	UK9014041	260.3	Gannet <i>Morus bassanus</i>	All seasons
Saltee Islands SPA	IE0004002	265.9	Gannet <i>Morus bassanus</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Horn Head to Fanad Head SPA	IE0004194	296.3	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Breeding seabird assemblage	As above for relevant species
Mingulay and Berneray SPA	UK9001121	370.3	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Breeding seabird assemblage	As above for relevant species
The Shiant Isles SPA	UK9001041	442.5	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Isles of Scilly SPA/Isles of Scilly Ramsar	UK9020288 UK11033	464.8	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Manx shearwater <i>Puffinus puffinus</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	Non-breeding seasons
			Great black-backed gull <i>Larus marinus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Handa SPA	UK9001241	480.2	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
St Kilda SPA	UK9001031	490.4	Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Manx shearwater <i>Puffinus puffinus</i>	All seasons
			Gannet <i>Morus bassanus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Cape Wrath SPA	UK9001231	502.3	Fulmar <i>Fulmarus glacialis</i>	All seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Flannan Isles SPA	UK9001021	510.8	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
North Rona and Sula Sgeir SPA	UK9001011	567.8	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Gannet <i>Morus bassanus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Buchan Ness to Collieston Coast SPA	UK9002491	385.7	Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
East Caithness Cliffs SPA	UK9001182	449.8	Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Fair Isle SPA	UK9002091	620.1	Fulmar <i>Fulmarus glacialis</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Flamborough and Filey Coast SPA	UK9006101	233.5	Gannet <i>Morus bassanus</i>	Non-breeding seasons
			Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species



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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Hermaness, Saxa Vord and Valla Field SPA	UK9002011	763.5	Gannet <i>Morus bassanus</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Rum SPA	UK9001341	340.7	Manx shearwater	All seasons
			Breeding seabird assemblage	As above for relevant species
Sule Skerry and Sule Stack SPA	UK9002181	548.9	Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Gannet <i>Morus bassanus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Troup, Pennan and Lion's Heads SPA	UK9002471	414.7	Kittiwake <i>Rissa tridactyla</i>	Non-breeding season
			Breeding seabird assemblage	As above for relevant species
West Westray SPA	UK9002101	580.3	Kittiwake <i>Rissa tridactyla</i>	Non-breeding season
			Breeding seabird assemblage	As above for relevant species
Auskerry SPA	UK9002381	558.3	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Mousa SPA	UK9002361	681.4	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Priest Island (Summer Isles) SPA	UK9001261	440.2	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Treshnish Isles SPA	UK9003041	303.8	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Foula SPA	UK9002061	679.9	Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Ramna Stacks and Gruney SPA	UK9002021	751.3	Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
The Dee Estuary SPA	UK9013011	70.7	Pintail <i>Anas acuta</i>	Migratory seasons
			Teal <i>Anas crecca</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
			Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Bar-tailed godwit <i>Limosa lapponica</i>	Migratory seasons
			Black-tailed godwit <i>Limosa limosa islandica</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
Waterbird assemblage	As above for relevant species			
The Dee Estuary Ramsar	298	70.7	Teal <i>Anas crecca</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Pintail <i>Anas acuta</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Black-tailed godwit <i>Limosa limosa islandica</i>	Migratory seasons
			Bar-tailed godwit <i>Limosa lapponica</i>	Migratory seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Redshank <i>Tringa totanus</i>	Migratory seasons
Traeth Lafan/ Lavan Sands, Conway Bay SPA	UK9013031	70.0	Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Red-breasted merganser <i>Mergus serrator</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Great crested grebe <i>Podiceps cristatus</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
Dyfi Estuary/Aber Dyfi SPA	UK9020284	148.6	Greenland white-fronted goose <i>Anser albifrons flavirostris</i>	Migratory seasons
Burry Inlet SPA	UK9015011	247.2	Pintail <i>Anas acuta</i>	Migratory seasons
			Teal <i>Anas crecca</i>	Migratory seasons
			Wigeon <i>Anas penelope</i>	Migratory seasons
			Shoveler <i>Anas clypeata</i>	Migratory seasons
			Turnstone <i>Arenaria interpres</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
			Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
			Waterbird assemblage	As above for relevant species
Burry Inlet Ramsar	562	247.2	Redshank <i>Tringa totanus</i>	Migratory seasons

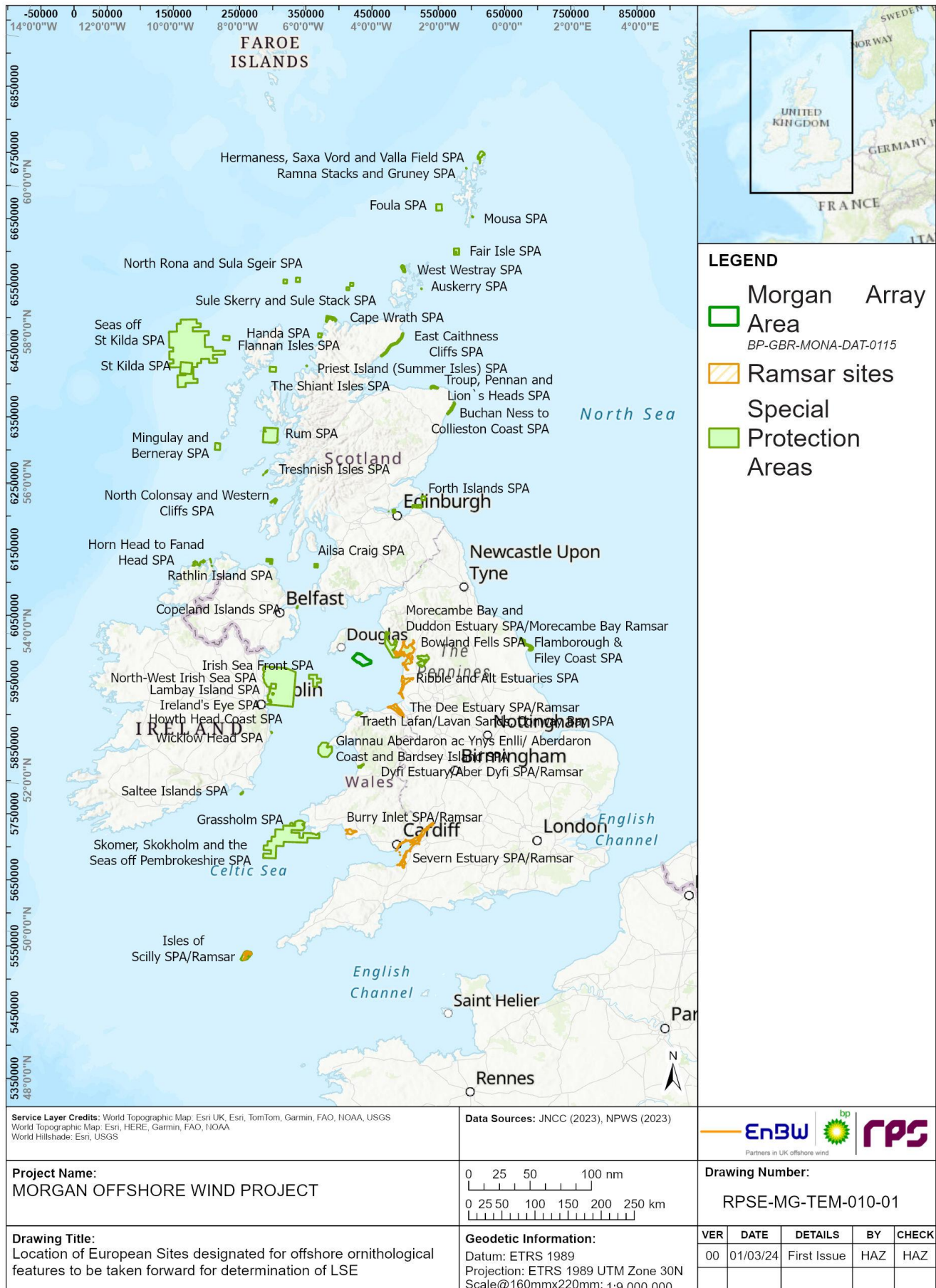
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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Whimbrel <i>Numenius phaeopus</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Greenshank <i>Tringa nebularia</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
Severn Estuary SPA	UK9015022	258.6	Gadwall <i>Anas strepera</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Bewick's swan <i>Cygnus columbianus bewickii</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
			Waterbird assemblage	As above for relevant species
Severn Estuary Ramsar	67	258.6	Bewick's swan <i>Cygnus columbianus bewickii</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Gadwall <i>Anas strepera</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
			Ringed plover <i>Charadrius hiaticula</i>	Migratory seasons
			Teal <i>Anas crecca</i>	Migratory seasons
			Pintail <i>Anas acuta</i>	Migratory seasons
North-west Irish Sea	IE004236	88.2	Kittiwake <i>Rissa tridactyla</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	All seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Herring gull <i>Larus argentatus</i>	Non-breeding seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
Seas off St Kilda	UK9020332	474.3	Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Gannet <i>Morus bassanus</i>	All seasons

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**Figure 1.8: Location of European Sites designated for offshore ornithological features to be taken forward for the determination of LSE.**



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### 1.4 Determination of likely significant effects

#### 1.4.1 Overview

1.4.1.1 The initial screening process documented in section 1.3, generated a list of designated sites and qualifying interest features (Table 1.4, Table 1.5 and Table 1.9) for further determination of LSE as a result of the Morgan Generation Assets. This section of the HRA screening process therefore documents the determination of LSE for those European sites which have been identified for further consideration through section 1.4.

#### 1.4.2 Methodology

1.4.2.1 The assessment of LSE in the following sections is presented as a series of matrices setting out whether no LSE can be concluded for the relevant features of the European sites identified in section 1.3.

1.4.2.2 The matrix approach adopted is based upon an approach set out within the Planning Inspectorate's Advice Note 10 on HRA (The Planning Inspectorate, 2022; Version 9) relating to NSIPs. The matrix approach used is considered to be a pragmatic approach and useful in defining the extent of impacts from the Morgan Generation Assets on identified designated sites' qualifying interest features, in relation to the sites' conservation objectives. It also provides a clear audit trail for agreement with the statutory consultees on the scope of the HRA and the features and impacts to be taken forward into the appropriate assessment for each site.

1.4.2.3 The following matrix key is applicable to the matrices presented in the subsequent sections:

- ✓ = Potential for a LSE/LSE cannot be excluded
- ✗ = No potential for an LSE
- C = Construction
- O&M = Operations and Maintenance
- D = Decommissioning.

1.4.2.4 With respect to the consideration of mitigation at the HRA screening stage, in April 2018, the European Court of Justice issued a judgement in the People Over Wind and Sweetman case (Case C323/17) clarifying the stage in a HRA process when measures adopted as part of the project can be taken into account when assessing impacts on a European site. The ruling stated that "...in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site."

#### 1.4.3 Assessment of LSE for Annex II diadromous fish

1.4.3.1 A total of nine European sites were identified in the initial screening process (section 1.3.3) to be taken forward for determination of LSE for Annex II diadromous fish species. These sites are:

- Dee Estuary/Aber Dyfrdwy SAC
- River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC

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- River Ehen SAC
- River Eden SAC
- Derwent and Bassenthwaite Lake SAC
- Solway Firth SAC
- River Kent SAC
- River Bladnoch SAC
- Afon Gwyrfai a Llyn Cwellyn SAC.

### Site overviews

1.4.3.2 The following sections provide a brief overview of each of the sites brought forward for consideration of LSE and a summary of their designated features.

#### **River Ehen SAC**

1.4.3.3 The River Ehen forms the outfall from Ennerdale Water and flows some 20 km to Sellafield where it meets the Irish Sea. The SAC is located between Ennerdale Water and the convergence with the River Keekle. This part of the river supports outstanding populations of the freshwater pearl mussel for which the SAC is designated, likely resulting from high amount of tree shade along the banks, which is thought to be of importance for mussel habitat. The SAC is also designated for Atlantic salmon which plays an important role in the lifecycle of the freshwater pearl mussel.

#### **Dee Estuary/Aber Dyfrdwy SAC**

1.4.3.4 The overview relating to Annex I features of this SAC is detailed in section 1.3.3. The subtidal area of the SAC provides important breeding and nursery areas for coastal fish species, the Dee is also used as a migratory passage for species such as migratory fish species including river lamprey, sea lamprey, Atlantic salmon, sea trout, twaite shad, smelt *Osmerus eperlanus*, and eels *Anguilla anguilla* to and from their spawning and nursery grounds in the River Dee upstream of the estuary or open sea. Noting that although twaite shad have been recorded in a fish trap on Chester weir near the tidal limit of the River Dee, there are no records of a spawning population in the river (Countryside Council for Wales, 2010).

#### **River Derwent and Bassenthwaite Lake SAC**

1.4.3.5 The SAC consists of the River Derwent, a large oligotrophic river system with high water quality and a natural channel. The Derwent flows through two lakes Derwentwater and Bassenthwaite, with presence of aquatic flora is typical of oligotrophic/mesotrophic lake. Designated fish species present within the SAC include salmon, sea lamprey, river lamprey and brook lamprey. The site encompasses various important salmon spawning areas as well as extensive sea and river lamprey nursery grounds.

#### **River Kent SAC**

1.4.3.6 The River Kent's main tributaries have their catchments in the southeastern Lake District fells which provide natural mineral enrichment in the form the calcium necessary for growth. Due to high water quality, heavy rainfall on the catchment fells and a short distance from the headwaters to the mouth of the river, a high degree of flushing occurs throughout the river which maintains the river bed free of silt and algal growth. This provides suitable habitat for populations of bullhead. The high water quality, this headwater also provides the moderate, fast flow regime, cool temperatures

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and suitable areas of stable river channel, also provide sufficient habitat for freshwater pearl mussels found primarily in one of the upper tributaries.

### **Solway Firth SAC**

- 1.4.3.7 The Solway is a large, complex estuary with moderately strong tidal streams and wave action. The sediment habitats present throughout the estuary consist mainly of dynamic sandflats and subtidal reefs. There are unusually large areas of upper marsh which is predominantly characterised by saltmarsh rush *Juncus gerardii* community with smaller areas of the saltmarsh-grass/fescue *Puccinellia/Festuca* communities. The sublittoral sediment communities are typically sparse in the inner estuary, due to high levels of sediment mobility coupled with low and variable salinity whilst intertidal sediments are characterised by flats of fine sands, rather than muds. The estuary also provides a migratory passage for sea lamprey and river lamprey to and from their spawning and nursery grounds.

### **River Bladnoch SAC**

- 1.4.3.8 The River Bladnoch flows from Mayberry Loch in South Ayrshire for seven miles to Wigtown Bay. The River Bladnoch is designated for Atlantic salmon and the site supports a high-quality salmon population and a spring run of salmon. The river's ecological and water quality characteristics are influenced by a moderate-sized catchment with diverse upland and lowland areas.

### **River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC**

- 1.4.3.9 The SAC extends from Llyn Tegid encompassing the Bala lake and its banks and outfalls into the River Dee. The site extends downstream to where it joins the Dee Estuary SSSI. Several Dee tributaries are also included within the site, specifically the Ceiriog, Meloch, Tryweryn, and Mynach. The River Dee is designated for Atlantic salmon, with the Mynach, Meloch and Ceiriog tributaries being the most prevalent salmon spawning tributaries in the Dee catchment. Other diadromous fish species present as qualifying features of the site are river lamprey and sea lamprey. The Dee also supports populations of bullhead, brook lamprey and otter.

### **River Ehen SAC**

- 1.4.3.10 The River Ehen forms the outfall from Ennerdale Water and flows some 20 km to Sellafield where it meets the Irish Sea. The SAC is located between Ennerdale Water and the convergence with the River Keekle. This part of the river supports outstanding populations of the freshwater pearl mussel for which the SAC is designated, likely resulting from high amount of tree shade along the banks, which is thought to be of importance for mussel habitat. The SAC is also designated for Atlantic salmon which plays an important role in the lifecycle of the freshwater pearl mussel.

### **Afon Gwyrfai a Llyn Cwellyn SAC**

- 1.4.3.11 This SAC encompasses the Afon Gwyrfai and Llyn Cwellyn. The Gwyrfai flows out of Llyn y Gader near Rhyd Ddu and passes through Llyn Cwellyn before reaching the sea at Caernarfon Bay. Llyn Cwellyn is a deep oligotrophic lake, recognised for its conservation importance. The Gwyrfai river system is recognised for outstanding ecological and water quality and is designated for an extensive salmon population, one of the best supporting rivers in the United Kingdom.

### **River Eden SAC**

- 1.4.3.12 The River Eden SAC is designated for Atlantic salmon, sea lamprey, river lamprey and brook lamprey. The River Eden maintains a large population of salmon owing to the extensive suitable habitat available including areas of gravel and finer silt owing to the

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highly erodible nature of the rock within the river, which provide conditions for spawning and nursery areas. The River Eden also supports brook and river lampreys and a large population of sea lamprey in the middle to lower regions of the river. The extensive areas of gravel outlined above, and generally good quality water, also provide habitat for bullhead, the tributaries, specifically those flowing over limestone, support high numbers of bullhead.

### Pathways for LSE: potential impacts on Annex II fish

- 1.4.3.13 A list of potential impacts and effects on diadromous fish that may result from the Morgan Generation Assets has been provided below. These are the impacts which must be taken into account when determining the potential for LSE on the designated sites and qualifying fish features identified in section 1.3.3. The list of potential impacts has been compiled using the experience and knowledge gained from previous offshore wind farm projects and Natural England's 'Advice on Operations' (NRW (2010), Countryside Council For Wales (2022a), Countryside Council For Wales (2022b), Natural England (2019a), Natural England (2019b), Natural England (2019c), NatureScot (2022a) and NatureScot (2022b) for individual features of sites. Consideration of the potential impacts identified for Annex II diadromous fish species is presented in the following sections to inform the determination of LSE below.

### **Construction phase**

#### **Temporary habitat loss/disturbance**

- 1.4.3.14 There is potential for temporary, direct habitat loss and disturbance as a result of jack-up events for the installation of the foundations for the wind turbines and OSPs, cable installation (including pre-lay preparation such as boulder and sandwave clearance) of inter-array and interconnector cables, anchor placement and the removal of disused cable in the fish and shellfish ecology study area, during the construction phase of the Morgan Generation Assets. This impact will be spatially restricted to within the footprint of the Morgan Array Area. No European sites with Annex II diadromous fish species physically overlap with the Morgan Array Area (see Figure 1.4) and so there is no potential for direct impacts to supporting habitats for Annex II diadromous fish species within any site. There is the potential for migratory fish to be present in the waters in and around the Morgan Array Area, and to be affected by temporary habitat loss/disturbance (e.g. effects on feeding grounds). Similar habitats are however widespread within the wider Irish Sea region and it is considered that there would be no barrier effects to migratory fish reaching the designated sites as a result of this impact. Furthermore, any impacts to supporting habitats such as foraging grounds outside the designated sites would be temporary and would not be expected to result in any long-term effects on the availability of food in the area. On this basis there is considered to be no potential for LSE on any Annex II fish species of any of the European sites screened in as a result of temporary habitat loss/disturbance. This impact is screened out for all sites.

#### **Increases in SSC and sediment deposition**

- 1.4.3.15 Sediment disturbance arising from construction activities (e.g. foundation and cable installation, and seabed preparation works) may result in temporary, indirect impacts on diadromous fish as a result of temporary increases in SSC. The extent of this impact will be spatially restricted to within the Morgan Array Area and the surrounding area (see section 1.3.2 and detail outlined in paragraph 1.3.2.8 and 1.3.2.12, also detailed in Volume 4, Annex 1.1: Physical processes technical report of the Environmental



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Statement (Document Reference F4.1.1)). Increases in SSC and sediment deposition will not result in barrier effects for Annex II fish features reaching any of the European sites listed in Table 1.4.

- 1.4.3.16 Effects associated with the Morgan Array Area have been screened out given the highly mobile nature of migratory fish and the Morgan Array Area is located over 62 km from all European sites (see Table 1.4) and is therefore outside the 12 km ZoI, as determined by the physical processes modelling (see section 1.3.2 and detail outlined in paragraph 1.3.2.8 and 1.3.2.12; Table 1.4). This impact is therefore screened out for all European sites.

### Underwater sound impacting fish

- 1.4.3.17 There is potential for mortality, injury and/or disturbance to migratory fish as a result of construction activities including pile-driving to install foundations and clearance of Unexploded Ordnance (UXO), as well as construction/installation vessel sound. The greatest potential for sound to be generated will occur within the Morgan Array Area as a result of piling activities and UXO clearance. It is acknowledged that there will be stages when fish do not move, for example salmon are likely to aggregate in the open sea near river mouths, prior to the upriver migration (e.g., Matz, 2014). The nearest European site to the Morgan Array Area with Annex II diadromous fish qualifying interest features is the Dee Estuary/Aber Dyfrdwy SAC which is located 70.1 km from the Morgan Array Area (see Figure 1.4), but there is potential for migratory species to be present within, or transiting through, the Morgan Array Area and potential area of impact. The zone of impact has been determined for the EIA through sound modelling. Based on the sound modelling and contours presented in Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3), the potential for LSE on any Annex II features of European sites as a result of underwater sound arising from construction activities cannot be excluded for all European sites. Underwater sound is therefore screened in for further consideration for diadromous fish for all sites.

### Disturbance/remobilisation of sediment-bound contaminants

- 1.4.3.18 Seabed disturbance associated with construction (e.g. foundation and cable installation) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on fish and shellfish communities. There is comprehensive desktop information available to characterise the Irish Sea region (e.g. sediment chemistry data for Rhiannon Offshore Wind Farm (Celtic Array Ltd, 2014)), as well as site specific survey information available from the Morgan Array Area.
- 1.4.3.19 The benthic subtidal site-specific surveys conducted in 2021 and 2022 within the Morgan Array Area analysed a total of 24 sediment samples from across the Morgan benthic subtidal ecology study area for sediment chemistry (full details of these surveys are outlined in Volume 4, Annex 2.1: Benthic subtidal ecology technical report of the Environmental Statement (Document Reference F4.2.1)). Overall, levels of contamination were low across the Morgan benthic subtidal ecology study area. Concentrations of most metals were below the Cefas AL1 and the Canadian TEL and all were below the Cefas AL2 and Canadian PEL. The exception was arsenic which exceeded Cefas AL1 at three sample stations however all were below AL2, and 17 sample stations exceeded TEL but were below PEL. No samples were found to exceed the relevant thresholds for PCBs or PAHs in the Morgan benthic subtidal ecology study area. Concentrations of organotins were below the LOD at all stations. Therefore, if

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migratory fish from nearby SACs were to pass through the ZoI, the low levels of contaminants means that impacts to designated features are considered unlikely.

- 1.4.3.20 In addition, the nearest SAC with Annex II designated diadromous fish features is located 62.5 km away (River Ehen SAC), outside of the ZoI, so this impact can be screened out as a result of the distance from the Morgan Generation Assets in addition to the low levels of contaminants described above. Therefore, the potential for LSE can be discounted for all sites.

### Accidental pollution

- 1.4.3.21 There is a risk of pollution being accidentally released during the construction phase of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, (the nearest site being the River Ehen SAC which is located 62.5 km from the Morgan Array Area) any effects, should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II diadromous fish qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on conservation objectives of the site (e.g. disruption to/from migration to SACs). On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

- 1.4.3.22 It should be noted that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These include an Offshore environmental management plan which will include a marine pollution contingency plan, chemical risk assessment and marine waste management and disposal arrangements. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. They will also set out industry good practice and OSPAR (Oslo-Paris), International Maritime Organisation (IMO) and MARPOL (International Convention for the Prevention of Pollution from Ships) guidelines for preventing pollution at sea. These management plans have not however, been considered in the determination of LSE. They will nevertheless reduce the likelihood of an accidental pollution event occurring.

### Operations and maintenance phase

#### Temporary habitat disturbance

- 1.4.3.23 Temporary habitat disturbance may occur during the operations and maintenance phase of the Morgan Generation Assets as a result of maintenance operations (e.g. cable repair/reburial, use of jack-up vessels to facilitate wind turbine component repairs etc.). This impact will be spatially restricted to within the footprint of the Morgan Generation Assets and there is no physical overlap with the Morgan Array Area and any European sites and so there is no potential for direct impacts to supporting habitats for Annex II diadromous fish species within any site. There is the potential for migratory fish to be present in the waters in and around the Morgan Array Area, and to be affected by temporary habitat loss/disturbance (e.g. effects on feeding grounds).



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Similar habitats are however widespread within this part of the Irish Sea and it is considered that there would be no barrier effects to migratory fish reaching the designated sites as a result of this impact. Furthermore, any impacts to supporting habitats such as foraging grounds outside the designated sites would be temporary and would not be expected to result in any long-term effects on the availability of food in the area. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of temporary habitat loss/disturbance and so this impact is screened out from further consideration.

### **Increases in SSC and sediment deposition**

- 1.4.3.24 Temporary increases in SSC and associated sediment deposition may arise during maintenance activities (e.g. cable reburial or replacement works). The magnitude of this impact will be substantially less than that during construction as no seabed preparation will be required for these activities. The extent of this impact will be spatially restricted to within the Morgan Array Area and the surrounding area (see section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching any of the European sites listed in Table 1:5.
- 1.4.3.25 Effects associated with the Morgan Array Area have been screened out as the Morgan Array Area is located over 62 km from all of the European sites (see Table 1.4) and therefore outside of the 12 km Zol (see paragraph 1.3.2.13; Table 1.4), as determined by the physical processes modelling (see 1.3.2.8 and 1.3.2.12). Therefore, this impact is screened out for all European sites.

### **Underwater sound impacting fish**

- 1.4.3.26 During the operations and maintenance phase there is the potential for sound generated by the operational wind turbines, and from vessels undertaking operations and maintenance activities to result in disturbance to migratory fish as they pass through the Morgan Generation Assets. The operational sound from wind turbines is however of a very low frequency and low sound pressure level (Andersson *et al.*, 2011). Studies have found that sound levels are only high enough to have the potential to cause a behavioural reaction within metres from a wind turbine (Sigray and Andersson 2011; Andersson *et al.*, 2011) and therefore such levels are not considered likely to result in significant effects on diadromous fish species. Similarly, underwater sound generated from operations and maintenance vessels is likely to be at a low level and effects would only occur if fish remained within the immediate vicinity of the vessel (i.e. within metres) for a number of hours which is unlikely given the likely movements that the majority of vessels (e.g. crew transfer vessels etc.) will be making within the Morgan Generation Assets. It is therefore considered that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of underwater sound during the operations and maintenance phase and this impact is screened out of further consideration for all sites.

### **Long-term habitat loss**

- 1.4.3.27 There is the potential for long-term habitat loss to occur directly under all foundation structures and associated scour protection for the duration of the operations and maintenance phase. This impact will be spatially restricted to within the footprint of the Morgan Array Area and there is no physical overlap between the Morgan Array Area

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and any European sites (see Figure 1.4). As such, there is no potential for direct impacts to supporting habitats for Annex II diadromous fish species within any site.

- 1.4.3.28 There is the potential for migratory fish to be present in the waters in and around the Morgan Array Area, and to be affected by long-term habitat loss (e.g. loss of feeding grounds). Similar habitats are however widespread within this region of the Irish Sea and the areas of seabed impacted by long-term loss will be discreet and small in the context of the habitats present in the wider area. Furthermore, it is considered that there would be no barrier effects to migratory fish reaching the designated sites as a result of this impact. Any impacts to supporting habitats such as foraging grounds outside the designated sites would be localised and would not be expected to result in any long-term effects on the availability of food in the area. On this basis, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of long-term habitat loss, and this impact is screened out from further consideration.

### **Electromagnetic Fields (EMF)**

- 1.4.3.29 The presence of subsea electrical cabling has the potential to emit a localised EMF which may interfere with the navigation of migratory fish, particularly in shallow nearshore waters (Gill and Bartlett, 2010). The potential for LSE on Annex II features of European sites as a result of EMF from subsea cabling cannot be excluded.

### **Colonisation of hard structures**

- 1.4.3.30 Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) in the offshore environment are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. These structures may also facilitate the spread of INNS. Further, the introduction of hard substrate into the marine environment could increase the time fish spend in the vicinity of the structures (known as the fish aggregation (or reef) effect). It is anticipated that the risk of bio-invasion and the spread of marine INNS is low and that colonisation of hard substrates will lead to limited effects on fish and shellfish populations. Further, effects on migratory fish are expected to be highly limited, given offshore areas coinciding with the Morgan Generation Assets are unlikely to be particularly important for diadromous fish species. On this basis, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of colonisation of hard substrates, and this impact is screened out from further consideration.

### **Disturbance/remobilisation of sediment-bound contaminants**

- 1.4.3.31 Seabed disturbance associated with maintenance activities (e.g. cable reburial or replacement works) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on fish and shellfish communities. However, site-specific surveys undertaken across the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20) and all the European sites are outside the 12 km Zol for this impact, being located more than 62 km away.
- 1.4.3.32 Therefore, there is considered to be no potential for LSE on Annex II diadromous fish features of any of the SACs identified and this impact is screened out.

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### Accidental pollution

- 1.4.3.33 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/vehicles and equipment/ machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, (the nearest site being the River Ehen SAC which is located 63 km from the Morgan Array Area) any effects should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II diadromous fish qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on conservation objectives of the site (e.g. disruption to/from migration to SACs). On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.
- 1.4.3.34 It should be noted that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licenses. These include an Offshore environmental management plan which will include a marine pollution contingency plan, chemical risk assessment and marine waste management and disposal arrangements. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. These management plans have not taken into account in the determination of LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

### Decommissioning phase

- 1.4.3.35 The potential for impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above in the construction phase (section 5.3.3 Construction Phase) and have not been reiterated.

### Determination of LSE for Annex II diadromous fish

- 1.4.3.36 Table 1.18 to Table 1.26 present the results of the LSE determination assessment as a result of the Morgan Generation Assets on relevant qualifying interest features of the Dee Estuary/Aber Dyfrdwy SAC, River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, River Ehen SAC, River Eden SAC, River Derwent and Bassenthwaite SAC, Solway Firth SAC, River Kent SAC, River Bladnoch SAC and the Afon Gwyrfaï a Llyn Cwellyn SAC, respectively. These assessments are made in the absence of measures adopted as part of the project. The footnotes to the following tables provide a brief assessment to support the screening in or out of each of the LSEs on the identified SAC features.

### LSE In-combination

- 1.4.3.37 The LSE test requires consideration of the Morgan Generation Assets alone and/or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but there is potential for a LSE in-combination with other plans and projects (e.g. due

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to wide foraging ranges resulting in a species interacting with a large number of projects).

1.4.3.38 Given the highly precautionary method for site selection applied during this HRA Stage 1 Screening assessment, it is considered that the consolidation of information regarding external plans and projects would not likely result in additional European sites or new effect pathways being identified for the HRA Stage 1 Screening assessment.

1.4.3.39 For diadromous fish species, the potential for LSE alone is identified for all sites with the potential to be affected, therefore effects in-combination will be considered in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2).

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Table 1.18: LSE matrix for Annex II diadromous fish species of the River Ehen SAC.

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment-bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>		x <sub>d</sub>			x <sub>e</sub>		✓ <sub>f</sub>			x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>
Freshwater pearl mussel <i>Margaritifera margaritifera</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>		x <sub>d</sub>			x <sub>e</sub>		✓ <sub>f</sub>			x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Array Area and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish and freshwater pearl mussel qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching the site given the highly mobile nature of migratory fish, the distance to the European site and the SAC lies outside of the Zol as determined by the physical processes modelling (section 1.3.2 and

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detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish and freshwater pearl mussel qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e., foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish and freshwater pearl mussel qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and the distance from River Ehen SAC (62.5 km), the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an



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accidental pollution event occurring. Furthermore, considering the large distance to the SAC (62.5 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of the site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.19: LSE matrix for Annex II diadromous fish species of the Dee Estuary/ Aber Dyfrdwy SAC.**

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			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				C	O&M	D	C	O&M	D
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching the site given the highly mobile nature of migratory fish, the distance to the European site (70.1 km), and the SAC lies outside of the Zol as determined by the physical processes modelling (section

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1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e., foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and the distance from the Dee Estuary/ Aber Dyfrdwy SAC (70.1 km), the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an

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accidental pollution event occurring. Furthermore, considering the large distance to the SAC (70.1 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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Table 1.20: LSE matrix for Annex II diadromous fish species of the River Derwent and Bassenthwaite SAC.

European Qualifying Features	Temporary Habitat Loss /Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d		*e			✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d		*e			✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d		*e			✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in

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paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching the site given the highly mobile nature of migratory fish, the distance to the European site (71.2 km), and the SAC lies outside of the ZOI as determined by the physical processes modelling (section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e., foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the River Derwent and Bassenthwaite SAC (71.2 km), the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the



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risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (71.2 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** – Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.21: LSE Matrix for Annex II diadromous fish species of the River Kent SAC.**

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D
Freshwater pearl mussel <i>Margaritifera margaritifera</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>		x <sub>d</sub>			x <sub>e</sub>			✓ <sub>f</sub>		x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

Note: This site is only designated for freshwater pearl mussel and no diadromous fish species, however brown trout is thought to be the host species within the River Kent SAC and Atlantic salmon are also present within the river (Natural England, 2019). There therefore may be an indirect effect to freshwater pearl mussel through effects on host species.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching the site, given the highly mobile nature of migratory fish, the distance to the European site (80.9 km), and the SAC lies outside of the Zol as determined by the physical processes modelling (section

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1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for host species of the freshwater pearl mussel (brown trout and Atlantic salmon) to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex features of the site indirectly through potential impacts to host species during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for impact on the host species of the freshwater pearl mussel and therefore no LSE on the freshwater pearl mussel qualifying feature of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish host species of the freshwater pearl mussel. It is considered that there is potential for LSE on the Annex II qualifying interest feature of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the River Kent SAC (80.9 km) the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences.

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While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (80.9 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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Table 1.22: LSE matrix for Annex II diadromous fish species of the Solway Firth SAC.

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier

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effects for Annex II fish features reaching the site, given the highly mobile nature of migratory fish, the distance to the European site (84.7 km), and the SAC lies out of the Zol as determined by the physical processes modelling (section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the Solway Firth SAC (84.7 km), the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent



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plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (84.7 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.23: LSE matrix for Annex II diadromous fish species of the River Bladnoch SAC.**

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and sediment deposition will not result in barrier effects for Annex II fish features reaching the site given the highly mobile nature of migratory fish, the distance to the European site (89.8 km), and the SAC lies outside of the Zol as determined by the physical processes modelling (section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

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- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the River Bladnoch SAC (89.8 km) the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (89.8 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is

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considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.24: LSE matrix for Annex II diadromous fish species of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.**

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance of sediment bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>		x <sub>d</sub>			x <sub>e</sub>			✓ <sub>f</sub>		x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>
Sea lamprey <i>Petromyzon marinus</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>		x <sub>d</sub>			x <sub>e</sub>			✓ <sub>f</sub>		x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>
River lamprey <i>Lampetra fluviatilis</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>		x <sub>d</sub>			x <sub>e</sub>			✓ <sub>f</sub>		x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching the site given the highly mobile nature of migratory fish, the distance to the

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European site (89.8 km), and the SAC lies out of the Zol as determined by the physical processes modelling (section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (89.8 km) the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences.



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While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (89.8 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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Table 1.25: LSE matrix for Annex II fish species of the Afon Gwyrfaï a Llyn Cwellyn SAC.

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D			
Atlantic salmon <i>Salmo salar</i>	x <sub>a</sub>	x <sub>a</sub>	x <sub>a</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	✓ <sub>c</sub>	x <sub>c</sub>	✓ <sub>c</sub>				x <sub>d</sub>			x <sub>e</sub>			✓ <sub>f</sub>			x <sub>g</sub>	x <sub>g</sub>	x <sub>g</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>	✓ <sub>i</sub>

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier effects for Annex II fish features reaching the site, given the highly mobile nature of migratory fish, the distance to the European site (117.9 km), and the SAC lies outside of the Zol as determined by the physical processes modelling (section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

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- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the Afon Gwyrfa i Llyn Cwellyn SAC (117.9 km), the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (117.9 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation,

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there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.26: LSE matrix for Annex II diadromous fish species of the River Eden SAC.**

European Qualifying Features	Temporary Habitat Loss/ Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment contaminants			Accidental Pollution			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	/	O&M	D	C	O&M	D	C	O&M	D	
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f				*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f				*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f				*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (section 1.3.2 and detail outlined in paragraphs 1.3.2.8, 1.3.2.12 and 1.3.2.13). Increases in SSC and associated sediment deposition will not result in barrier

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effects for Annex II fish features reaching the site, given the highly mobile nature of migratory fish, the distance to the European site (125.6 km), and the SAC lies outside of the ZOI as determined by the physical processes modelling (section 1.3.2 and detail outlined in paragraphs 1.3.2.8 and 1.3.2.12). Therefore, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.

- c. **Underwater sound impacting fish** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (see paragraph 1.4.3.19 and 1.4.3.20). The site-specific surveys undertaken to assess the levels of sediment contaminants within the Morgan Array Area reported low levels of sediment contamination (see paragraph 1.4.3.19 and 1.4.3.20). Due to the low levels of sediment contamination, the highly mobile nature of migratory fish and particularly the distance from the River Eden SAC (125.6 km) the impact is screened out for the Morgan Array Area. Therefore, it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the European site from disturbance/remobilisation of sediment bound contaminants during all phases of the Morgan Generation Assets.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent



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plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the likelihood of an accidental pollution event occurring. Furthermore, considering the large distance to the SAC (125.6 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of this site as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

## **1.4.4 Assessment of LSE for Annex II marine mammals**

1.4.4.1 A total of 43 European sites were identified in the initial screening process (section 1.3.4) to be taken forward for determination of LSE for Annex II marine mammals. These sites are listed below, broken down by country:

- Fifteen sites in the United Kingdom:
  - North Anglesey Marine/Gogledd Môn Forol SAC
  - North Channel SAC
  - Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC
  - West Wales Marine/Gorllewin Cymru Forol SAC
  - Cardigan Bay/Bae Ceredigion SAC
  - Pembrokeshire Marine/Sir Benfro Forol SAC
  - Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC
  - Isles of Scilly Complex SAC
  - The Maidens SAC
  - Strangford Lough
  - Murlough SAC
  - Lundy SAC
  - Monach Islands SAC
  - North Rona SAC
  - Treshnish Isles SAC
- Eleven sites in Republic of Ireland:
  - Rockabill to Dalkey Island SAC
  - Roaringwater Bay and Islands SAC
  - Blasket Islands SAC
  - Saltee Islands SAC
  - Duvillaun Islands SAC
  - Horn Head and Rinclevan SAC
  - Inishbofin and Inishshark SAC
  - Inishkea Islands SAC
  - Lambay Island SAC
  - Slieve Tooley/Tormore Island/Loughros Beg Bay SAC
  - Slyne Head Islands SAC
- 17 sites in France: (see Table 1.5).

### **Site overviews**

1.4.4.2 As outlined in section 1.3.4, a total of 43 European sites were identified in the initial screening process to be taken forward for determination of LSE. These sites and the associated qualifying features are set out in Table 1.27 below.

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**Table 1.27: The SACs and Ramsar sites taken forward for determination of LSE, with details of associated marine mammal qualifying features.**

European Site	Relevant Annex II Features
<b>UK</b>	
North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>
North Channel SAC	Harbour porpoise <i>Phocoena phocoena</i>
Strangford Lough	Harbour seal <i>Phoca vitulina</i>
Murlough SAC	Harbour seal <i>Phoca vitulina</i>
Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i>
West Wales Marine/Gorllewin Cymru Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>
Cardigan Bay/Bae Ceredigion SAC	Bottlenose dolphin <i>Tursiops truncatus</i>
Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal <i>Halichoerus grypus</i>
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour porpoise <i>Phocoena phocoena</i>
Lundy SAC	Grey seal <i>Halichoerus grypus</i>
Treshnish Isles SAC	Grey seal <i>Halichoerus grypus</i>
Isles of Scilly Complex SAC	Grey seal <i>Halichoerus grypus</i>
The Maidens SAC	Grey seal <i>Halichoerus grypus</i>
Monach Islands SAC	Grey seal <i>Halichoerus grypus</i>
North Rona SAC	Grey seal <i>Halichoerus grypus</i>
<b>Republic of Ireland</b>	
Rockabill to Dalkey Island SAC	Harbour porpoise <i>Phocoena phocoena</i>
Lambay Island SAC	Grey seal <i>Halichoerus grypus</i>
Saltee Islands SAC	Grey seal <i>Halichoerus grypus</i>
Horn Head and Rinclevan SAC	Grey seal <i>Halichoerus grypus</i>
Slieve Tooley/Tormore Island/Loughros Beg Bay SAC	Grey seal <i>Halichoerus grypus</i>
Duvillaun Islands SAC	Grey seal <i>Halichoerus grypus</i>
Inishbofin and Inishshark SAC	Grey seal <i>Halichoerus grypus</i>
Inishkea Islands SAC	Grey seal <i>Halichoerus grypus</i>
Slyne Head Islands SAC	Grey seal <i>Halichoerus grypus</i>
Roaringwater Bay and Islands SAC	Harbour porpoise <i>Phocoena phocoena</i> Grey seal <i>Halichoerus grypus</i>
Blasket Islands SAC	Harbour porpoise <i>Phocoena phocoena</i> Grey seal <i>Halichoerus grypus</i>
<b>France</b>	
Mers Celtiques - Talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>
Abers - Côte des légendes SCI	Harbour porpoise <i>Phocoena phocoena</i>

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European Site	Relevant Annex II Features
Ouessant-Molène SCI	Harbour porpoise <i>Phocoena phocoena</i>
Côte de Granit rose-Sept-Iles SCI	Harbour porpoise <i>Phocoena phocoena</i>
Anse de Goulven, dunes de Keremma SCI	Harbour porpoise <i>Phocoena phocoena</i>
Tregor Goëlo SCI	Harbour porpoise <i>Phocoena phocoena</i>
Côtes de Crozon SCI	Harbour porpoise <i>Phocoena phocoena</i>
Chaussée de Sein SCI	Harbour porpoise <i>Phocoena phocoena</i> Grey seal <i>Halichoerus grypus</i>
Cap Sizun SCI	Harbour porpoise <i>Phocoena phocoena</i>
Récifs du talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>
Anse de Vauville SCI	Harbour porpoise <i>Phocoena phocoena</i>
Cap d'Erquy-Cap Fréhel SCI	Harbour porpoise <i>Phocoena phocoena</i>
Baie de Saint-Brieuc - Est SCI	Harbour porpoise <i>Phocoena phocoena</i>
Banc et récifs de Surtainville SCI	Harbour porpoise <i>Phocoena phocoena</i>
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI	Harbour porpoise <i>Phocoena phocoena</i>
Estuaire de la Rance SCI	Harbour porpoise <i>Phocoena phocoena</i>
Baie du Mont Saint Michel SCI	Harbour porpoise <i>Phocoena phocoena</i>

### Pathways for LSE: potential impacts on Annex II marine mammals

- 1.4.4.3 A list of potential impacts and effects on marine mammals that may result from the Morgan Generation Assets has been provided below. These are the impacts which must be taken into account when determining the potential for LSE on the designated sites and marine mammal qualifying interest features identified. The list of potential impacts on marine mammals has been compiled using the experience and knowledge gained from previous offshore wind farm projects and Natural England's and Natural Resources Wales 'Advice on Operations' (JNCC, 2019; JNCC and DAERA, 2019; Natural Resources Wales, 2018) for individual features of sites.
- 1.4.4.4 No LSEs are predicted for many of the more distant sites, however, due to the location of the identified SACs within the relevant species' MU the potential for connectivity with the Morgan Generation Assets cannot be discounted and the sites are screened in for LSE and assessment within the HRA Stage 2 ISAA – Part 3 SPA Assessments (Document Reference E1.3).
- 1.4.4.5 Consideration of the potential impacts identified for Annex II marine mammals is presented in the following sections to inform the determination of LSE below.

### **Construction phase**

#### **Injury and disturbance from underwater sound generated from piling**

- 1.4.4.6 Impact piling during construction may result in hearing damage/auditory injury or behavioural disturbance/displacement (including barrier effects whereby marine mammals may be excluded from the area) of marine mammals. As agreed with the marine mammal EWG, a precautionary approach has, been adopted to the

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determination of LSE which assumes that there is the potential for connectivity with Annex II harbour porpoise, bottlenose dolphin and harbour seal features of all sites located within the relevant MU for each species (Table 1.2).

1.4.4.7 For grey seal, the OSPAR Region III Interim MU has been used to identify European sites to be taken forward for determination of LSE in this section. Telemetry data from Wright and Sinclair (2022) for grey and harbour seal has then been used to identify European sites with connectivity to the Morgan Generation Assets and therefore, for which there may be an LSE.

1.4.4.8 Seal satellite tracking data from tagged grey seals is presented in Appendix B of Volume 4, Annex 4.1: Marine mammal technical report of the Environmental Statement (Document Reference F4.4.1). The satellite tracking data presented all grey seals which crossed the seal telemetry and haul-out study area (which comprised the total area of four seal MUs, namely the Northwest England, Wales, Southwest Scotland and Northern Ireland seal MUs). The results of the seal telemetry data for adult and pup grey seals is presented in Table 1.28.

**Table 1.28: Results of seal telemetry data and connectivity to Annex II grey seal SACs**

European site	Adult grey seals recorded within the seal telemetry and haul-out study area	Adult grey seals within a 100 km buffer of the Morgan Generation Assets	Pup grey seals recorded within the seal telemetry and haul-out study area	Pup grey seals within a 100 km buffer of the Morgan Generation Assets
Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	17	17	10	10
Pembrokeshire Marine/Sir Benfro Forol SAC	14	8	11	6
Cardigan Bay SAC	10	8	4	3
Saltee Islands SAC	4	3	4	3
The Maidens SAC	1	1	-	-
Lundy SAC	1	-	-	-
Isle of Scilly Complex SAC	-	-	2	2

1.4.4.9 On the basis of the telemetry data summarised in Table 1.28, it can be concluded that there is a high level of connectivity between the grey seal telemetry data and haul-out study area and the Pen Llŷn a'r Sarnau/Lleyn Peninsula, and the Sarnau SAC (i.e. 17 adult grey seals recorded within a 100 km buffer of the Morgan Array Area showed connectivity with this SAC), the Pembrokeshire Marine/Sir Benfro Forol SAC (i.e. eight adult grey seals recorded within a 100 km buffer of the Morgan Array Area showed connectivity with this SAC) and the Cardigan Bay/Bae Ceredigion SAC (i.e. eight adult grey seals recorded within a 100 km buffer of the Morgan Array Area showed connectivity with this SAC). On the basis of the telemetry data summarised in Table 1.28, it can be concluded that there is comparatively lower levels of connectivity with grey seal SACs which are at greater distances from the Morgan Generation Assets

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than those which are closer to the Morgan Generation Assets, for example Saltee Isnads SAC, The Maidens SAC, Lundy SAC and the Isle of Scilly Complex SAC.

1.4.4.10 On this basis there is considered to be potential connectivity between the Morgan Generation Assets and the following SACs with grey seal features and therefore the potential for LSE cannot be discounted:

- Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC
- Pembrokeshire Marine/Sir Benfro Forol SAC
- Cardigan Bay/Bae Ceredigion SAC
- The Maidens SAC
- Lundy SAC
- Isle of Scilly Complex SAC.

1.4.4.11 It can therefore be concluded that there is no potential connectivity between the Morgan Generation Assets and the following SACs with grey seal features and therefore the potential for LSE can be discounted:

- Treshnish Isles SAC
- Monach Islands SAC
- North Rona SAC
- Lambay Island SAC
- Saltee Islands SAC
- Horn Head and Rinclevan SAC
- Slieve Tooley/Tormore Island/Loughros Beg Bay SAC
- Duvillaun Islands SAC
- Inishbofin and Inishshark SAC
- Inishkea Islands SAC
- Slyne Head Islands SAC
- Roaringwater Bay and Islands SAC
- Blasket Islands SAC
- Chaussée de Sein SCI.

1.4.4.12 Seal satellite tracking data from tagged harbour seals is also presented in Appendix B of Volume 4, Annex 4.1: Marine mammal technical report of the Environmental Statement (Document Reference F4.4.1). Of the 46 tagged harbour seals that entered the seal telemetry and haul-out study area (which comprised the total area of four seal MUs, namely the Northwest England, Wales, Southwest Scotland and Northern Ireland seal MUs), five had telemetry track data recorded within a 50 km buffer of the Morgan Array Area (Figure 1.10). The telemetry tracks were recorded between 2006 and 2008 and were concentrated within the northwest region of the seal telemetry and haul-out study area. No tracks were recorded within or south of the Morgan Array Area. All 34 harbour seals tagged in the Northern Ireland MU, including the five which entered the 50 km buffer of the Morgan Array Area, showed connectivity to the Strangford Lough SAC (tagging location). Figure 1.10 also shows connectivity between the Murlough SAC and a 50 km buffer of the Morgan Array Area. In line with



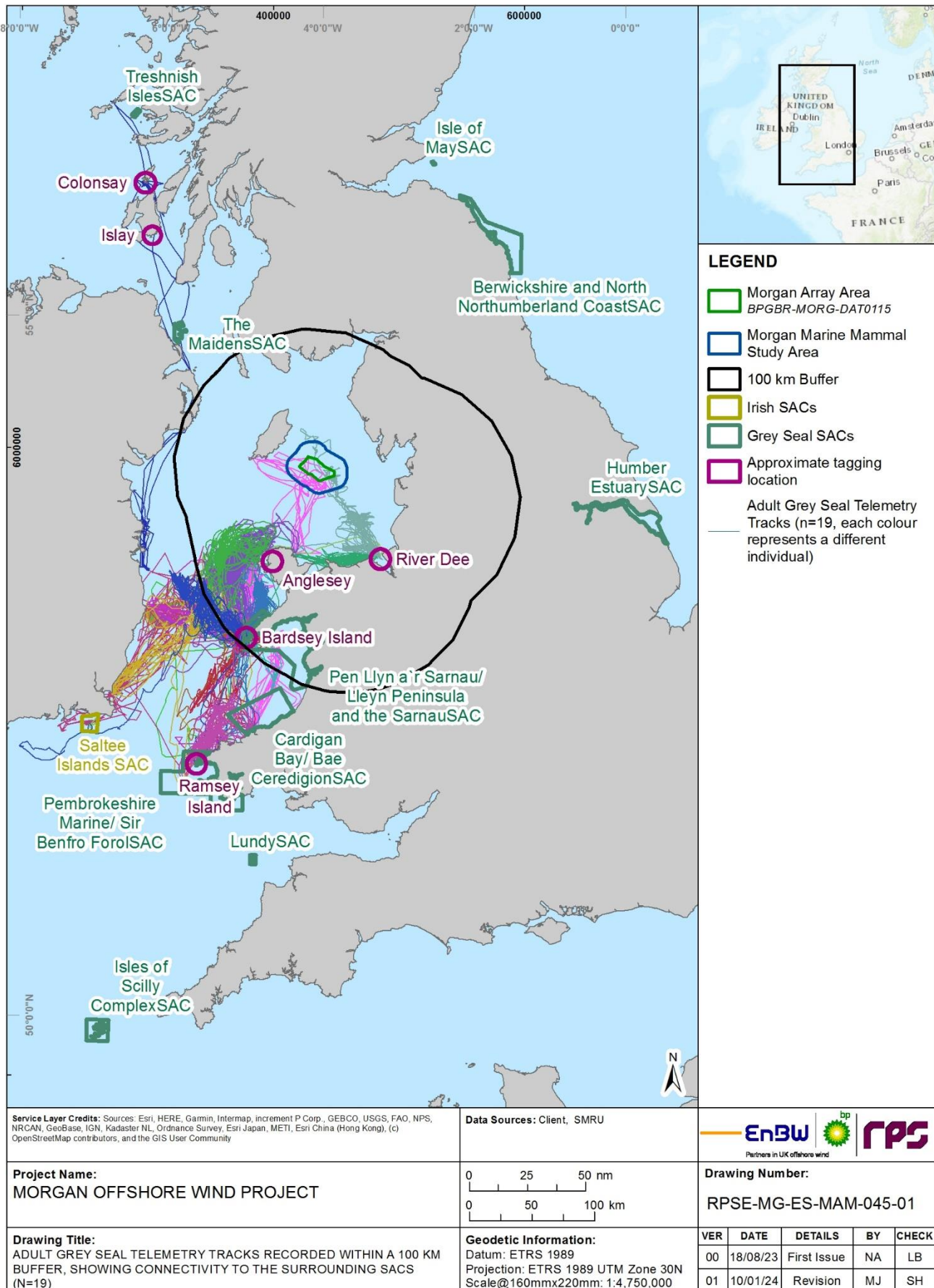
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the sources noted above, there is considered to be potential connectivity with the Strangford Lough SAC and Murlough SAC.

- 1.4.4.13 In summary, it is concluded that LSE from underwater sound resulting from piling activities on marine mammals cannot be excluded for all SACs included in Table 1.28, with the exception of the Annex II grey seal SACs outlined in paragraph 1.4.4.11 above. This impact is therefore screened in for further consideration in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4 (except for those Annex II grey seal SACs with no potential connectivity to the Morgan Generation Assets (paragraph 1.4.4.11). The HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) will include consideration of site-specific underwater sound modelling and assessments and the distribution and abundances of the relevant Annex II marine mammal features outlined above.

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**Figure 1.9: Adult grey seal telemetry tracks recorded within the 100 km buffer of the Morgan Generation Assets showing connectivity to the surrounding SACs (n=19) (Wright and Sinclair, 2022).**

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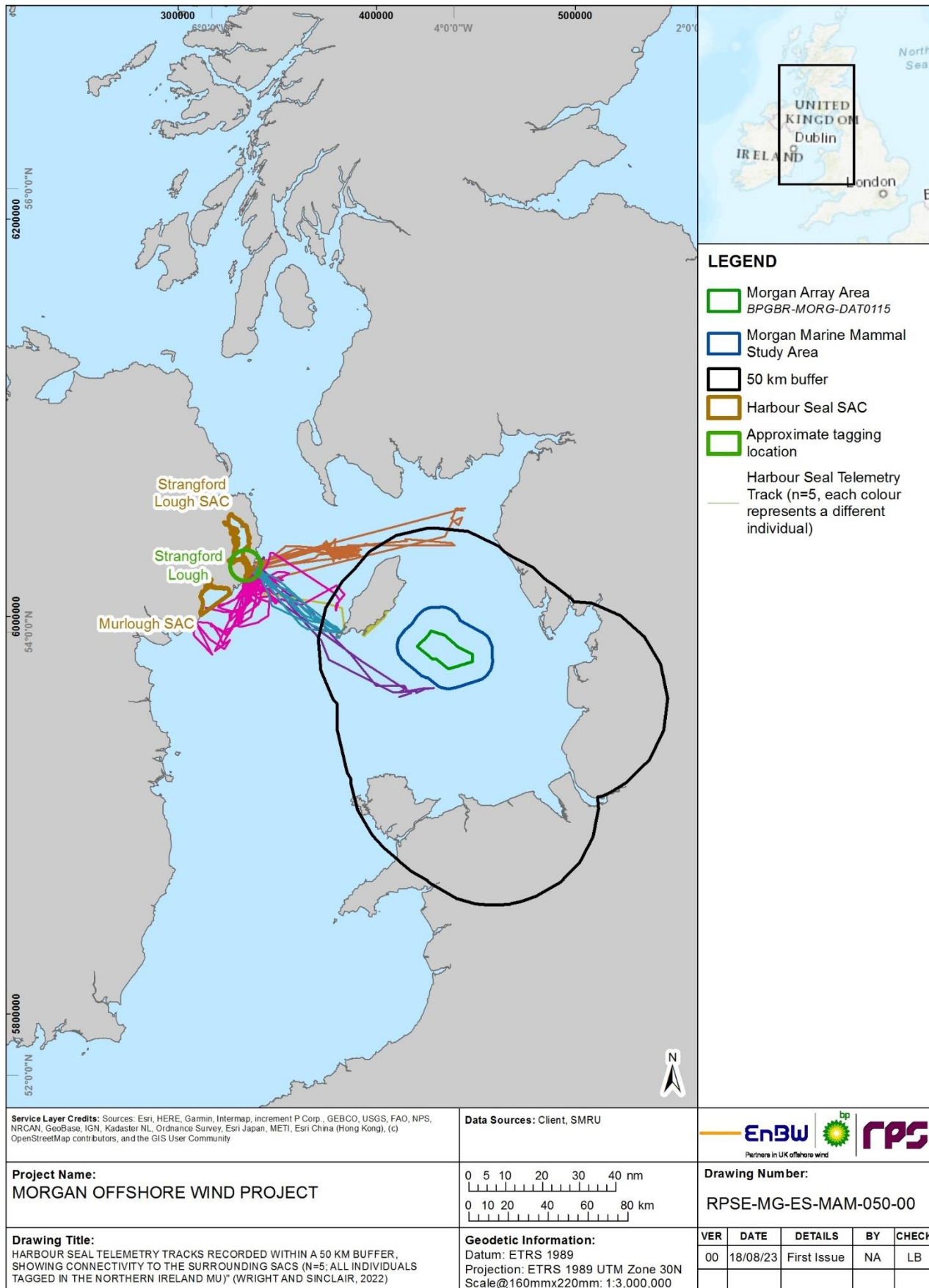


Figure 1.10: Harbour seal telemetry tracks recorded within a 50 km buffer showing connectivity to the surrounding SACs (n=5, all tagged in Northern Ireland MU) (Wright and Sinclair, 2022).

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### **Injury and disturbance from underwater sound generation from UXO detonation**

- 1.4.4.14 There may be a requirement for the clearance of UXO from the Morgan Generation Assets. The detonation of small charges as part of this process has the potential to result in hearing damage/auditory injury or behavioural disturbance/displacement (including barrier effects, whereby marine mammals may be excluded from the area) of marine mammals. Based on feedback from the marine mammal EWG, a precautionary approach has, been adopted to the determination of LSE at this stage which assumes that there is the potential for connectivity with Annex II harbour porpoise, bottlenose dolphin and harbour seal features of all sites located within the relevant MU for each species.
- 1.4.4.15 For grey seal, the OSPAR Region III Interim MU has been used to identify European sites to be taken forward for determination of LSE in this section. Telemetry data from Wright and Sinclair (2022) has then been used to identify European sites with connectivity to the Morgan Generation Assets and therefore those with the potential for LSE (see paragraph 1.4.4.6 to 1.4.4.11, Figure 1.9 and Table 1.28).
- 1.4.4.16 On this basis, it is concluded that LSE from underwater sound resulting from UXO detonation on marine mammals cannot be excluded for all of the SACs included in Table 1.5, with the exception of the Annex II grey seal SACs outlined in paragraph 1.4.4.11 above. This impact is therefore screened in for further consideration in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4 (with the exception of those Annex II grey seal SACs with no potential connectivity to the Morgan Generation Assets (paragraph 1.4.4.11). The HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) will include consideration of site-specific underwater sound modelling and assessments and the distribution and abundances of the relevant Annex II marine mammal features outlined above.

### **Underwater sound from pre-construction site investigation surveys**

- 1.4.4.17 The impact of pre-construction related activities, and in particular geophysical surveys, may result in behavioural disturbance/displacement (including barrier effects, whereby marine mammals may be excluded from the area) of marine mammals. As agreed with the marine mammal EWG, a precautionary approach has been adopted to the determination of LSE which assumes that there is the potential for connectivity with Annex II harbour porpoise, bottlenose dolphin and harbour seal features of all sites located within the relevant MU for each species (Table 1.2).
- 1.4.4.18 For grey seal, the OSPAR Region III Interim MU has been used to identify European sites to be taken forward for determination of LSE in this section. Telemetry data from Wright and Sinclair (2022) has then been used to identify European sites with connectivity to the Morgan Generation Assets and therefore, those with the potential for LSE.
- 1.4.4.19 On this basis it is concluded that LSE from underwater sound resulting from pre-construction site investigation surveys on marine mammals cannot be excluded for all SACs included in Table 1.27 with the exception of the Annex II grey seal SACs outlined in paragraph 1.4.4.11 above. This impact is therefore screened in for further consideration in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4 with the exception of the Annex II grey seal SACs with no potential connectivity to the Morgan Generation Assets (paragraph 1.4.4.11). The HRA



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Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) will include consideration of site-specific underwater sound assessments and the distribution and abundances of the relevant Annex II marine mammal features outlined above.

### **Underwater sound from vessels and other (non-piling) sound producing activities**

- 1.4.4.20 Disturbance of marine mammals may also arise during the construction phase from vessel use and other construction related activities (e.g. dredging, trenching, rock placement). The extent of this potential disturbance will be spatially restricted to within the Morgan Array Area and along vessel routes to ports used in support of the Morgan Generation Assets during the construction phase. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic. There is the potential for connectivity with Annex II harbour porpoise, bottlenose dolphin and harbour seal features of all sites located within the relevant MU for each species.
- 1.4.4.21 For grey seal, the OSPAR Region III Interim MU has been used to identify European sites to be taken forward for determination of LSE in this section. Telemetry data from Wright and Sinclair (2022) has then been used to identify European sites with connectivity to the Morgan Generation Assets and therefore, for which there may be an LSE.
- 1.4.4.22 On this basis it is concluded that LSE from underwater sound resulting from vessels and other sound sources on marine mammals cannot be excluded for all SACs included in Table 1.5, except the Annex II grey seal SACs outlined in paragraph 1.4.4.11 above. This impact is therefore screened in for further consideration in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4 (with the exception of those Annex II grey seal SACs with no potential connectivity to the Morgan Generation Assets (paragraph 1.4.4.11)).

### **Vessel collision risk**

- 1.4.4.23 An increase in vessel activity, compared to baseline levels, during the construction phase, may result in increased vessel collisions with marine mammals. The extent of this potential disturbance will be spatially restricted to within the Morgan Array Area and along routes to local ports. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic.
- 1.4.4.24 During any given year of the construction phase, there could be a maximum increase of 1,929 construction vessel movements within the Morgan Array Area on the current baseline of 4,239 vessel movements per year within the Morgan Array Area. Whilst a broad range of vessel types are involved in collisions with marine mammals (Laist *et al.*, 2001), vessels travelling at higher speeds pose a higher risk because of the potential for a stronger impact (Schoeman *et al.*, 2020). Vessels travelling at 7 m/s (or 14 kn) or faster are those most likely to cause death or serious injury to marine mammals (Laist *et al.*, 2001; Wilson *et al.*, 2007). With the exception of Crew Transfer Vessels (CTVs), vessels involved in the construction phase are likely to be travelling at a speed slower than 14 knots. Those vessels potentially moving faster (i.e. CTVs) will, however, be limited in number with only up to a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time. Other vessels present are likely to be stationary for long periods of time and travel at slow speeds.

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- 1.4.4.25 There is also no overlap between the Morgan Generation Assets and any SAC designated for Annex II marine mammals (the closest SAC being the North Anglesey Marine/Gogledd Môn Forol SAC which is located at a distance of 28.2 km from the Morgan Array Area; all other SACs are located >60 km from the Morgan Array Area). Therefore, the likelihood of collisions occurring between vessels and marine mammal features of SACs is further reduced and is considered to be low. Marine mammals are also likely to maintain their distance if foraging within the Morgan Array Area.
- 1.4.4.26 There is therefore considered to be no potential for the short-term increased vessel activity during the construction phase to result in a significant effect to Annex II marine mammal features in terms of collision risk with vessels. As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of vessel collision risk is therefore screened out of further consideration for all sites.
- 1.4.4.27 In addition, it is anticipated that the risk of such collision events occurring will be minimised and managed by the implementation of measures set out in the Offshore environmental management plan which will outline instructions for vessel behaviour and vessel operators, including advice to operators to not deliberately approach marine mammals and to avoid sudden changes in course or speed. While these plans have not been considered in the determination of no LSE, they will nevertheless further reduce the potential for a collision event to occur.

### Changes in prey availability

- 1.4.4.28 There is the potential for changes in marine mammal prey abundance and distribution to arise as a result of construction activities which physically disturb the seabed, result in increased SSC or which generate underwater sound. Potential impacts to prey species may result in changes in the ability/success of marine mammals to forage in the area of the Morgan Array Area. The risk of effects on prey species is expected to be greatest during the construction phase (e.g. due to seabed disturbance and/or underwater sound during construction) with effects during operations and maintenance expected to be much reduced.
- 1.4.4.29 There is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. Any potential temporary changes to the fish community in the vicinity of the Morgan Array Area as a result of construction impacts such as underwater sound, are unlikely to result in significant effects to Annex II marine mammal features given prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. As such, no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of the majority of European sites with the exception of the North Anglesey Marine/Gogledd Môn Forol SAC which has been screened in on a precautionary basis, due to its proximity to the Morgan Generation Assets.
- 1.4.4.30 The effect of underwater sound on prey species can however only be fully assessed using the result of project-specific underwater sound modelling which will be undertaken for the EIA. Until these results are available, this impact cannot be screened out for further consideration in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) for the Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4.



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### Increased SSC and associated sediment deposition

- 1.4.4.31 Disturbance to water quality as a result of construction activities (e.g. foundation and cable installation, and site preparation activities) can have both direct and indirect impacts on marine mammals. Indirect impacts would include effects on prey species (this impact is screened in under 'changes in prey availability' above). Direct impacts include the impairment of visibility and therefore foraging ability which might be expected to reduce foraging success. Marine mammals are well known to forage in tidal areas where water conditions are turbid and visibility conditions poor. For example, harbour porpoise and harbour seal in the UK have been documented foraging in areas with high tidal flows (e.g. Pierpoint, 2008; Marubini *et al.*, 2009; Hastie *et al.*, 2016); therefore, low light levels, turbid waters and suspended sediments are unlikely to negatively impact marine mammal foraging success. When the visual sensory systems of marine mammals are compromised, they are able to sense the environment in other ways, for example, seals can detect water movements and hydrodynamic trails with their mystacial vibrissae; while odontocetes primarily use echolocation to navigate and find food in darkness.
- 1.4.4.32 Whilst elevated SSC arising during construction of the Morgan Generation Assets may temporarily decrease light availability in the water column and produce turbid conditions, the maximum impact range is expected to be localised with sediments rapidly dissipating over one tidal excursion. In addition, there is a large natural variability in the SSC within the Irish Sea, so marine mammals living here will be tolerant of any small-scale increases, such as those associated with the construction activities.
- 1.4.4.33 As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of increased SSC and sediment deposition is therefore screened out of further consideration for all sites.

### Accidental pollution

- 1.4.4.34 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, (the nearest site being the North Anglesey Marine/Gogledd Môn Forol SAC which is located 28.2 km from the Morgan Array Area) any effects, should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II marine mammal qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.
- 1.4.4.35 It should be noted that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These include an Offshore environmental management plan which will include a marine pollution contingency plan, chemical risk assessment and marine waste management and disposal arrangements. These plans include planning for accidental spills, address all potential contaminant releases and

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include key emergency contact details. They will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. These plans have not however, been considered in the determination of no LSE, but they will nevertheless reduce the likelihood of an accidental pollution event occurring.

### Operations and maintenance phase

#### Underwater sound from vessels and other vessel activities

- 1.4.4.36 Disturbance of marine mammals may arise during the operations and maintenance phase from increased vessel traffic and vessel-based activities (e.g. cable reburial etc.) associated with operations and maintenance activities. As during the construction phase, the extent of this potential disturbance will be spatially restricted to within the Morgan Array Area and along routes to local ports. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic. However, at this stage, project-specific underwater sound modelling has not yet been completed and therefore cannot yet be used to inform the assessment of LSE. A precautionary approach has, therefore, been adopted to the determination of LSE at this stage which assumes that there is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. On this basis it is concluded that LSE from underwater sound resulting from vessels and other vessel activities on marine mammals cannot be excluded. This impact is therefore screened in for further consideration in the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4.

#### Vessel collision risk

- 1.4.4.37 An increase in vessel activity associated with operations and maintenance activities may result in increased collisions with marine mammals. The extent of this potential disturbance will however be spatially restricted to within the Morgan Array Area and along routes to local ports. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic.
- 1.4.4.38 During any given year of the operations and maintenance phase there could be a maximum increase of 849 vessel movements (all vessel types) within the Morgan Array Area on the current baseline of 4,239 vessel movements per year within the Morgan Array Area. As outlined in paragraph 1.4.4.24, faster moving vessels (e.g. CTVs) travelling at 14 knots or faster are those most likely to cause death or serious injury to marine mammals. The MDS however assumes that only up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Other vessels present are likely to be stationary for long periods of time and travel at slow speeds, therefore the potential for collision with these vessels is considered to be low.
- 1.4.4.39 As also outlined for the construction phase, there is no overlap between the Morgan Generation Assets and any SAC designated for Annex II marine mammals (the closest SAC being the North Anglesey Marine/Gogledd Môn Forol SAC which is located at a distance of 28.2 km from the Morgan Array Area, all other SACs are located >60 km from the Morgan Array Area). Therefore, the likelihood of collisions occurring between vessels and marine mammals is considered to be low. Marine mammals are likely to maintain their distance if foraging within the Morgan Array Area.

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- 1.4.4.40 There is therefore considered to be little potential for the increased vessel activity during the operations and maintenance phase to result in a significant effect to Annex II marine mammal features in terms of collision risk with vessels. As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of vessel collision risk is therefore screened out of further consideration for all sites.
- 1.4.4.41 In addition, it is anticipated that the risk of such collision events occurring will be minimised and managed by the implementation of measures set out in the Offshore environmental management plan which will outline instructions for vessel behaviour and vessel operators, including advice to operators to not deliberately approach marine mammals and to avoid sudden changes in course or speed. While these plans have not been considered in the determination of no LSE, they will nevertheless further reduce the likelihood of a collision event occurring.
- 1.4.4.42 As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of vessel collision risk is therefore screened out of further consideration for all sites.

### Changes in prey availability

- 1.4.4.43 There is the potential for changes in marine mammal prey abundance and distribution to arise as a result of operations and maintenance activities and as a result of the presence of offshore structures. The potential for any adverse effects on prey are, however, significantly reduced compared to the construction phase as underwater sound will be substantially lower (i.e. no piling will be required). As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of changes in prey availability is therefore screened out of further consideration for all sites within the relevant MUs outlined in section 1.3.4.

### Operational sound

- 1.4.4.44 The MMO (MMO, 2014) review of post-consent monitoring at offshore wind farms found that available data on the operational wind turbine sound, from the UK and abroad, in general showed that sound levels from operational wind turbines are low. The spatial extent of the potential impact of the operational wind turbine sound on marine receptors is generally estimated to be small, and behavioural responses are only likely at ranges close to the wind turbines. This is supported by several published studies which provide evidence that marine mammals are not displaced from operational wind farms.
- 1.4.4.45 At the Horns Rev and Nysted offshore wind farms in Denmark, long term monitoring showed that both harbour porpoise and harbour seal were sighted regularly within the operational offshore wind farms, and within two years of operation, the populations had returned to levels that were comparable with the wider area (Diederichs *et al.*, 2008). Similarly, a monitoring programme at the Egmond aan Zee offshore wind farm in the Netherlands reported that significantly more porpoise activity was recorded within the offshore wind farm compared to the reference area during the operations phase (Scheidat *et al.*, 2011). Other studies at Dutch and Danish offshore wind farms (Lindeboom *et al.*, 2011) also suggest that harbour porpoise may be attracted to increased foraging opportunities within operating offshore wind farms. In addition, recent tagging work by Russell *et al.* (2014) found that some tagged harbour and grey seal demonstrated grid like movement patterns as these animals moved between individual wind turbines, strongly suggestive of these structures being used for foraging.

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1.4.4.46 Other reviews have also concluded that operational wind farm sound will have negligible effects (Madsen *et al.*, 2006; Teilmann *et al.*, 2006a; Teilmann *et al.*, 2006b; CEFAS, 2010; Brasseur *et al.*, 2012). As such, no LSE s are anticipated to occur to any marine mammal qualifying feature of any European site and the impact of operational sound will be screened out of further consideration.

### EMF

1.4.4.47 Based on the data currently available, there is no evidence of EMF related to marine renewable devices having any impact (either positive or negative) on marine mammals (Copping, 2018). There is no evidence that seals can detect or respond to EMF, however, some species of cetaceans may be able to detect variations in magnetic fields (Normandeau *et al.*, 2011). To date, the only marine mammal known to show any response to EMF is the Guiana dolphin *Sotalia guianensis* which has been shown to possess an electroreceptive system, which uses the vibrissal crypts on their rostrum to detect electrical stimuli similar to those generated by small to medium sized fish (Czech-Damal *et al.*, 2013). However, this has not been shown in any other species of marine mammal and this species does not occur within the Morgan marine mammal study area for the generation assets. As such, no LSE s are anticipated to occur to any marine mammal qualifying feature of any European site and the impact of EMF will be screened out of further consideration.

### Accidental pollution

1.4.4.48 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/machinery.

1.4.4.49 Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, (the nearest site being the North Anglesey Marine/Gogledd Môn Forol SAC which is located 28.2 km from the Morgan Array Area) any effects should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II marine mammal qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on the conservation objectives of the site. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

1.4.4.50 It should be noted that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These include an Offshore environmental management plan which will include a marine pollution contingency plan, chemical risk assessment and marine waste management and disposal arrangements. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. They will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. These plans have not however, been considered in the determination of no LSE, but they will nevertheless reduce the likelihood of an accidental pollution event occurring.



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### Decommissioning phase

- 1.4.4.51 The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above in the construction phase.

### Determination of LSE for Annex II marine mammals

- 1.4.4.52 Table 1.29 to Table 1.56 present the results of the LSE determination assessment as a result of the Morgan Generation Assets on relevant qualifying interest features of the European sites identified for marine mammals. Separate HRA screening tables are presented for each of the UK sites and Republic of Ireland sites. A single table (Table 1.56) has been produced to cover the 16 French sites screened into the LSE assessment for harbour porpoise. This is because the justifications for the screening decisions were the same for all French sites on the basis of the distance of these sites from the Morgan Generation Assets. A separate table has been provided to cover the single French site (Chaussée de Sein SCI) screened into the LSE assessment for both harbour porpoise and grey seal.
- 1.4.4.53 These assessments have been made in the absence of measures adopted as part of the project. The footnotes to these tables provide a brief assessment to support the screening in or out of each of these LSEs on the identified SAC features.

### **LSE in-combination**

- 1.4.4.54 The LSE test requires consideration of the Morgan Generation Assets alone and/or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but for Table 1.29 which there is potential for a LSE in-combination to occur in combination with other plans or projects (e.g. due to wide foraging ranges resulting in a species interacting with a large number of projects).
- 1.4.4.55 Given the method for site selection applied during this Screening assessment, it is considered that the consolidation of information regarding external plans and projects would not likely result in additional LSEs being identified for the Screening assessment. For marine mammals, the potential for LSE alone is identified for all sites within the respective species MU, therefore effects in-combination will be considered at the HRA Stage 2 ISAA – Stage 2 SAC Assessments (Document Reference E1.2).

Table 1.29: LSE matrix for North Anglesey Marine/ Gogledd Môn Forol SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	✓d	*d	*d	*e			*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (28.2 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. The majority of impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. However, LSE associated with changes to prey species have been screened in for this SAC on a precautionary basis due to its proximity to the Morgan Generation Assets Boundary. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phases compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (28.2 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to the Annex II harbour porpoise feature of the SAC as a result of in-combination effects



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across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.30: LSE matrix for the North Channel SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	√a			√a			√a			√b	√b	√b	*c	*c	*c	*d	*d	*d	*e			*e			*f			*g			*h	*h	*h	√i	√i	√i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (64 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets Boundary (i.e. 64.0 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE to the harbour porpoise features from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (64 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects

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across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.31: LSE matrix for Strangford Lough SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour seal <i>Phoca vitulina</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d				*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the harbour seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (94.7 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets Boundary (i.e. 94.7 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE to the harbour seal features from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - Harbour seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour seal will be small. Several published studies indicate that harbour seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (94.7 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour seal features of the SAC as a result of in-combination effects across

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all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



Table 1.32: LSE matrix for Murlough SAC.

European Site Qualifying Features	Underwater sound from Piling		Underwater sound from Clearance of UXO		Underwater sound from Pre-construction site surveys		Underwater sound from Vessels and other Vessel Activities		Vessel Collision Risk		Changes in Prey Availability		Changes in Water Clarity		Operational Sound		EMF		Accidental Pollution		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	C	O&M	D	C	O&M	D					
Harbour seal <i>Phoca vitulina</i>	✓ a			✓ a			✓ a			✓ b	✓ b	✓ b	✗ c	✗ c	✗ c	✗ d	✗ d	✗ d	✗ e		✗ f		✗ g	✗ h	✗ h	✗ h	✓ i	✓ i	✓ i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the harbour seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (98.4 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets Boundary (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets Boundary (i.e. 98.4 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE to the harbour seal features from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - Harbour seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour seal will be small. Several published studies indicate that harbour seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (98.4 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



Table 1.33: LSE matrix Lambay Island SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D		
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f				*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. Given the distance of the SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - as outlined in paragraph 1.4.4.11 there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Lambay Island SAC and the Morgan Generation Assets. There is no potential for LSE on the Lambay Island SAC as a result of in combination impacts.

Table 1.34: LSE matrix for Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Bottlenose dolphin <i>Tursiops truncatus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d				*e			*f			*g			*h	*h	*h	✓i	✓i	✓i
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d				*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for bottlenose dolphin and grey seal features of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is the potential for bottlenose dolphin and grey seal features of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other non-vessel activities. It is therefore concluded that there is potential for LSE from vessel sound and other vessel related activities.
- Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (119.7 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - Bottlenose dolphin and grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of this species. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to bottlenose dolphin will be small. Given the low abundance of bottlenose dolphin within the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence to indicate that bottlenose dolphin or grey seal respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (119.7 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II bottlenose dolphin and grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.35: LSE matrix for the West Wales Marine/Gorllewin Cymru Forol SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e			*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (121.0 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (121.0 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise feature of the SAC as a result of in-combination effects

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across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



Table 1.36: LSE matrix Cardigan Bay/Bae Ceredigion SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Bottlenose dolphin <i>Tursiops truncatus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d				*e			*f			*g			*h	*h	*h	✓i	✓i	✓i
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d				*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the bottlenose dolphin and grey seal features of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is considered to be the potential for bottlenose dolphin and grey seal features from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (188.1 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** - Bottlenose dolphin and grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of this species. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to bottlenose dolphin and grey seal will be small. Given the distance of the SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence to indicate that bottlenose dolphin or grey seal respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (188.1 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.



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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II bottlenose dolphin and grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.37: LSE matrix for Pembrokeshire Marine/Sir Benfro Forol SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound during site investigation surveys			Underwater sound due to vessel use and other activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Underwater sound from wind turbine operation			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	✓ a			✓ a			✓ a			✓ b	✓ b	✓ b	× c	× c	× c	× d	× d	× d		× e			× f			× g			× h	× h	× h	✓ i	✓ i	✓ i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a × symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (237.3 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a

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maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (237.3 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further

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managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.38: LSE matrix for the Bristol Channel Approaches/Dynesfeydd Mor Hafren SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	xd	xd	xd	xe			xe			xf			xg			xh	xh	xh	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✕ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the

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impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.

- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (300.5 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.



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- h. Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (300.5 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- i. In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



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- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (335.1 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large

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distance to the SAC (335.1 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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Table 1.40: LSE matrix for Treshnish Isles SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
	Grey seal <i>Halichoerus grypus</i>																																	
	x <sub>a</sub>			x <sub>a</sub>			x <sub>a</sub>			x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>c</sub>	x <sub>c</sub>	x <sub>c</sub>	x <sub>d</sub>	x <sub>d</sub>	x <sub>d</sub>		x <sub>e</sub>			x <sub>f</sub>			x <sub>g</sub>			x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>i</sub>	x <sub>i</sub>	x <sub>i</sub>

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11 there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – as outlined in paragraph 1.4.4.11 there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. Given the distance of the SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11 there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11 there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11 there is no potential connectivity between grey seal features associated with the Treshnish Isles SAC and the Morgan Generation Assets. There is no potential for LSE on the Treshnish Isles SAC as a result of in combination impacts.



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**Table 1.41: LSE matrix for Isles of Scilly Complex SAC**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	xd	xd	xd		xe			xf			yg			xh	xh	xh	vi	vi	vi

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.

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- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (464.9 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large

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distance to the SAC (464.9 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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Table 1.42: LSE matrix Monach Islands SAC

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. Given the distance of the Monach Islands SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Monach Islands SAC and the Morgan Generation Assets. There is no potential for LSE on the Monach Islands SAC as a result of in combination impacts.

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**Table 1.43: LSE matrix North Rona SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.



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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. Given the distance of the North Rona SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the North Rona SAC and the Morgan Generation Assets. There is no potential for LSE on the North Rona SAC as a result of in combination impacts.

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**Table 1.44: LSE matrix for The Maidens SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D			
Grey seal <i>Halichoerus grypus</i>	✓ a			✓ a			✓ a			✓ b	✓ <sup>b</sup>	✓ b	✗ c	✗ <sup>c</sup>	✗ c	✗ c	✗ <sup>d</sup>	✗ d	✗ d	✗ <sup>d</sup>	✗ d	✗ e	✗ <sup>e</sup>	✗ e	✗ f	✗ <sup>f</sup>	✗ f	✗ g	✗ <sup>g</sup>	✗ g	✗ h	✗ <sup>h</sup>	✗ h	✓ i	✓ <sup>i</sup>	✓ i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (142.0 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be

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low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (142 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of

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European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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Table 1.45: LSE matrix for Rockabill to Dalkey Island SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	√a			√a			√a			√b	√b	√b	*c	*c	*c	*d	*d	*d	*e			*e			*f			*g			*h	*h	*h	√i	√i	√i
Grey seal <i>Halichoerus grypus</i>	xa			xa			xa			xb	xb	xb	xc	xc	xc	xd	xd	xd	xe			xe			xf			xg			xh	xh	xh	xi	xi	xi

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.

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- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (123.4 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.



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- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (123.4 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.46: LSE matrix for Saltee Islands SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Grey seal <i>Halichoerus grypus</i>	✓ a			✓ a			✓ a			✓ b	✓ b	✓ b	× c	× c	× c	× d	× d	× d		× e					× f			× g			× h	× h	× h	✓ i	✓ i	✓ i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a × symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and site investigation surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.

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- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (259.5 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large

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distance to the SAC (259.5 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.47: LSE matrix Horn Head and Rinclevan SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. Given the distance of the Horn Head and Rinclevan SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Horn Head and Rinclevan SAC and the Morgan Generation Assets. There is no potential for LSE on the Horn Head and Rinclevan SAC as a result of in combination impacts.



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Table 1.48: LSE matrix for the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.

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- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. Given the distance of the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slieve Tooley/Tormore Island/Loughros Beg Bay and the Morgan Generation Assets. There is no potential for LSE on the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC as a result of in combination impacts.

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**Table 1.49: LSE matrix for the Duvillaun Islands SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f				*g		*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. Given the distance of the Duvillaun Islands SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Duvillaun Islands SAC and the Morgan Generation Assets. There is no potential for LSE on the Duvillaun Islands SAC as a result of in combination impacts.

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**Table 1.50: LSE matrix for the Inishbofin and Inishark SAC**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. Given the distance of the Inishbofin and Inishark SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishbofin and Inishark SAC and the Morgan Generation Assets. There is no potential for LSE on the Inishbofin and Inishark SAC as a result of in combination impacts.



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**Table 1.51: LSE matrix for the Inishkea Islands SAC**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	
Grey seal <i>Halichoerus grypus</i>	*a			*a			*a			*b	*b	*b	*c	*c	*c	*d	*d	*d		*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. Given the distance of the Inishbofin and Inishark SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Inishkea Islands SAC and the Morgan Generation Assets. There is no potential for LSE on the Inishkea Islands SAC as a result of in combination impacts.

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**Table 1.52: LSE matrix for the Slyne Head Islands SAC**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D		
Grey seal <i>Halichoerus grypus</i>	x <sub>a</sub>			x <sub>a</sub>			x <sub>a</sub>			x <sub>b</sub>	x <sub>b</sub>	x <sub>b</sub>	x <sub>c</sub>	x <sub>c</sub>	x <sub>c</sub>	x <sub>d</sub>	x <sub>d</sub>	x <sub>d</sub>		x <sub>e</sub>			x <sub>f</sub>				x <sub>g</sub>			x <sub>h</sub>	x <sub>h</sub>	x <sub>h</sub>	x <sub>i</sub>	x <sub>i</sub>	x <sub>i</sub>

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. There is therefore no potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.

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- d. **Changes in prey availability** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Ini Slyne Head Islands SAC and the Morgan Generation Assets. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. Given the distance of the Slyne Head Islands SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution.
- i. **In-combination effects** - as outlined in paragraph 1.4.4.11, there is no potential connectivity between grey seal features associated with the Slyne Head Islands SAC and the Morgan Generation Assets. There is no potential for LSE on the Slyne Head Islands SAC as a result of in combination impacts.

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**Table 1.53: LSE matrix for the Roaringwater Bay and Islands SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e			*e			*f			*g			*h	*h	*h	✓i	✓i	✓i
Grey seal <i>Halichoerus grypus</i>	xa			xa			xa			xb	xb	xb	*c	*c	*c	*d	*d	*d	*e			*e			*f			*g			*h	*h	*h	*i	*i	*i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✖ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - Given the significant distance of the SAC to the Morgan Array Area (472.9 km from the Morgan Array Area), the Morgan Array Area is unlikely to constitute important foraging grounds for individuals from these sites and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of these sites. However, due to the sites being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from these sites and the Morgan Array Area. In the absence of project specific underwater sound modelling, a

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precautionary approach has been adopted at this stage and it is therefore concluded that there is potential for LSE on the Annex II harbour porpoise feature of the site during the construction phase from piling, UXO clearance activities or site investigation surveys (e.g. geophysical surveys). As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE on Annex II grey seal features from underwater sound during the construction phase.

- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. There is therefore no potential for LSE on grey seal features of the SAC from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (472.9 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. Furthermore, the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE on Annex II grey seal features from vessel collision risk during the construction phase. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to harbour porpoise features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is



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no potential for LSE for the harbour porpoise feature of the SAC from changes in prey availability during the operations and maintenance and decommissioning phases. As outlined in in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of the SAC from changes in prey availability.

- e. **Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE for the harbour porpoise feature of this SAC from changes in water clarity. As outlined in in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of the SAC from changes in water clarity.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE for the harbour porpoise feature of this SAC as a result of wind turbine sound during the operations and maintenance phase. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of the SAC from operational sound.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE for the harbour porpoise feature of the SAC from EMF during the operations and maintenance phase. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Roaringwater Bay and Islands SAC and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of the SAC from EMF during the operational and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (472.9 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been

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considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. There is no potential for LSE in-combination for the grey seal feature of the Roaringwater Bay and Islands SAC.

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**Table 1.54: LSE matrix Basket Islands SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓ a			✓ a			✓ a			✓ b	✓ b		✓ b	✗ c	✗ c	✗ c	✗ d	✗ d	✗ d	✗ e		✗ e			✗ g			✗ h	✗ h	✗ h	✓ i	✓ i	✓ i
Grey seal <i>Halichoerus grypus</i>	✗ a			✗ a			✗ a			✗ b	✗ b		✗ b	✗ c	✗ c	✗ c	✗ d	✗ d	✗ d	✗ e		✗ e			✗ g			✗ h	✗ h	✗ h	✗ j	✗ j	✗ j

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - Given the significant distance of the SAC to the Morgan Array Area (589.6 km from the Morgan Array Area), the Morgan Array Area is unlikely to constitute important foraging grounds for individuals from this site and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of this site. However, due to the site being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from this site and the Morgan Array Area. In the absence of project specific underwater sound modelling, a precautionary approach has been adopted at this stage and it is therefore concluded that there is potential for LSE on the Annex II harbour porpoise feature of the site during the construction phase from piling, UXO clearance activities or site

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investigation surveys (e.g. geophysical surveys). As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Blasket Islands SAC and the Morgan Generation Assets. There is therefore considered to be no potential for LSE on Annex II grey seal features from underwater sound during the construction phase.

- b. **Underwater sound from vessels and other vessel activities** - There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Blasket Islands SAC and the Morgan Generation Assets. There is therefore no potential for LSE on grey seal features of the SAC from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Generation Assets (589.6 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Blasket Islands SAC and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE on grey seal from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE for the harbour porpoise feature of this SAC from changes in prey availability during the operations and maintenance and decommissioning phases. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Blasket Islands SAC and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of this SAC from changes in prey availability.
- e. **Changes in water clarity** - Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be

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localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE for the harbour porpoise feature of this SAC from changes in water clarity. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Blasket Islands SAC and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of this SAC from changes in water clarity.

- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase on harbour porpoise. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Blasket Islands SAC and the Morgan Generation Assets. It is therefore considered that there is no potential for LSE on the grey seal feature of this SAC from operational sound.
- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (589.6 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Blasket Islands SAC and the Morgan Generation Assets. There is no potential for LSE on the Blasket Islands SAC as a result of in combination impacts.

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**Table 1.55 LSE matrix for the Chaussée de Sein SCI**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	xd	xd	xd	xe			xe			xf			xg			xh	xh	xh	✓i	✓i	✓i
Grey seal <i>Halichoerus grypus</i>	xa			xa			xa			xb	xb	xb	xc	xc	xc	xd	xd	xd	xe			xe			xf			xg			xh	xh	xh	xi	xi	xi

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✕ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - given the significant distance of the SAC to the Morgan Generation Assets (675.6 km), the Morgan Generation Assets boundary is unlikely to constitute important foraging grounds for individuals from this site and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of this site. However, due to this site being located within the Celtic and Irish seas MU for harbour porpoise there is potential connectivity between the Morgan Generation Assets and harbour porpoise features of this site. In the absence of project specific underwater sound modelling, a precautionary approach has been adopted at this stage and it is therefore concluded that there is potential for LSE on the Annex II harbour porpoise feature of the site during the construction phase from piling, UXO clearance activities or site



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investigation surveys (e.g. geophysical surveys). As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Chaussée de Sein SCI and the Morgan Generation Assets. There is therefore considered to be no potential for LSE on Annex II grey seal features from underwater sound during the construction phase.

- b. **Underwater sound from vessels and other vessel activities** - there is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Generation Assets and ZOI of the potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Chaussée de Sein SCI and the Morgan Generation Assets. There is therefore no potential for LSE on grey seal features of the SAC from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** - Considering the distance at which the SAC is located from the Morgan Array Area, the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of six CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal features associated with the Chaussée de Sein SCI and the Morgan Generation Assets. It is therefore concluded that there is no potential for LSE on grey seal features from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - the majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Array Area (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >500 km) no LSEs are anticipated to occur as a result of changes in prey availability to harbour porpoise features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE for the harbour porpoise feature of this SAC from changes in prey availability during the operations and maintenance and decommissioning phases. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Chaussée de Sein SCI and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of this SAC from changes in prey availability.

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- e. **Changes in water clarity** - harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE for the harbour porpoise feature of this SAC from changes in water clarity. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Chaussée de Sein SCI and the Morgan Generation Assets. It is therefore considered that there is also no potential for LSE on the grey seal feature of this SAC from changes in water clarity.
- f. **Operational sound** - sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE for the harbour porpoise feature of this SAC as a result of wind turbine sound during the operations and maintenance phase. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Chaussée de Sein SCI and the Morgan Generation Assets. It is therefore considered that there is no potential for LSE on the grey seal feature of this SAC from operational sound.
- g. **EMF** - there is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE for the harbour porpoise features of this SAC from EMF during the operations and maintenance phase. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Chaussée de Sein SCI and the Morgan Generation Assets. Given the distance of the SAC from the Morgan Array Area, there is therefore considered to be no potential for LSE on grey seal feature of the SAC as a result of EMF during the operations and maintenance phase.
- h. **Accidental pollution** - there is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (675.6 km), any effects should they occur, will not directly affect the SAC. On this basis, and in the absence of mitigation, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of the site as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- i. **In-combination effects** - activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone,

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the potential for LSE has been concluded in-combination. As outlined in paragraph 1.4.4.11, on the basis of the telemetry data, there is no potential connectivity between grey seal associated with the Chaussée de Sein SCI and the Morgan Generation Assets. There is no potential for LSE on the Chaussée de Sein SCI as a result of in combination impacts.

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**Table 1.56: LSE matrix for the 16 other French sites.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			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	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D	C	O & M	D			
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e			*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

SACs within French waters have been assessed together, as all SACs are designated for harbour porpoise and impacts are expected to be similar across all 16 sites.

- a. **Underwater sound from piling, UXO clearance and pre-construction site investigation surveys** - Given the significant distance of the nearest French site to the Morgan Array Area (closest site is located 558.8 km from the Morgan Array Area), the Morgan Array Area is unlikely to constitute important foraging grounds for individuals from these sites and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of these sites. However, due to the sites being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from these sites and the Morgan Generation Assets. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.

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- b. **Underwater sound from vessels and other vessel activities** - Given the large distances of all the French sites from the Morgan Array Area (the closest site is located 558.8 km from the Morgan Array Area), it is considered that vessel traffic will not result in a significant disturbance to Annex II harbour porpoise feature of any French site. However, due to the sites being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from these sites and the Morgan Generation Assets. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- c. **Vessel collision risk** - Considering the distance at which the French SACs are located from the Morgan Generation Assets (>500 km from the Morgan Array Area) the likelihood of collisions occurring between vessels and marine mammals is considered to be low. In addition, fast moving vessels (e.g. CTVs) which pose the greater collision risk will be limited in number with a maximum of 12 CTVs potentially being present within the Morgan Array Area at any one time during the construction phase and up to a maximum of six CTVs may be present on site at any one time during the operations and maintenance phase. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100 km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** - Given the large distance between the Morgan Array Area and the French sites for harbour porpoise (closest site is 558.8 km from the Morgan Array Area) and the fact that increases in SSC will be localised, short-term and intermittent, they are considered unlikely to result in significant effects to the foraging ability of harbour porpoise. There is no potential for LSE from changes in water clarity for any French site.
- f. **Operational sound** - Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Given the large distance between the Morgan Array Area and the French sites for harbour porpoise (closest site is 558.8 km from the Morgan Array Area) and that several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.

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- g. **EMF** - There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence to indicate that harbour porpoise respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. Furthermore, considering the large distance to the SAC (the closest SAC: Mers Celtiques - Talus du golfe de Gascogne is located 558.8 km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution. It should be noted that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These plans have not however, been considered in the determination of no LSE, but will nevertheless reduce the likelihood of an accidental pollution event occurring.
- i. **In-combination effects** - Over the distances considered, all relevant effect-pathways are considered extremely weak, such that only a negligible (if even detectable) influence would be apparent. Such effects could not contribute to any material degree to an in-combination effect and as such, in-combination effects associated with planned projects or other activities in the vicinity of the Morgan Generation Assets are also not anticipated for the harbour porpoise feature of any French site.



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**1.4.5 Assessment of LSE for offshore ornithological features**

**Site overview**

1.4.5.1 As outlined in section 1.3.5, designated sites with offshore ornithological features were identified in the initial screening process to be taken forward for determination of LSE. These sites and the associated qualifying features are set out in Table 1.57 below.

**Table 1.57: The SPAs and Ramsar sites taken forward for determination of LSE, with details of the associated qualifying features.**

<sup>1</sup> Measured as the closest, straight line, distance from the SPA (irrespective of the presence of land masses).

Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar	UK9020326	31.3	Herring gull <i>Larus argentatus</i>	All seasons
	UK11045		Lesser black-backed gull <i>Larus fuscus</i>	All seasons
	UK11022		Breeding seabird assemblage	As above for relevant species
Ribble and Alt Estuaries SPA / Ribble and Alt Estuaries Ramsar	UK9005103	51.0	Lesser black-backed gull <i>Larus fuscus</i>	All seasons
	UK11057		Breeding seabird assemblage	As above for relevant species
Irish Sea Front SPA	UK9020328	56.7	Manx shearwater <i>Puffinus puffinus</i>	All seasons
Bowland Fells SPA	UK9005151	70.0	Lesser black-backed gull <i>Larus fuscus</i>	All seasons
Copeland Islands SPA	UK9020291	112.3	Manx shearwater <i>Puffinus puffinus</i>	All seasons
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA	UK9013121	128.7	Manx shearwater <i>Puffinus puffinus</i>	All seasons
Lambay Island SPA	IE0004069	130.4	Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Herring gull	Non-breeding seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
Breeding seabird assemblage	As above for relevant species			

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Ireland's Eye SPA	IE0004117	138.6	Kittiwake <i>Rissa tridactyla</i>	All seasons
Howth Head Coast SPA	IE0004113	139.3	Kittiwake <i>Rissa tridactyla</i>	All seasons
Ailsa Craig SPA	UK9003091	142.3	Gannet <i>Morus bassanus</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Breeding seabird assemblage	As above for relevant species
Wicklow Head SPA	IE0004127	165.4	Kittiwake <i>Rissa tridactyla</i>	All seasons
Rathlin Island SPA	UK0030055	186.1	Kittiwake <i>Rissa tridactyla</i>	All seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Forth Islands SPA	UK9004171	219.9	Gannet <i>Morus bassanus</i>	Non-breeding seasons
Skomer, Skokholm and the seas off Pembrokeshire/Sgomer, Sgogwm a moroedd Benfro SPA	UK9014051	252.0	Manx shearwater <i>Puffinus puffinus</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	Non-breeding seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Breeding seabird assemblage	As above for relevant species
North Colonsay and Western Cliffs SPA	UK9003171	257.6	Kittiwake <i>Rissa tridactyla</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Grassholm SPA	UK9014041	260.3	Gannet <i>Morus bassanus</i>	All seasons
Saltee Islands SPA	IE0004002	265.9	Gannet <i>Morus bassanus</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	All seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Horn Head to Fanad Head SPA	IE0004194	296.3	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Breeding seabird assemblage	As above for relevant species
Mingulay and Berneray SPA	UK9001121	370.3	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
The Shiant Isles SPA	UK9001041	442.5	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Isles of Scilly SPA/Isles of Scilly Ramsar	UK9020288	464.8	Fulmar <i>Fulmarus glacialis</i>	All seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
	UK11033		Manx shearwater <i>Puffinus puffinus</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	Non-breeding seasons
			Great black-backed gull <i>Larus marinus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Handa SPA	UK9001241	480.2	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
St Kilda SPA	UK9001031	490.4	Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Manx shearwater <i>Puffinus puffinus</i>	All seasons
			Gannet <i>Morus bassanus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Cape Wrath SPA	UK9001231	502.3	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Flannan Isles SPA	UK9001021	510.8	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
North Rona and Sula Sgeir SPA	UK9001011	567.8	Fulmar <i>Fulmarus glacialis</i>	All seasons
			Gannet <i>Morus bassanus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Buchan Ness to Collieston Coast SPA	UK9002491	385.7	Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
East Caithness Cliffs SPA	UK9001182	449.8	Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Fair Isle SPA	UK9002091	620.1	Fulmar <i>Fulmarus glacialis</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Flamborough and Filey Coast SPA	UK9006101	233.5	Gannet <i>Morus bassanus</i>	Non-breeding seasons
			Kittiwake <i>Rissa tridactyla</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species
Hermaness, Saxa Vord and Valla Field SPA	UK9002011	763.5	Gannet <i>Morus bassanus</i>	Non-breeding seasons
			Breeding seabird assemblage	As above for relevant species

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
Rum SPA	UK9001341	340.7	Manx shearwater	All seasons
			Breeding seabird assemblage	As above for relevant species
Sule Skerry and Sule Stack SPA	UK9002181	548.9	Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Gannet <i>Morus bassanus</i>	Non-breeding seasons
			European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
			Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Troup, Pennan and Lion's Heads SPA	UK9002471	414.7	Kittiwake <i>Rissa tridactyla</i>	Non-breeding season
			Breeding seabird assemblage	As above for relevant species
West Westray SPA	UK9002101	580.3	Kittiwake <i>Rissa tridactyla</i>	Non-breeding season
			Breeding seabird assemblage	As above for relevant species
Auskerry SPA	UK9002381	558.3	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Mousa SPA	UK9002361	681.4	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Priest Island (Summer Isles) SPA	UK9001261	440.2	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Treshnish Isles SPA	UK9003041	303.8	European storm petrel <i>Hydrobates pelagicus</i>	Migratory seasons
Foula SPA	UK9002061	679.9	Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons
			Breeding seabird assemblage	As above for relevant species
Ramna Stacks and Gruney SPA	UK9002021	751.3	Leach's petrel <i>Oceanodroma leucorhoa</i>	Migratory seasons



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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
The Dee Estuary SPA	UK9013011	70.7	Pintail <i>Anas acuta</i>	Migratory seasons
			Teal <i>Anas crecca</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
			Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Bar-tailed godwit <i>Limosa lapponica</i>	Migratory seasons
			Black-tailed godwit <i>Limosa limosa islandica</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
			Waterbird assemblage	As above for relevant species
The Dee Estuary Ramsar	298	70.7	Teal <i>Anas crecca</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Pintail <i>Anas acuta</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Black-tailed godwit <i>Limosa limosa islandica</i>	Migratory seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Bar-tailed godwit <i>Limosa lapponica</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
Traeth Lafan/ Lavan Sands, Conway Bay SPA	UK9013031	70.0	Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Red-breasted merganser <i>Mergus serrator</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Great crested grebe <i>Podiceps cristatus</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
Dyfi Estuary/Aber Dyfi SPA	UK9020284	148.6	Greenland white-fronted goose <i>Anser albifrons flavirostris</i>	Migratory seasons
Burry Inlet SPA	UK9015011	247.2	Pintail <i>Anas acuta</i>	Migratory seasons
			Teal <i>Anas crecca</i>	Migratory seasons
			Wigeon <i>Anas penelope</i>	Migratory seasons
			Shoveler <i>Anas clypeata</i>	Migratory seasons
			Turnstone <i>Arenaria interpres</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
			Oystercatcher <i>Haematopus ostralegus</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
Redshank <i>Tringa totanus</i>	Migratory seasons			

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Waterbird assemblage	As above for relevant species
Burry Inlet Ramsar	562	247.2	Redshank <i>Tringa totanus</i>	Migratory seasons
			Whimbrel <i>Numenius phaeopus</i>	Migratory seasons
			Curlew <i>Numenius arquata</i>	Migratory seasons
			Greenshank <i>Tringa nebularia</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Grey plover <i>Pluvialis squatarola</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Knot <i>Calidris canutus</i>	Migratory seasons
Severn Estuary SPA	UK9015022	258.6	Gadwall <i>Anas strepera</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Bewick's swan <i>Cygnus columbianus bewickii</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
			Waterbird assemblage	As above for relevant species
Severn Estuary Ramsar	67	258.6	Bewick's swan <i>Cygnus columbianus bewickii</i>	Migratory seasons
			Shelduck <i>Tadorna tadorna</i>	Migratory seasons
			Gadwall <i>Anas strepera</i>	Migratory seasons
			Dunlin <i>Calidris alpina alpina</i>	Migratory seasons
			Redshank <i>Tringa totanus</i>	Migratory seasons
			Ringed plover <i>Charadrius hiaticula</i>	Migratory seasons

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Designated Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features	Season of relevance
			Teal <i>Anas crecca</i>	Migratory seasons
			Pintail <i>Anas acuta</i>	Migratory seasons
North-west Irish Sea	IE004236	88.2	Kittiwake <i>Rissa tridactyla</i>	All seasons
			Lesser black-backed gull <i>Larus fuscus</i>	All seasons
			Herring gull <i>Larus argentatus</i>	Non-breeding seasons
			Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Razorbill <i>Alca torda</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
Seas off St Kilda	UK9020332	474.3	Guillemot <i>Uria aalge</i>	Non-breeding seasons
			Fulmar <i>Fulmarus glacialis</i>	All seasons
			Gannet <i>Morus bassanus</i>	All seasons

**Pathways for LSE: potential impacts on offshore ornithological features**

- 1.4.5.2 A range of potential impacts on the offshore ornithological features have been identified which may occur during the construction, operations and maintenance, and decommissioning phases of the Morgan Generation Assets (Table 1.58). These are the impacts which are taken into account when determining the potential for LSE on the designated sites and seabirds (i.e. during the breeding, passage and non-breeding seasons) identified in section 1.3.5 and Table 1.57. The list of potential impacts on seabirds has been compiled using the experience and knowledge gained from previous offshore wind farm projects, as well as published literature.
- 1.4.5.3 Consideration of the potential impacts identified for the offshore ornithological features is presented in the following sections to inform the determination of LSE. Some of the designated sites screened in include an assemblage qualifying feature. For the purposes of considering the potential effect pathways, these named components are treated as qualifying features (with the potential effect pathways also considered for the overall assemblage feature).

**Table 1.58: Potential impacts associated with the Morgan Generation Assets.**

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Impact	Development phase of relevance		
	Construction	Operations and maintenance	Decommissioning
Temporary habitat loss/disturbance and increased SSC	✓	×	✓
Disturbance and displacement from airborne sound and presence of vessels and infrastructure	✓	✓	✓
Changes in prey availability	✓	✓	✓
Accidental pollution	✓	✓	✓
Permanent habitat loss/disturbance and increased SSC	×	✓	×
Collision risk	×	✓	×
Barrier to movement	×	✓	×

**Construction phase**

**Temporary habitat loss/disturbance and increased suspended sediment concentrations**

1.4.5.4 Direct habitat loss arising from the presence of infrastructure may occur during the construction phase of the Morgan Generation Assets. This is a temporary (and relatively short-term) effect in relation to the construction period and is unlikely to be significant for offshore ornithological features using the Morgan Array Area due to the lack of overlap between the Morgan Array Area and any SPAs. Indirect loss of habitats used by offshore ornithological features is assessed as displacement. Therefore, it is considered that there is no potential for LSE in relation to the qualifying features of any of the SPAs identified with regards to temporary habitat loss/disturbance and increased SSC, and this impact is not considered further.

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

1.4.5.5 Airborne sound, the presence of vessels and construction works may disturb seabirds from offshore foraging or non-foraging areas (e.g., rafting, moulting) in the short-term, causing changes in behaviour or displacing them from the affected areas. Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. This would only be likely to apply to seabirds which use the area of the marine environment in which construction activities will occur. As such, there is no potential for LSE in relation to the qualifying features of any of the SPAs identified with regards to disturbance and displacement from airborne sound and presence of vessels and infrastructure, and this impact is not considered further.

**Changes in prey availability**

1.4.5.6 There is the potential for changes in bird prey (e.g., fish species) abundance and distribution to arise as a result of construction activities which physically disturb the seabed, result in increased SSC or which generate underwater sound. Reduction or disruption to prey availability to seabirds may cause displacement from foraging

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grounds in the area or reduced energy intake, affecting survival rates or productivity in the population in the short-term. The risk of effects on prey species is expected to be greatest during the construction phase (e.g., due to seabed disturbance and/or underwater sound during construction) with effects during the operations and maintenance phase expected to be much reduced.

- 1.4.5.7 As outlined in section 1.3.5 above, there is the potential for connectivity with SPA populations considered in this HRA screening. Any potential temporary changes to the fish community in the vicinity of the Morgan Array Area as a result of construction impacts, such as underwater sound, are unlikely to result in significant effects to SPA populations bird species given that the majority of impacts on prey species will be spatially limited to the Morgan Array Area (for habitat disturbance) and surrounding area (e.g., behavioural effects from underwater sound), particularly in the context of the extensive foraging ranges for bird species and the highly mobile nature of these species. As such, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations for the SPAs considered due to the distances between the Morgan Generation Assets and any SPA and the limited spatial extent of potential impacts.

### Accidental pollution

- 1.4.5.8 There is a risk of pollution being accidentally released during the construction phase of the Morgan Generation Assets from sources including vessels, vehicles, equipment and machinery. Pollution events are considered unlikely, and given the low volumes typically associated with offshore wind farm development (see Volume 1, Chapter 3: Project description of the Environmental Statement (Document Reference F1.3)), should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g., due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SPAs identified, (the nearest site being the Liverpool Bay/Bae Lerpwl SPA, which is located 10 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPAs. As noted above, any indirect effects on Annex I offshore ornithological qualifying interests from accidental release of pollutants would be unlikely and should they occur, these would be unlikely to lead to a significant effect on conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex I offshore ornithological qualifying interests features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.
- 1.4.5.9 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These include an Offshore environmental management plan which will include a marine pollution contingency plan, chemical risk assessment and marine waste management and disposal arrangements. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR (Oslo-Paris), International Maritime Organization (IMO) and MARPOL (International Convention for the Prevention of Pollution from Ships) guidelines for preventing pollution at sea. These management plans are not taken into account at this screening stage of the HRA. They will however be taken into account in as part of the HRA stage 2 ISAA (Document Reference E1.2).



## Operations and maintenance phase

### Permanent habitat loss/disturbance and increased SSC

- 1.4.5.10 Direct habitat disturbance may occur during the operations and maintenance phase of the Morgan Generation Assets, leading to reduced foraging opportunities either directly (loss of habitat) or indirectly (increased SSC reducing visibility and therefore foraging success). Given the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g., resting, moulting), direct habitat loss due to the Morgan Generation Assets is unlikely to have effects on SPA breeding seabird populations. Similarly, no effects are predicted on migratory waterbird populations as a result of birds passing through (or over) the Morgan Generation Assets on migration. Therefore, it is considered that there is no potential for LSE in relation to the qualifying features of any of the SPAs identified with regards to permanent habitat loss/disturbance and increased SSC, and this impact is not considered further.

### Disturbance and displacement from airborne sound and presence of vessels and infrastructure

- 1.4.5.11 The presence of operational wind turbines, as well as the associated maintenance activities, may disturb seabirds and displace them from preferred foraging areas over the long-term. This may lead to a reduction in foraging opportunities or increased competition and energy expenditure, resulting in decreased survival rates or productivity in the population. Such effects may be most likely in relation to seabirds using the marine habitats within the Morgan Array Area, although species are known to vary in their sensitivity to displacement (e.g., large gull species show little evidence of displacement from offshore wind farms, whereas gannet and red-throated diver show marked displacement (Dierschke *et al.*, 2018; Dorsch *et al.*, 2020)). Additionally, the effects of such displacement are likely to be minimal for species such as Manx shearwater and fulmar (irrespective of their sensitivity to the effect), which have particularly large foraging ranges, because the resultant habitat loss will represent a small proportion of the available habitat that they use.
- 1.4.5.12 The effect of disturbance and displacement as a result of the Morgan Generation Assets (during all phases) has been quantified in Volume 4, Annex 5.2: Offshore ornithology displacement technical report of the Environmental Statement (Document Reference F4.5.2). The results of these analyses have been considered in the context of SPA and Ramsar populations within Appendix A: Apportioning assessment to SPAs/Ramsar sites of this LSE screening which is summarised in the HRA Screening tables below (see Table 1.59 to Table 1.109). As stated in paragraph 1.4.5.21, species and sites which have an estimated mortality of <0.0 (rounded to one decimal place) are screened out of further assessment.

### Collision risk

- 1.4.5.13 Collisions of seabirds with the rotating blades of the wind turbines may result in the death or injury of individuals. Such mortality may be additive, so could cause population declines or, in some situations, prevent population recovery. Therefore, seabird species which forage within, or commute through, the Morgan Array Area may be vulnerable to such effects. For seabirds, collision risk may vary between species in relation to a range of factors associated with flight behaviour but with flight heights being of fundamental importance in predicting the vulnerability to this effect (Johnston *et al.*, 2014). Thus, species which fly at low heights and below the rotor swept area

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(e.g., fulmar and auk species) are less vulnerable to this effect pathway, in contrast to other species which generally fly at greater heights and are at risk of collision for a proportion of their flight time (e.g., kittiwake, large gull species and gannet).

- 1.4.5.14 The effect of collisions has been modelled in Volume 4, Annex 5.3: Offshore ornithology non-migratory seabird collision risk modelling of the Environmental Statement (Document Reference F4.5.3). The results of this assessment have been considered in the context of SPA populations within the apportioning assessment (Appendix A) and, where relevant to the species, in combination with displacement effects discussed above (i.e., for gannet and kittiwake). The findings of these assessments are summarised for each SPA feature in the HRA screening tables below (see Table 1.59 and). As stated in paragraph 1.4.5.22, species and sites which have an estimated mortality of <0.0 birds (rounded to one decimal place) are screened out of further assessment.

### Barrier to movement

- 1.4.5.15 Large scale offshore wind farms may act as barriers to seabird and/or migratory waterbird movements, causing individuals to fly around or over the wind turbine arrays. Therefore, seabird species that commute frequently across the Morgan Array Area (e.g., to access foraging areas) could incur greater energetic costs as a consequence of these effects, with the potential for this to result in decreased survival rates or productivity in the population. This is particularly relevant to seabirds during the breeding season, when they frequently commute between the colony and foraging areas (e.g., Searle *et al.*, 2018).
- 1.4.5.16 The likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of SPAs are low, particularly in the context of the large foraging ranges used by seabirds and the large distances from the Morgan Array Area at which the SPAs are located. This impact is screened out for all sites.

### Changes in prey availability

- 1.4.5.17 As discussed in paragraph 1.4.5.6 above, indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance in the marine environment. Reduction or disruption to prey availability for seabirds may cause displacement from the area or reduced energy intake, affecting survival rates or productivity of the population in the long-term. However, impacts on fish populations during the operations and maintenance phase and decommissioning phase are expected to be considerably lower than those for construction and as such, there is no potential for LSE associated with changes to prey availability during the operations and maintenance.

### Accidental pollution

- 1.4.5.18 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm operations, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g., due to the expected low volumes of pollutants associated with operational offshore wind). Furthermore, considering the large distances to the SPAs identified, (the nearest site being the Liverpool Bay/Bae Lerpwl SPA, which is located 10 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPAs. As noted above, any indirect effects on Annex I offshore ornithological qualifying interests from

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accidental release of pollutants would be unlikely and should they occur, these would be unlikely to lead to a significant effect on conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex I offshore ornithological qualifying interests features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

- 1.4.5.19 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets and secured as a condition of the marine licences. These include an Offshore environmental management plan which will include a marine pollution contingency plan, chemical risk assessment and marine waste management and disposal arrangements. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. These plans will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. While these plans are not considered in the determination of no LSE, they will nevertheless further reduce the potential for LSE.

### **Decommissioning phase**

- 1.4.5.20 The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above for the construction phase. The impacts of direct habitat loss, collision and barriers to movement are not applicable to the decommissioning phase and will not be considered in the determination of LSE.

### **Determination of LSE for offshore ornithological features**

- 1.4.5.21 Table 1.59 to Table 1.109 present the results of the LSE determination assessment as a result of the Morgan Generation Assets on relevant qualifying interest features of the European sites identified for offshore ornithological features. When determining LSE, where the predicted effect is less than 0.0 annual mortalities (i.e., an annual figure of 0.2 mortalities would not be rounded down to 0, but 0.04 annual mortalities would be rounded to 0.0) then that SPA has been screened out. Any apportioning impact less than 0.0 annual mortalities has not been screened in, on the basis that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination. This approach has been agreed with the EWG for the Morgan Generation Assets. The mean number of annual mortalities is used for both displacement and collision estimates following the parameters recommended by Natural England for collision risk modelling and the upper range of displacement and mortality rates based on advice in JNCC *et al.* (2022).
- 1.4.5.22 These assessments have been made in the absence of mitigation measures but based on the outputs of the site-specific modelling and assessments outlined above. The footnotes to these tables provide a brief explanation to support the screening in or out of each of these LSE on the identified SPA features.

### **LSE in combination**

- 1.4.5.23 The LSE test requires consideration of the Morgan Generation Assets alone and/or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but for which there is potential for a LSE in-combination to occur when considering

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other plans or projects (e.g., due to wide foraging ranges resulting in a species interacting with a large number of projects).

1.4.5.24 The approach that this assessment follows is that all impacts which could not be screened out are included within the in-combination assessment also.

1.4.5.25 Given the highly precautionary method for site selection applied during this Screening assessment, it is considered that the consolidation of information regarding external plans and projects would not likely result in additional LSEs being identified for the Screening assessment.

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**Table 1.59: LSE matrix for offshore ornithological features of the Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Lesser black-backed gull <i>Larus fuscus</i>	*a	*a	*a	*b	*b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Herring gull <i>Larus argentatus</i>	*a	*a	*a	*b	*b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	*h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Temporary habitat loss/disturbance and increased SSC due to all phases of the Morgan Generation Assets is unlikely to have effects on SPA seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g., roosting). The features for which LSE have been identified at this SPA are also not vulnerable to disturbance and displacement impacts (Wade *et al.*, 2016). On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for any qualifying feature of this SPA.

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- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull and herring gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull and herring gull qualifying feature of this SPA.
- c. **Collision risk** - For lesser black-backed gull and herring gull the Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum annual number of expected collisions was more than zero adult birds. The potential for LSE is therefore identified for lesser black-backed gull and herring gull as features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (31 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered, as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (31 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.



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- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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Table 1.60: LSE matrix for the Ribble and Alt Estuaries SPA Ribble and Alt Estuaries Ramsar.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
Lesser black-backed gull <i>Larus fuscus</i>	*a	*a	*a	*b	*b	*b		✓c					*d			*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	*h	*h		✓h					*h			*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Temporary habitat loss/disturbance and increased SSC due to all phases of the Morgan Generation Assets is unlikely to have effects on SPA seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g., roosting). The features for which LSE have been identified at this SPA are also not vulnerable to disturbance and displacement impacts (Wade *et al.*, 2016). On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for any qualifying feature of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull are not considered vulnerable to disturbance and displacement effects and were not

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considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull qualifying feature of this SPA.

- c. **Collision risk** - The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum annual mortality associated with collisions for lesser black-backed gull was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to collision risk for lesser black-backed gull.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (51 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (51 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE, it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be

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conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.61: LSE matrix for offshore ornithological features of the Bowland Fells SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
<b>Lesser black-backed gull</b> <i>Larus fuscus</i>	*a	*a	*a	*b	*b	*b		✓c					*d			*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (70 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull qualifying feature of this SPA.

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- c. **Collision risk** - The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for lesser black-backed gull was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to collision risk for the lesser black-backed gull feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (70 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (70 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



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**Table 1.62: LSE matrix for offshore ornithological features of the Copeland Islands SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Manx shearwater</b> <i>Puffinus puffinus</i>	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (112 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with the disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for Manx shearwater was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE for the Manx shearwater feature of this SPA.

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- c. **Collision risk** - The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for Manx shearwater was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the Manx shearwater feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (112 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (112 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.63: LSE matrix for offshore ornithological features of the Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
<b>Manx shearwater</b> <i>Puffinus puffinus</i>	*a	*a	*a	*b	✓b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (129 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with the disturbance and displacement from airborne sound and presence of vessels

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and infrastructure impact for Manx shearwater was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE for the Manx shearwater feature of this SPA.

- c. **Collision risk** - The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for Manx shearwater was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the Manx shearwater feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (129 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (129 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.64: LSE matrix for offshore ornithological features of the Lambay Island SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Kittiwake <i>Rissa tridactyla</i></b>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Fulmar <i>Fulmarus glacialis</i></b>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Lesser black-backed gull <i>Larus fuscus</i></b>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Herring gull <i>Larus argentatus</i> (non-breeding season)</b>	*a	*a	*a	*b	*b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Guillemot <i>Uria aalge</i> (non-breeding season)</b>	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Razorbill <i>Alca torda</i> (non-breeding season)</b>	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Breeding seabird assemblage</b>	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included

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and the box is highlighted in blue, where a LSE has been ruled out a ✖ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (130 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull is not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull qualifying feature of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot and razorbill features of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for the kittiwake feature of this SPA.
- c. **Collision risk** – Fulmar, guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar, guillemot and razorbill qualifying features of this SPA. For kittiwake please see justification for ‘Disturbance and displacement from airborne sound and presence of vessels and infrastructure’. The potential for LSE is concluded for the kittiwake feature of this SPA. The Apportioning Assessment undertaken for the



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Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for lesser black-backed gull was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for lesser black-backed gull. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the collision impact for herring gull was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to collision risk for the herring gull feature of this SPA.

- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (130 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (130 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered

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that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.65: LSE matrix for offshore ornithological features of the Ireland’s Eye SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Kittiwake <i>Rissa tridactyla</i></b>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (139 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to collision risk for the kittiwake feature of this SPA.

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- c. **Collision risk** - See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. The potential for LSE is concluded for the kittiwake features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (139 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (139 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.66: LSE matrix for offshore ornithological features of the Howth Head Coast SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Kittiwake <i>Rissa tridactyla</i></b>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (139 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to collision risk for the kittiwake feature of this SPA.

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- c. **Collision risk** - See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. On this basis, it is considered that there is the potential for LSE in relation to collision risk for the kittiwake qualifying feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (139 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (139 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



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Table 1.67: LSE matrix for offshore ornithological features of the Ailsa Craig SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Gannet Morus bassanus</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Kittiwake Rissa tridactyla</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Lesser black-backed gull</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<i>Breeding seabird assemblage</i>	*h	*h	*h	*b	✓h	*b		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (142 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.

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- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull qualifying feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet and kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet and kittiwake features of this SPA.
- c. **Collision risk** - The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for lesser black-backed gull was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for lesser black-backed gull. See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the gannet and kittiwake qualifying features. The potential for LSE is concluded for the gannet and kittiwake features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (142 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that

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the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (142 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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Table 1.68: LSE matrix for offshore ornithological features of the Wicklow Head SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Kittiwake Rissa tridactyla</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (165 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.

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- c. **Collision risk** - See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. On this basis, it is considered that there is the potential for LSE in relation to collision risk for the kittiwake qualifying feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (165 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (165 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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**Table 1.69: LSE matrix for offshore ornithological features of the Rathlin Island SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Kittiwake Rissa tridactyla</i>	*a	*a	*a	*b	√b	*b		√c			*d		*e	*e	*e	*f	*f	*f	*g	√g	*g
<i>Fulmar Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<i>Lesser black-backed gull Larus fuscus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<i>Guillemot Uria aalge (non-breeding season)</i>	*a	*a	*a	*b	√b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	√g	*g
<i>Razorbill Alca torda (non-breeding season)</i>	*a	*a	*a	*b	√b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	√g	*g
<i>Breeding seabird assemblage</i>	*h	*h	*h	*h	√h	*h		√h			*h		*h	*h	*h	*h	*h	*h	*h	√h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a √ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.



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- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (186 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
  
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull qualifying feature of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with the disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot and razorbill features of this SPA.
  
- c. **Collision risk** - Fulmar, guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying features of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for lesser black-backed gull was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for lesser black-backed gull. See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. On this basis, it is considered that there is the potential for LSE in relation to collision risk for the kittiwake qualifying feature of this SPA.

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- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (186 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (186 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where

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the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.70: LSE matrix for offshore ornithological features of the Skomer, Skokholm and the Seas off Pembrokeshire SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Manx shearwater <i>Puffinus puffinus</i>	*a	*a	*a	*b	✓b	*b		*c				*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	✓b	*b		✓c				*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Lesser black-backed gull <i>Larus fuscus</i> (non- breeding seasons)	*a	*a	*a	*b	*b	*b		✓c				*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Guillemot <i>Uria aalge</i> (non-breeding season)	*a	*a	*a	*b	✓b	*b		*c				*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Razorbill <i>Alca torda</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		*c				*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c				*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h				*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

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- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (252 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Lesser black-backed gull and European storm petrel are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull and European storm petrel qualifying features of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot, razorbill and Manx shearwater was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot, razorbill and Manx shearwater features of this SPA.
- c. **Collision risk** – Guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying feature of this SPA. See justification for ‘Disturbance and displacement from airborne sound and presence of vessels and infrastructure’ for the kittiwake feature of this SPA. The potential for LSE is concluded for the kittiwake features of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for Manx shearwater was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the Manx shearwater feature of this SPA. For lesser black-backed gull, the Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum annual number of expected collisions was more than zero adult birds. The potential for LSE is therefore identified for the lesser black-backed gull feature of this SPA.

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- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (252 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (252 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where



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the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.71: LSE matrix for offshore ornithological features of the North Colonsay and Western Cliffs SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Kittiwake Rissa tridactyla</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Guillemot Uria aalge</i> (non-breeding season)	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (258 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined

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disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA.

- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above for kittiwake qualifying feature. On this basis, it is considered that there is potential for LSE in relation to collision risk for the kittiwake feature of this SPA. Guillemot is not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the guillemot feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (258 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (258 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

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- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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Table 1.72: LSE matrix for offshore ornithological features of the Grassholm SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (260 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet feature of this SPA.

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- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above for gannet qualifying feature. On this basis, it is considered that there is potential for LSE in relation to collision risk for the gannet feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (260 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (260 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - SPA mortality numbers for the gannet qualifying feature of this SPA were well below 0.5% of the baseline mortality as outlined in section 1.4.5. However, due to the higher mortality rate of two birds associated with the combined effect of collision risk and displacement, this species will be brought through to the appropriate assessment on a precautionary basis. This is for in-combination collision risk and disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts combined during all phases.



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**Table 1.73: LSE matrix for offshore ornithological features of the Saltee Islands SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Gannet Morus bassanus</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Kittiwake Rissa tridactyla</i>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Fulmar Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<i>Guillemot Uria aalge (non-breeding season)</i>	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Razorbill Alca torda (non-breeding season)</i>	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

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- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (266 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot and razorbill features of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet and kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet and kittiwake features of this SPA.
- c. **Collision risk** – Fulmar, guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar, guillemot and razorbill qualifying features of this SPA. See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for the kittiwake and gannet qualifying features. On this basis, it is considered that there is potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (266 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision

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risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.

- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (266 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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Table 1.74: LSE matrix for offshore ornithological features of the Horn Head to Fanad Head SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
<i>Fulmar Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
Breeding seabird assemblage	*h	*h	*h	*h	*h	*h		*h					*h			*h	*h	*h	*h	*h	*h	*h	*h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (296 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar.

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- c. **Collision risk** - Fulmar is not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar qualifying feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (296 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (296 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.75: LSE matrix for offshore ornithological features of the Mingulay and Berneray SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure	Collision risk	Barrier to movement			Changes in prey availability	Accidental pollution			In-combination effects					
	C	O&M	D			C	O&M	D		C	O&M	D	C	O&M	D	C	O&M	D
<i>Fulmar Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*c			*d	*e	*e	*e	*f	*f	*f	*g	*g	*g
<i>Guillemot Uria aalge</i> (non-breeding season)	*a	*a	*a	*b	✓b	*c			*d	*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Razorbill Alca torda</i> (non-breeding season)	*a	*a	*a	*b	✓b	*c			*d	*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h			*h	*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (370 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.



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- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot and razorbill features of this SPA.
- c. **Collision risk** – Fulmar, guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (370 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to

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the SPA (370 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.76: LSE matrix for offshore ornithological features of The Shiant Isles SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Fulmar <i>Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Razorbill <i>Alca torda</i> (non-breeding season)	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		*h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (443 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph

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1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for razorbill was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the razorbill feature of this SPA.

- c. **Collision risk** - Fulmar and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (443 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (443 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

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- g. In-combination** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.77: LSE matrix for offshore ornithological features of the Isles of Scilly SPA/Isles of Scilly Ramsar.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Fulmar <i>Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Manx shearwater <i>Puffinus puffinus</i>	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Lesser black- backed gull <i>Larus fuscus</i> (non-breeding season)	*a	*a	*a	*b	*b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Great black- backed gull <i>Larus marinus</i> (non-breeding season)	*a	*a	*a	*b	*b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h



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The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (465 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. European storm petrel, lesser black-backed gull and great black-backed gull are not considered vulnerable to disturbance and displacement effects and were not considered in displacement analyses for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the European storm petrel, lesser black-backed gull and great black-backed gull qualifying features of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for Manx shearwater was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the Manx shearwater feature of this SPA.
- c. **Collision risk** - Fulmar is not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar qualifying feature of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for Manx shearwater was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for Manx shearwater. The proportion of the baseline mortality of the BDMPS population of European storm petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel at this SPA. The Apportioning Assessment (Appendix A) estimated that the

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maximum mortality associated with collision risk impacts for great black-backed gull was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to collision risk impacts for the great black-backed gull feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with collision risk impacts for lesser black-backed gull was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk impacts for the lesser black-backed gull feature of this SPA.

- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (465 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (465 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is

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considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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Table 1.78: LSE matrix for offshore ornithological features of the Handa SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
Fulmar <i>Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
Guillemot <i>Uria aalge</i> (non-breeding season)	*a	*a	*a	*b	✓b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	✓g
Razorbill <i>Alca torda</i> (non-breeding season)	*a	*a	*a	*b	✓b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	✓g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		*h					*h			*h	*h	*h	*h	*h	*h	*h	*h	✓h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (480 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities.

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On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.

- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot and razorbill was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot and razorbill features of this SPA.
- c. **Collision risk** – Fulmar, guillemot and razorbill are not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying features of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (480 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that

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the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (480 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.



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Table 1.79: LSE matrix for offshore ornithological features of the St Kilda SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Guillemot <i>Uria aalge</i> (non-breeding season)	*a	*a	*a	*b	√b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*f	*g	√g	*g
Gannet <i>Morus bassanus</i> (non-breeding season)	*a	*a	*a	*b	√b	*b		√c			*d		*e	*e	*e	*f	*f	*f	*f	*g	√g	*g
Fulmar <i>Fulmarus glacialis</i>	*a	*a	*a	*b	√b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*f	*g	√g	*g
Manx shearwater <i>Puffinus puffinus</i>	*a	*a	*a	*b	√b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*f	*g	√g	*g
Leach's petrel <i>Oceanodroma leucorhoa</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*f	*g	*g	*g
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*f	*g	*g	*g
Breeding seabird assemblage	*h	*h	*h	*h	√h	*h		√h			*h		*h	*h	*h	*h	*h	*h	*h	*h	√h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a √ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

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- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (490 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with the combined collision and displacement impact for Manx shearwater was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE for the Manx shearwater feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the disturbance and displacement from airborne sound and presence of vessels and infrastructure impact for guillemot and fulmar was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot and fulmar features of this SPA. European storm petrel and Leach's petrel are not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for these species at this SPA.
- c. **Collision risk** – Guillemot and fulmar are not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar qualifying feature of this SPA. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for Manx shearwater was zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for Manx shearwater. For gannet please see justification for 'Disturbance and displacement from airborne sound and presence of vessels and infrastructure'. The potential for LSE is concluded for the gannet feature of this SPA. The proportion of the baseline mortality of the BDMPS population of European storm petrel and Leach's petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel and Leach's petrel at this SPA.

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- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (490 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (490 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where

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the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.80: LSE matrix for offshore ornithological features of the Cape Wrath SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Kittiwake Rissa tridactyla</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Fulmar Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<i>Guillemot Uria aalge</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (502 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context

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of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.

- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.
- c. **Collision risk** - Fulmar and guillemot are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying features of this SPA. See conclusion for 'Disturbance and displacement from airborne sound and presence of vessels and infrastructure'. The potential for LSE is concluded for the kittiwake feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (502 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or



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similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (502 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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Table 1.81: LSE matrix for offshore ornithological features of the Flannan Isles SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Fulmar</b> <i>Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Leach's petrel</b> <i>Oceanodroma leucorhoa</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Guillemot</b> <i>Uria aalge</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Breeding seabird assemblage</b>	*h	*h	*h	*h	✓h	*h		*h			*h		*h	*h	*h	*h	*h	*h	*h	*h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (511 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA

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are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.

- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA. Leach's petrel are not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.
- c. **Collision risk** - Fulmar and guillemot are not considered vulnerable to collision risk (Wade *et al.*, 2016) and were not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for these qualifying features of this SPA. The proportion of the baseline mortality of the BDMPs population of Leach's petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for Leach's petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (511 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or

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similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (511 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.82: LSE matrix for offshore ornithological features of the North Rona and Sula Sgeir SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
<b>Fulmar</b> <i>Fulmarus glacialis</i>	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Gannet</b> <i>Morus bassanus</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c					*d			*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Leach's petrel</b> <i>Oceanodroma leucorhoa</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>European storm petrel</b> <i>Hydrobates pelagicus</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Breeding seabird assemblage</b>	*h	*h	*h	*h	✓h	*h		✓h					*h			*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

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- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (568 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for fulmar. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet feature of this SPA. European storm petrel and Leach's petrel are not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for these species at this SPA.
- c. **Collision risk** - Fulmar is not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar qualifying feature of this SPA. See conclusion for 'Disturbance and displacement from airborne sound and presence of vessels and infrastructure'. The potential for LSE is concluded for the gannet feature of this SPA. The proportion of the baseline mortality of the BDMPS population of European storm petrel and Leach's petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel and Leach's petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (568 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision



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risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.

- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (568 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.83: LSE matrix for offshore ornithological features of the Buchan Ness to Collieston Coast SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of Scotland). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined

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disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.

- c. **Collision risk** - See conclusion for 'Disturbance and displacement from airborne sound and presence of vessels and infrastructure'. The potential for LSE is concluded for the kittiwake feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of Scotland), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (the SPA is located in the North Sea on the east coast of Scotland) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure

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and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.84: LSE matrix for offshore ornithological features of the East Caithness Cliffs SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of Scotland). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined

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disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.

- c. **Collision risk** - See conclusion for 'Disturbance and displacement from airborne sound and presence of vessels and infrastructure'. The potential for LSE is concluded for the kittiwake feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of Scotland), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (the SPA is located in the North Sea on the east coast of Scotland) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure



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and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.85: LSE matrix for offshore ornithological features of the Fair Isle SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Fulmar <i>Fulmarus glacialis</i> (non-breeding seasons)</b>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
<b>Breeding seabird assemblage</b>	*h	*h	*h	*h	*h	*h		*h			*h		*h	*h	*h	*h	*h	*h	*h	*h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (620 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and

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displacement from airborne sound and presence of vessels and infrastructure for fulmar was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the fulmar feature of this SPA.

- c. **Collision risk** - Fulmar is not considered vulnerable to collision risk (Wade *et al.*, 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the fulmar qualifying feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (620 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (620 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

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- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.86: LSE matrix for offshore ornithological features of the Flamborough and Filey Coast SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<i>Kittiwake Rissa tridactyla</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<i>Gannet Morus bassanus</i> (non-breeding seasons)	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of England). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.

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- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet feature of this SPA.
- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for the kittiwake and gannet qualifying features. On this basis, it is considered that there is potential for LSE in relation to collision risk for the kittiwake feature of this SPA. There is no potential for LSE in relation to collision risk for the gannet feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of England), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the



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determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (the SPA is located in the North Sea on the east coast of England) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.
- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.87: LSE matrix for offshore ornithological features of the Forth Islands SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Gannet <i>Morus bassanus</i> (non-breeding seasons)</b>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Breeding seabird assemblage</b>	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of England). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet

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was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.

- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for gannet. On this basis, it is considered that there is potential for LSE in relation to collision risk for the gannet feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of England), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (the SPA is located in the North Sea on the east coast of England) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure

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and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

- h. Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.88: LSE matrix for offshore ornithological features of the Hermaness, Saxa Vord and Valla Field SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Gannet <i>Morus bassanus</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (764 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to

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disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet feature of this SPA.

- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for gannet. On this basis, it is considered that there is potential for LSE in relation to collision risk for the gannet feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (764 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (764 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** – Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



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- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.89: LSE matrix for offshore ornithological features of the Rum SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Manx shearwater	*a	*a	*a	*b	✓b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		*h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (341 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for Manx shearwater was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the Manx shearwater feature of this SPA.

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- c. **Collision risk** - The Apportioning Assessment undertaken for the Morgan Generation Assets (Appendix A) estimated that the maximum mortality numbers associated with collisions for Manx shearwater was effectively zero adult birds per annum. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the Manx shearwater feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (341 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (341 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be

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conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.90: LSE matrix for offshore ornithological features of the Sule Skerry and Sule Stack SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
Guillemot <i>Uria aalge</i> (non-breeding season)	*a	*a	*a	*b	√b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	√g	*g
Gannet <i>Morus bassanus</i> (non-breeding seasons)	*a	*a	*a	*b	√b	*b		√c					*d			*e	*e	*e	*f	*f	*f	*g	√g	*g
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
Leach's petrel <i>Oceanodroma leucorhoa</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g
Breeding seabird assemblage	*h	*h	*h	*h	√h	*h		√h					*h			*h	*h	*h	*h	*h	*h	*h	√h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (549 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities.

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On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.

- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for gannet was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the gannet feature of this SPA. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with disturbance and displacement from airborne sound and presence of vessels and infrastructure for guillemot was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the guillemot feature of this SPA. European storm petrel and Leach's petrel are not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for these species at this SPA.
- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for gannet. On this basis, it is considered that there is potential for LSE in relation to collision risk for the gannet feature of this SPA. Guillemot is not considered vulnerable to collision risk (Wade et al., 2016) and was not considered in collision risk modelling for the Morgan Generation Assets. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the guillemot feature of this SPA. The proportion of the baseline mortality of the BDMPS population of European storm petrel and Leach's petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel and Leach's petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (549 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or



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similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (549 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination. Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.91: LSE matrix for offshore ornithological features of the Troup, Pennan and Lion's Heads.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons)	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
Breeding seabird assemblage	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of Scotland). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for

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kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.

- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for kittiwake. On this basis, it is considered that there is potential for LSE in relation to collision risk for the kittiwake feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (the SPA is located in the North Sea on the east coast of Scotland), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (the SPA is located in the North Sea on the east coast of Scotland) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure

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and/or collision risk impacts in-combination during the operations and maintenance phase. Where the potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.92: LSE matrix for offshore ornithological features of the West Westray SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
<b>Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons)</b>	*a	*a	*a	*b	✓b	*b		✓c			*d		*e	*e	*e	*f	*f	*f	*g	✓g	*g
<b>Breeding seabird assemblage</b>	*h	*h	*h	*h	✓h	*h		✓h			*h		*h	*h	*h	*h	*h	*h	*h	✓h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (580 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. The Apportioning Assessment (Appendix A) estimated that the maximum mortality associated with the combined

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disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision impact for kittiwake was more than zero adult birds per annum. On this basis, it is considered that there is potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk for the kittiwake feature of this SPA.

- c. **Collision risk** - See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for kittiwake. On this basis, it is considered that there is potential for LSE in relation to collision risk for the kittiwake feature of this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (580 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (580 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.



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- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.

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**Table 1.93: LSE matrix for offshore ornithological features of the Auskerry SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (558 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. European storm petrel is not considered vulnerable to disturbance and displacement from airborne sound and

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presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.

- c. **Collision risk** - The proportion of the baseline mortality of the BDMPS population of European storm petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (558 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (558 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

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Table 1.94: LSE matrix for offshore ornithological features of the Mousa SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	xa	xa	xa	xb	xb	xb		xc					xd			xe	xe	xe	xf	xf	xf	xg	xg	xg

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (681 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. European storm petrel is not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.

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- c. **Collision risk** - The proportion of the baseline mortality of the BDMPS population of European storm petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (681 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (681 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

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**Table 1.95: LSE matrix for offshore ornithological features of the Priest Island (Summer Isles) SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	xa	xa	xa	xb	xb	xb		xc					xd			xe	xe	xe	xf	xf	xf	xg	xg	xg

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (440 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. European storm petrel is not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.



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- c. **Collision risk** - The proportion of the baseline mortality of the BDMPS population of European storm petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (440 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (440 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

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**Table 1.96: LSE matrix for offshore ornithological features of the Treshnish Isles SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
European storm petrel <i>Hydrobates pelagicus</i> (migratory seasons)	xa	xa	xa	xb	xb	xb		xc					xd			xe	xe	xe	xf	xf	xf	xg	xg	xg

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- h. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (304 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- i. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. European storm petrel is not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.

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- j. **Collision risk** - The proportion of the baseline mortality of the BDMPS population of European storm petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for European storm petrel at this SPA.
- k. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (304 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- l. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- m. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (304 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- n. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

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Table 1.97: LSE matrix for offshore ornithological features of the Foula SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D
Leach's petrel <i>Oceanodroma leucorhoa</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Breeding seabird assemblage	*h	*h	*h	*h	*h	*h		*h			*h		*h	*h	*h	*h	*h	*h	*h	*h	*h

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (680 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Leach's petrel is not considered vulnerable to disturbance and displacement from airborne sound and presence of

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vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.

- c. **Collision risk** - The proportion of the baseline mortality of the BDMPS population of Leach's petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for Leach's petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (680 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (680 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- h. **Breeding seabird assemblage** - The screening conclusions for the breeding seabird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the breeding seabird assemblage. Where

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the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the breeding seabird assemblage.



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Table 1.98: LSE matrix for offshore ornithological features of the Ramna Stacks and Gruney SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
Leach's petrel <i>Oceanodroma leucorhoa</i> (migratory seasons)	*a	*a	*a	*b	*b	*b		*c					*d			*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** - Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (751 km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** - The potential for LSE has been ruled out in the construction and decommissioning phases for all features based on the information in paragraph 1.4.5.5. Leach's petrel is not considered vulnerable to disturbance and displacement from airborne sound and presence of vessels and infrastructure and were not considered in displacement analyses for the Morgan Generation Assets, the potential for LSE is therefore discounted for this species at this SPA.

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- c. **Collision risk** - The proportion of the baseline mortality of the BDMPS population of Leach's petrel represented by the predicted collision risk estimate is less than 0.01% (Appendix A). The potential for LSE is therefore discounted for Leach's petrel at this SPA.
- d. **Barrier to movement** - Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (751 km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, very low numbers of features for which connectivity has been identified will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the qualifying features of this SPA.
- e. **Changes in prey availability** - As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (751 km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

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**Table 1.99: LSE matrix for the Irish Sea Front SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Manx shearwater <i>Puffinus puffinus</i>	*a	*a	*a	*a	√a	*a		*a			*a			*a	*a	*a	*a	*a	*a	*a	√a	*a

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✖ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. The screening conclusions for the Irish Sea Front SPA are identical to those reached for those SPAs that contribute birds to the population of birds that utilises the foraging areas incorporated into the designation of the Irish Sea Front SPA. This includes the Skomer, Skokholm and Seas off Pembrokeshire SPA, Rum SPA and Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA. The potential for LSE is therefore concluded for Manx shearwater at this SPA.

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**Table 1.100: LSE matrix for offshore ornithological features of the North-west Irish Sea SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
<i>Kittiwake Rissa tridactyla</i>	*a	*a	*a	*a	√a	*a		√a			*a		*a	*a	*a	*a	*a	*a	*a	*a	√a	*a
<i>Lesser black-backed gull Larus fuscus</i>	*a	*a	*a	*a	*a	*a		*a			*a		*a	*a	*a	*a	*a	*a	*a	*a	*a	*a
<i>Herring gull Larus argentatus</i>	*a	*a	*a	*a	*a	*a		√a			*a		*a	*a	*a	*a	*a	*a	*a	*a	√a	*a
<i>Guillemot Uria aalge</i>	*a	*a	*a	*a	√a	*a		*a			*a		*a	*a	*a	*a	*a	*a	*a	*a	√a	*a
<i>Razorbill Alca torda</i>	*a	*a	*a	*a	√a	*a		*a			*a		*a	*a	*a	*a	*a	*a	*a	*a	√a	*a
<i>Fulmar Fulmarus glacialis</i>	*a	*a	*a	*a	*a	*a		*a			*a		*a	*a	*a	*a	*a	*a	*a	*a	*a	*a

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a √ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. The screening conclusions for the North-west Irish Sea SPA are identical to those reached for those SPAs that contribute birds to the population of birds that utilises the foraging areas incorporated into the designation of the North-west Irish Sea

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SPA. This includes the features for which LSE was identified for the Lambay Island SPA; Ireland's Eye SPA and Howth Head Coast SPA. The potential for LSE is therefore concluded for kittiwake, herring gull, guillemot and razorbill at this SPA.

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**Table 1.101: LSE matrix for offshore ornithological features of the Seas off St Kilda SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure	Collision risk	Barrier to movement			Changes in prey availability	Accidental pollution			In-combination effects							
	C	O&M	D			C	O&M	D		C	O&M	D	C	O&M	D	C	O&M	D		
<b>Guillemot <i>Uria aalge</i> (non-breeding season)</b>	*a	*a	*a	*a	√a	*a			*a			*a	*a	*a	*a	*a	*a	*a	√a	*a
<b>Fulmar <i>Fulmarus glacialis</i></b>	*a	*a	*a	*a	√a	*a			*a			*a	*a	*a	*a	*a	*a	*a	√a	*a
<b>Gannet <i>Morus bassanus</i></b>	*a	*a	*a	*a	√a	*a			√a			*a			*a	*a	*a	*a	√a	*a

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a √ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. The screening conclusions for the Seas off St Kilda SPA are identical to those reached for those SPAs that contribute birds to the population of birds that utilises the foraging areas incorporated into the designation of the Seas off St Kilda SPA. For the fulmar and gannet features of the Seas off St Kilda SPA this includes the St Kilda SPA. The potential for LSE is therefore concluded for guillemot, fulmar and gannet at this SPA.



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**Table 1.102: LSE matrix for offshore ornithological features of the Burry Inlet SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Pintail <i>Anas acuta</i>								*a												*b	*b	*b
Teal <i>Anas crecca</i>								*a												*b	*b	*b
Wigeon <i>Anas penelope</i>								*a												*b	*b	*b
Shoveler <i>Anas clypeata</i>								*a												*b	*b	*b
Turnstone <i>Arenaria interpres</i>								*a												*b	*b	*b
Dunlin <i>Calidris alpina alpina</i>								*a												*b	*b	*b
Knot <i>Calidris canutus</i>								*a												*b	*b	*b
Oystercatcher <i>Haematopus ostralegus</i>								*a												*b	*b	*b
Curlew <i>Numenius arquata</i>								*a												*b	*b	*b

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	European site qualifying feature	Temporary habitat loss/disturbance and increased SSC	Disturbance and displacement from airborne sound and presence of vessels and infrastructure	Collision risk	Barrier to movement	Changes in prey availability	Accidental pollution	In-combination effects
Grey plover <i>Pluvialis squatarola</i>				*a				*b *b *b
Shelduck <i>Tadorna tadorna</i>				*a				*b *b *b
Redshank <i>Tringa totanus</i>				*a				*b *b *b
Waterbird assemblage				*c				*c *c *c

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Collision risk** – The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.
- b. **In-combination effects** – Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- c. **Waterbird assemblage** – The screening conclusions for the waterbird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for

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each feature for which LSE has been concluded alone and as part of the waterbird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the waterbird assemblage.

**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**
**Table 1.103: LSE matrix for offshore ornithological features of the Burry Inlet Ramsar.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Redshank <i>Tringa totanus</i>								*a												*b	*b	*b
Whimbrel <i>Numenius phaeopus</i>								*a												*b	*b	*b
Curlew <i>Numenius arquata</i>								*a												*b	*b	*b
Greenshank <i>Tringa nebularia</i>								*a												*b	*b	*b
Shelduck <i>Tadorna tadorna</i>								*a												*b	*b	*b
Grey plover <i>Pluvialis squatarola</i>								*a												*b	*b	*b
Dunlin <i>Calidris alpina alpina</i>								*a												*b	*b	*b
Knot <i>Calidris canutus</i>								*a												*b	*b	*b

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included

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and the box is highlighted in blue, where a LSE has been ruled out a ✖ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Collision risk** - The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.
- b. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

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**Table 1.104: LSE matrix for offshore ornithological features of the Dyfi Estuary/Aber Dyfi SPASPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D			
Greenland white-fronted goose <i>Anser albifrons flavirostris</i>								*a														*b	*b	*b

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Collision risk** - The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.
- b. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.



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Table 1.105: LSE matrix for offshore ornithological features of the Traeth Lafan/ Lavan Sands, Conway Bay SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Oystercatcher <i>Haematopus ostralegus</i>								*a												*b	*b	*b
Red-breasted merganser <i>Mergus serrator</i>								*a												*b	*b	*b
Curlew <i>Numenius arquata</i>								*a												*b	*b	*b
Great crested grebe <i>Podiceps cristatus</i>								*a												*b	*b	*b
Redshank <i>Tringa totanus</i>								*a												*b	*b	*b

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Collision risk** - The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.

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- b. In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**
**Table 1.106: LSE matrix for offshore ornithological features of the Severn Estuary Ramsar**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Bewick's swan <i>Cygnus columbianus bewickii</i>								*a												*b	*b	*b
Shelduck <i>Tadorna tadorna</i>								*a												*b	*b	*b
Gadwall <i>Anas strepera</i>								*a												*b	*b	*b
Dunlin <i>Calidris alpina alpina</i>								*a												*b	*b	*b
Redshank <i>Tringa totanus</i>								*a												*b	*b	*b
Ringed plover <i>Charadrius hiaticula</i>								*a												*b	*b	*b
Teal <i>Anas crecca</i>								*a												*b	*b	*b
Pintail <i>Anas acuta</i>								*a												*b	*b	*b

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included

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and the box is highlighted in blue, where a LSE has been ruled out a ✖ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Collision risk** - The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.
- b. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.

**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**
**Table 1.107: LSE matrix for offshore ornithological features of the Severn Estuary SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
<b>Gadwall</b> <i>Anas strepera</i>								*a												*b	*b	*b
<b>Dunlin</b> <i>Calidris alpina alpina</i>								*a												*b	*b	*b
<b>Bewick's swan</b> <i>Cygnus columbianus bewickii</i>								*a												*b	*b	*b
<b>Shelduck</b> <i>Tadorna tadorna</i>								*a												*b	*b	*b
<b>Redshank</b> <i>Tringa totanus</i>								*a												*b	*b	*b
<b>Waterbird assemblage</b>								*c												*c	*c	*c

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

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- a. **Collision risk** - The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.
- b. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- c. **Waterbird assemblage** - The screening conclusions for the waterbird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the waterbird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the waterbird assemblage.



**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**
**Table 1.108: LSE matrix for offshore ornithological features of The Dee Estuary Ramsar.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Teal <i>Anas crecca</i>								*a												*b	*b	*b
Shelduck <i>Tadorna tadorna</i>								*a												*b	*b	*b
Oystercatcher <i>Haematopus ostralegus</i>								*a												*b	*b	*b
Curlew <i>Numenius arquata</i>								*a												*b	*b	*b
Pintail <i>Anas acuta</i>								*a												*b	*b	*b
Grey plover <i>Pluvialis squatarola</i>								*a												*b	*b	*b
Knot <i>Calidris canutus</i>								*a												*b	*b	*b
Dunlin <i>Calidris alpina alpina</i>								*a												*b	*b	*b
Black-tailed godwit <i>Limosa limosa islandica</i>								*a												*b	*b	*b



**MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS**
**Table 1.109: LSE matrix for offshore ornithological features of The Dee Estuary SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			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	C	O&M	D	
Pintail <i>Anas acuta</i>								*a												*b	*b	*b
Teal <i>Anas crecca</i>								*a												*b	*b	*b
Dunlin <i>Calidris alpina alpina</i>								*a												*b	*b	*b
Knot <i>Calidris canutus</i>								*a												*b	*b	*b
Oystercatcher <i>Haematopus ostralegus</i>								*a												*b	*b	*b
Bar-tailed godwit <i>Limosa lapponica</i>								*a												*b	*b	*b
Black-tailed godwit <i>Limosa limosa islandica</i>								*a												*b	*b	*b
Curlew <i>Numenius arquata</i>								*a												*b	*b	*b
Grey plover <i>Pluvialis squatarola</i>								*a												*b	*b	*b

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European site qualifying feature			Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution	In-combination effects			
Shelduck <i>Tadorna tadorna</i>									*a										*b	*b	*b	
Redshan <i>Tringa totanus</i>									*a											*b	*b	*b
Waterbird assemblage									*c											*c	*c	*c

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green. Grey shaded columns indicate that the impact is not relevant in the associated development phase.

- a. **Collision risk** - The predicted collision risk estimate for all features represented a less than 0.1% increase in the associated baseline mortality for all features of the SPA. The potential for LSE is therefore discounted for all features.
- b. **In-combination effects** - Where the additional mortality associated with the Morgan Generation Assets is zero birds or it has been concluded for the project alone that there is no LSE it is considered that the Morgan Generation Assets will not act in-combination with other plans and projects and therefore no LSE is concluded.
- c. **Waterbird assemblage** - The screening conclusions for the waterbird assemblage are identical to those reached for the constituent features that form part of the assemblage. Where LSE is concluded assessments will therefore be conducted for each feature for which LSE has been concluded alone and as part of the waterbird assemblage. Where the potential for LSE has not been concluded for a feature, the potential for LSE is therefore discounted for the waterbird assemblage.

## **1.5 Approach to the in-combination assessment**

- 1.5.1.1 The Habitats Regulations require the consideration of the potential effects of a project on European sites both alone and in-combination with other plans or projects.
- 1.5.1.2 The in-combination assessment will consider all other relevant plans, projects and activities where information to inform the assessment is publicly available three months prior to the Morgan Generation Assets application. This approach is in line with the Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to NSIPs (The Planning Inspectorate, 2019).
- 1.5.1.3 For the Morgan Generation Assets in-combination assessment, a tiered approach has been adopted. This approach provides a framework for placing relative weight on the potential for each project/plan to be included in the in-combination assessment to ultimately be realised, based upon the project/plan's current stage of maturity and certainty in the project's parameters. The allocation of each project, plan and activity into tiers is not affected by the screening process but is merely a categorisation applied to all projects, plans and activities that have been screened in for assessment.
- 1.5.1.4 The tiered approach uses the following categorisations:
- Tier 1
    - Under construction
    - Permitted application
    - Submitted application
    - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an on-going impact
  - Tier 2
    - Scoping report has been submitted and is in the public domain
  - Tier 3
    - Scoping report has not been submitted and is not in the public domain
    - Identified in a relevant development plan
    - Identified in other plans and programmes.
- 1.5.1.5 An overview of the projects or activities which will be considered for in-combination with the Morgan Generation Assets include (but are not limited to):
- Other offshore wind farms and associated cabling and infrastructure
  - Oil and gas infrastructure/development (cables and pipelines)
  - Other forms of cabling (i.e. Telecommunications and interlinks)
  - Beach replenishment schemes
  - Tidal and wave energy schemes
  - Navigation and shipping
  - Aggregate extraction and disposal of dredging spoil.

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### 1.6 Summary of LSE

- 1.6.1.1 Table 1.110 provides a summary of the European sites, qualifying interest features and potential impacts for which a potential for a LSE has been identified as a result of the Morgan Generation Assets alone and/or in combination with other plans or projects. The table excludes all features which have been screened out as no potential for LSE has been identified. These sites and features will be taken forward for consideration in the HRA Stage 2 ISAA (Document Reference E1.1; E1.2; E1.3).
- 1.6.1.2 In total, 43 SACs are being taken forward for consideration in the HRA Stage 2 ISAA - Part 2 SAC Assessments (Document Reference E1.2). No European sites were considered for LSE with Annex I habitats (offshore) listed as designated features.
- 1.6.1.3 Nine SACs were considered for Annex II diadromous fish species in section 1.4.3. All nine of these sites were progressed to the HRA Stage 2 ISAA – Part 2 SAC Assessments (Document Reference E1.2) with respect to:
- Underwater sound
  - EMF
  - In-combination effects.
- 1.6.1.4 With respect to marine mammals, the assessment of LSE undertaken in section 1.4.4, considered 43 European sites (including 26 SACs in the UK and Ireland 17 French sites). Of these, the potential for LSE could not be discounted with respect to the following impacts for all sites considered:
- Underwater sound from piling
  - Underwater sound from clearance of UXO
  - Underwater sound from pre-construction site investigation surveys
  - Underwater sound from vessels and other vessel activities
  - Changes in prey availability (limited to the construction phase for North Anglesey Marine/Gogledd Môn Forol SAC only)
  - In-combination effects.
- 1.6.1.5 In relation to the SPAs (and associated Ramsar sites included on the basis of their ornithological features), the assessment of LSE undertaken in section 1.4.5 above, resulted in the 35 SPAs and 3 Ramsar sites listed in Table 1.17 being taken forward for consideration in the HRA Stage 2 ISAA – Part 3 SPA Assessments (Document Reference E1.3), these include marine SPAs, and breeding seabird colony SPAs.



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**Table 1.110: Summary of European Sites and relevant qualifying features for which potential LSEs have been identified and screened in for further assessment in the HRA Stage 2 ISAA.**

European site	Relevant qualifying features	Project phase	Impact
<b>Annex II Diadromous Fish Sites</b>			
River Ehen SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
	Freshwater pearl mussel <i>Margaritifera margaritifera</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
	River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
River Derwent and Bassenthwaite SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
			<ul style="list-style-type: none"> <li>In-combination effects.</li> </ul>
	Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
	River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
River Kent SAC	Freshwater pearl mussel <i>Margaritifera margaritifera</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
Solway Firth SAC	Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
	River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
River Bladnoch SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
			<ul style="list-style-type: none"> <li>In-combination effects.</li> </ul>
River Dee and Bala Lake/Afon Dyfrydwy a Llyn Tegid SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
	Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
	River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
Afon Gwyrfai a Llyn Cwellyn SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
River Eden SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>
		Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
	Sea lamprey <i>Petromyzon marinus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>In-combination effects.</li> <li>EMF</li> <li>In-combination effects.</li> </ul>
	River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound impacting fish</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects.</li> </ul>

### Annex II Marine Mammal Sites

North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>Changes in prey availability (construction only)</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
North Channel SAC	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Strangford Lough SAC		Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
	Harbour seal <i>Phoca vitulina</i>		<ul style="list-style-type: none"> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Murlough SAC	Harbour seal <i>Phoca vitulina</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	Bottlenose dolphin <i>Tursiops truncatus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
West Wales Marine/Gorllewin Cymru Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
The Maidens SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Cardigan Bay/Bae Ceredigion SAC	Bottlenose dolphin <i>Tursiops truncatus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>



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European site	Relevant qualifying features	Project phase	Impact
	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Lundy SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
		Operations and maintenance	<ul style="list-style-type: none"> <li>In-combination effects.</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Isles of Scilly Complex SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Rockabill to Dalkey Island SAC	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Saltee Islands SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
Roaringwater Bay and Islands SAC	Harbour porpoise <i>Phocoena phocoena</i>		<ul style="list-style-type: none"> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
Blasket Islands SAC	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
17 French Sites <ul style="list-style-type: none"> <li>Mers Celtiques - Talus du golfe de Gascogne SCI</li> <li>Abers - Côte des legends SCI</li> <li>Ouessant-Molène SCI</li> <li>Côte de Granit rose-Sept-Iles SCI</li> <li>Anse de Goulven, dunes de Keremma SCI</li> <li>Tregor Goëlo SCI</li> <li>Côtes de Crozon SCI</li> </ul>	Harbour porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site investigation surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>
		Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects.</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
<ul style="list-style-type: none"> <li>• Chaussée de Sein SCI</li> <li>• Cap Sizun SCI</li> <li>• Récifs du talus du golfe de Gascogne SCI</li> <li>• Anse de Vauville SCI</li> <li>• Cap d'Erquy-Cap Fréhel SCI</li> <li>• Baie de Saint-Brieuc – Est SC</li> <li>• Banc et récifs de Surtainville SCI</li> <li>• Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI</li> <li>• Estuaire de la Rance SCI</li> <li>• Baie du Mont Saint-Michel SCI.</li> </ul>			
<b>Seabird sites</b>			
Morecambe Bay and Duddon Estuary SPA/Morecambe Bay Ramsar	Lesser black-backed gull <i>Larus fuscus</i> Herring gull <i>Larus argentatus</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Collision risk</li> <li>• In-combination collision risk</li> </ul>

## MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

European site	Relevant qualifying features	Project phase	Impact
Ribble and Alt Estuaries SPA / Ribble and Alt Estuaries Ramsar	Lesser black-backed gull <i>Larus fuscus</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Collision risk</li> <li>• In-combination collision risk</li> </ul>
Bowland Fells SPA	Lesser black-backed gull <i>Larus fuscus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Collision risk</li> <li>• In-combination collision risk</li> </ul>
Copeland Islands SPA	Manx shearwater <i>Puffinus puffinus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA	Manx shearwater <i>Puffinus puffinus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Lambay Island SPA	Kittiwake <i>Rissa tridactyla</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
	Herring gull <i>Larus argentatus</i> (non-breeding season)		<ul style="list-style-type: none"> <li>• Collision risk</li> <li>• In-combination collision risk</li> </ul>
	Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding season)		<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Ireland's Eye SPA	Kittiwake <i>Rissa tridactyla</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Howth Head Coast SPA	Kittiwake <i>Rissa tridactyla</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
Ailsa Craig SPA	Gannet <i>Morus bassanus</i> Kittiwake <i>Rissa tridactyla</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Wicklow Head SPA	Kittiwake <i>Rissa tridactyla</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Rathlin Island SPA	Kittiwake <i>Rissa tridactyla</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>



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European site	Relevant qualifying features	Project phase	Impact
	Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding season)	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Skomer, Skokholm and the Seas off Pembrokeshire SPA	Kittiwake <i>Rissa tridactyla</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>Collision risk</li> <li>In-combination collision risk</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
	Lesser black-backed gull <i>Larus fuscus</i> (non-breeding seasons)	Operations and maintenance	<ul style="list-style-type: none"> <li>Collision risk</li> <li>In-combination collision risk</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
	Manx shearwater <i>Puffinus puffinus</i> Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding seasons)	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
North Colonsay and Western Cliffs SPA	Kittiwake <i>Rissa tridactyla</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>Collision risk</li> <li>In-combination collision risk</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
	Guillemot <i>Uria aalge</i> (non-breeding season)	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Grassholm SPA	Gannet <i>Morus bassanus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>Collision risk</li> <li>In-combination collision risk</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
Saltee Islands SPA	Gannet <i>Morus bassanus</i> Kittiwake <i>Rissa tridactyla</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>Collision risk</li> <li>In-combination collision risk</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
	Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding season)		<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Mingulay and Berneray SPA	Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding season) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
The Shiant Isles SPA	Razorbill <i>Alca torda</i> (non-breeding season) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
Isles of Scilly SPA/Isles of Scilly Ramsar	Lesser black-backed gull <i>Larus fuscus</i> (non-breeding season) Great black-backed gull <i>Larus marinus</i> (non-breeding season) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Collision risk</li> <li>• In-combination collision risk</li> </ul>
	Manx shearwater <i>Puffinus puffinus</i> Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Handa SPA	Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding season) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
St Kilda SPA	<p>Gannet <i>Morus bassanus</i> (non-breeding season) Breeding seabird assemblage</p>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
	<p>Guillemot <i>Uria aalge</i> (non-breeding season) Fulmar <i>Fulmarus glacialis</i> Manx shearwater <i>Puffinus puffinus</i></p>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Cape Wrath SPA	<p>Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons) Breeding seabird assemblage</p>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
	Guillemot <i>Uria aalge</i> (non-breeding seasons)	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Flannan Isles SPA	Guillemot <i>Uria aalge</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
North Rona and Sula Sgeir SPA	Gannet <i>Morus bassanus</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>Collision risk</li> <li>In-combination collision risk</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Buchan Ness to Collieston Coast SPA	Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>Collision risk</li> <li>In-combination collision risk</li> <li>In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
East Caithness Cliffs SPA	Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Flamborough and Filey Coast SPA	Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Forth Islands SPA	Gannet <i>Morus bassanus</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>



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European site	Relevant qualifying features	Project phase	Impact
Hermaness, Saxa Vord and Valla Field SPA	Gannet <i>Morus bassanus</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Rum SPA	Manx shearwater Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Sule Skerry and Sule Stack SPA	Guillemot <i>Uria aalge</i> (non-breeding season)	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
	Gannet <i>Morus bassanus</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
Troup, Pennan and Lion's Heads	Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
West Westray SPA	Kittiwake <i>Rissa tridactyla</i> (non-breeding seasons) Breeding seabird assemblage	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Irish Sea Front SPA	Manx shearwater <i>Puffinus puffinus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
North-west Irish Sea SPA	Kittiwake <i>Rissa tridactyla</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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European site	Relevant qualifying features	Project phase	Impact
	<p>Herring gull <i>Larus argentatus</i> (non-breeding season)</p> <hr/> <p>Guillemot <i>Uria aalge</i> (non-breeding season) Razorbill <i>Alca torda</i> (non-breeding season)</p>		<ul style="list-style-type: none"> <li>• Collision risk</li> <li>• In-combination collision risk</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
Seas off St Kilda SPA	Gannet <i>Morus bassanus</i>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• Collision risk</li> <li>• In-combination collision risk</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>
	<p>Fulmar <i>Fulmarus glacialis</i> Guillemot <i>Uria aalge</i> (non-breeding season)</p>	Operations and maintenance	<ul style="list-style-type: none"> <li>• Disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> <li>• In-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure</li> </ul>

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## Appendix A: Apportioning assessment for designated sites

### A.1 Breeding seabirds in the breeding season

#### A.1.1 Introduction

A.1.1.1.1 This Annex presents the results of the HRA screening approach for offshore ornithology qualifying features. Where it can be demonstrated that there will be zero mortalities (i.e. zero mortalities will be considered as 0.0, a 0.2 figure will not be rounded down to 0) of breeding birds (i.e. through collision risk modelling and/or displacement assessments and subsequent apportioning to individual SPAs) the associated qualifying feature will be screened out of further assessment. The SPAs and associated features included in this assessment are those for which connectivity with the Morgan Generation Assets has been identified in Table 1.17.

#### A.1.2 Impact estimates

A.1.2.1.1 The impact estimates to be used as part of this exercise are those calculated using Natural England's recommended parameters (Natural England, pers. comm., 7 July 2022) for use in collision risk modelling and the upper range associated with displacement and mortality rates as applied in displacement analyses for each species. The values associated with these scenarios are presented in Table A.1.

**Table A.1: Annual predicted mortality estimates across species and seasons from collision risk and displacement.**

Species	Mortality collisions	Mortality displacement	Mortality combined
Kittiwake	31.2	171.3	202.5
Great black-backed gull	4.6	N/A	N/A
Herring gull	8.7	N/A	N/A
Lesser black-backed gull	1.1	N/A	N/A
Guillemot	N/A	267.7 (non-breeding season only)	N/A
Razorbill	N/A	122.6 (non-breeding seasons only)	N/A
Fulmar	N/A	1.4	N/A
Manx shearwater	<0.1	21.7	N/A
Gannet	1.4	20.3	21.7

#### A.1.3 Apportioned impact estimates

A.1.3.1.1 Using the apportioning values presented in Volume 4, Annex 5.5: Offshore ornithology apportioning technical report of the Environmental Statement (Document Reference F4.5.5) the impact estimates in Table A.1 have been apportioned to each of the SPAs for which connectivity has been identified. In the breeding season this incorporates the proportion applicable to each SPA and the proportion applicable to adult birds only (i.e.

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removing immature birds). This has been undertaken for each species in the following tables. Any SPA highlighted in blue has an apportioned impact that is effectively zero and therefore will not be considered in the ISAA.

**Table A.2: Kittiwake**

<sup>1</sup> Breeding season apportioning values represent the SPA proportion multiplied by the adult:ratio proportion as presented in Volume 4, Annex 5.5: Offshore Ornithology Apportioning Technical Report of the Environmental Statement

SPA	Apportioning value			Mortality apportioned to SPA			Total
	Breeding season <sup>1</sup>	Post-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Pre-breeding season	
Lambay Island	0.033	0.003	0.004	1.4	0.3	0.2	1.9
Ireland's Eye	0.019	0.001	0.001	0.8	0.1	0.1	0.9
Howth Head Coast	0.027	0.002	0.002	1.1	0.1	0.1	1.4
Ailsa Craig	0.002	0.001	0.001	0.1	0.1	0.1	0.2
Wicklow Head	0.004	0.001	0.001	0.2	0.1	0.1	0.3
Rathlin Island	0.040	0.010	0.018	1.7	1.0	1.2	3.9
Skomer, Skokholm and the Seas off Pembrokeshire	0.002	0.001	0.002	0.1	0.1	0.2	0.4
North Colonsay and Western Cliffs	0.000	0.007	0.013	0.0	0.7	0.8	1.5
Saltee Islands	0.001	0.001	0.002	0.1	0.1	0.1	0.3
Buchan Ness to Collieston Coast	-	0.006	0.011	0.0	0.5	0.7	1.2
Cape Wrath	-	0.014	0.024	0.0	1.3	1.6	2.9
East Caithness Cliffs	-	0.018	0.035	0.0	1.7	2.3	4.0
Flamborough and Filey Coast	-	0.017	0.033	0.0	1.6	2.2	3.7
Troup, Pennan and Lions Heads	-	0.007	0.013	0.0	0.6	0.9	1.5
West Westray	-	0.005	0.010	0.0	0.5	0.7	1.2

**Table A.3: Great black-backed gull**

SPA	Apportioning value		Mortality apportioned to SPA		Total
	Breeding season	Non-breeding season	Breeding season	Non-breeding season	
Isles of Scilly	-	0.091	0.0	0.4	0.4

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**Table A.4: Herring gull**

SPA	Apportioning value (%)		Mortality apportioned to SPA		
	Breeding season	Non-breeding season	Breeding season	Non-breeding season	Total
Morecambe Bay and Duddon Estuary	0.509	0.016	0.3	0.1	0.4
Lambay Island	-	0.017	0.0	0.1	0.1

**Table A.5: Lesser black-backed gull**

<sup>1</sup> Breeding season apportioning values represent the SPA proportion multiplied by the adult:ratio proportion as presented in Volume 4, Annex 5.5: Offshore Ornithology Apportioning Technical Report of the Environmental Statement

Any SPA highlighted in blue has an apportioned impact that is effectively zero and therefore will not be considered in the ISAA.

SPA	Apportioning value					Mortality apportioned to SPA				
	Breeding season <sup>1</sup>	Post-breeding season	Non-breeding season	Pre-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Non-breeding season	Pre-breeding season	Total
Morecambe Bay and Duddon Estuary	0.093	0.031	0.048	0.031	0.0	0.0	0.0	0.0	0.0	0.1
Ribble and Alt Estuaries	0.197	0.051	0.080	0.051	0.0	0.0	0.0	0.0	0.0	0.1
Bowland Fells	0.358	0.028	0.044	0.028	0.1	0.0	0.0	0.0	0.0	0.1
Lambay Island	0.004	0.002	0.003	0.002	0.0	0.0	0.0	0.0	0.0	0.0
Ailsa Craig	0.001	0.001	0.002	0.001	0.0	0.0	0.0	0.0	0.0	0.0
Rathlin Island	0.002	0.001	0.001	0.001	0.0	0.0	0.0	0.0	0.0	0.0
Isles of Scilly	-	0.037	0.033	0.037	0.0	0.0	0.0	0.0	0.0	0.0
Skomer, Skokholm and Seas off Pembrokeshire	-	0.083	0.094	0.083	0.0	0.0	0.0	0.0	0.0	0.1

**Table A.6: Guillemot**

SPA	Apportioning value		Mortality apportioned to SPA		
	Breeding season	Non-breeding season	Breeding season	Non-breeding season	Total
Cape Wrath	-	0.046	0.0	12.2	12.2
Flannan Isles	-	0.016	0.0	4.4	4.4
Handa	-	0.063	0.0	17.0	17.0
Lambay Island	-	0.059	0.0	15.7	15.7

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SPA	Apportioning value		Mortality apportioned to SPA		
	Breeding season	Non-breeding season	Breeding season	Non-breeding season	Total
Mingulay and Berneray	-	0.023	0.0	6.0	6.0
North Colonsay and Western Cliffs	-	0.024	0.0	6.3	6.3
Rathlin Island	-	0.153	0.0	41.1	41.1
Saltee Islands	-	0.021	0.0	5.5	5.5
Skomer, Skokholm and Seas off Pembrokeshire	-	0.026	0.0	6.9	6.9
St Kilda	-	0.026	0.0	7.0	7.0
Sule Skerry and Sule Stack	-	0.013	0.0	3.4	3.4

**Table A.7: Razorbill**

SPA	Apportioning value				Mortality apportioned to SPA					
	Breeding season	Post-breeding season	Non-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Non-breeding season	Pre-breeding season	Total	
Handa	-	0.017	0.012	0.017	0.0	0.3	1.0	0.4	1.7	
Lambay Island	-	0.010	0.017	0.010	0.0	0.2	1.4	0.2	1.8	
Mingulay and Berneray	-	0.033	0.024	0.033	0.0	0.6	1.9	0.7	3.3	
Rathlin Island	-	0.050	0.036	0.050	0.0	0.9	3.0	1.1	5.0	
Saltee Islands	-	0.008	0.015	0.008	0.0	0.1	1.2	0.2	1.5	
The Shiant Isles	-	0.014	0.010	0.014	0.0	0.2	0.8	0.3	1.4	
Skomer, Skokholm and Seas off Pembrokeshire	-	0.019	0.011	0.019	0.0	0.3	0.9	0.4	1.7	

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**Table A.8: Fulmar**

Any SPA highlighted in blue has an apportioned impact that is effectively zero and therefore will not be considered in the ISAA.

SPA	Apportioning value				Mortality apportioned to SPA				
	Breeding season	Post-breeding season	Non-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Non-breeding season	Pre-breeding season	Total
Lambay Island	0.015	0.001	0.002	0.001	0.0	0.0	0.0	0.0	0.0
Rathlin Island	0.015	0.004	0.004	0.004	0.0	0.0	0.0	0.0	0.0
Saltee Islands	0.002	0.001	0.001	0.001	0.0	0.0	0.0	0.0	0.0
Horn Head to Fanad Head	0.003	0.005	0.005	0.005	0.0	0.0	0.0	0.0	0.0
Mingulay and Berneray	0.013	0.021	0.022	0.021	0.0	0.0	0.0	0.0	0.0
The Shiant Isles	0.003	0.010	0.011	0.010	0.0	0.0	0.0	0.0	0.0
Isles of Scilly	0.001	0.001	0.001	0.001	0.0	0.0	0.0	0.0	0.0
Handa	0.001	0.004	0.004	0.004	0.0	0.0	0.0	0.0	0.0
St Kilda	0.010	0.152	0.158	0.152	0.0	0.0	0.0	0.2	0.2
Cape Wrath	0.001	0.005	0.005	0.005	0.0	0.0	0.0	0.0	0.0
Flannan Isles	0.003	0.017	0.018	0.017	0.0	0.0	0.0	0.0	0.0
North Rona and Sula Sgeir	0.002	0.012	0.012	0.012	0.0	0.0	0.0	0.0	0.0
Fair Isle	-	0.007	0.011	0.007	0.0	0.0	0.0	0.0	0.0

**Table A.9: Manx shearwater (collision)**

SPA	Apportioning value			Mortality apportioned to SPA			Total
	Breeding season	Post-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Pre-breeding season	
Copeland Islands	0.03	0.01	0.01	0.0	0.0	0.0	0.0



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SPA	Apportioning value			Mortality apportioned to SPA			Total
	Breeding season	Post-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Pre-breeding season	
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island	0.09	0.02	0.02	0.0	0.0	0.0	0.0
Rum	0.09	0.15	0.15	0.0	0.0	0.0	0.0
Skomer, Skokholm and the seas off Pembrokeshire / Sgomer, Sgogwm a moroedd Benfro	0.75	0.44	0.44	0.0	0.0	0.0	0.0
Isles of Scilly	0.00	0.00	0.00	0.0	0.0	0.0	0.0
St Kilda	0.00	0.01	0.01	0.0	0.0	0.0	0.0

**Table A.10: Manx shearwater (displacement)**

SPA	Apportioning value			Mortality apportioned to SPA			Total
	Breeding season	Post-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Pre-breeding season	
Copeland Islands	0.03	0.01	0.01	3.1	0.4	0.0	3.5
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island	0.09	0.02	0.02	7.5	1.3	0.0	8.8
Rum	0.09	0.15	0.15	7.7	9.7	0.0	17.4
Skomer, Skokholm and the seas off Pembrokeshire / Sgomer, Sgogwm a moroedd Benfro	0.75	0.44	0.44	66.0	28.2	0.0	94.3
Isles of Scilly	0.00	0.00	0.00	0.0	0.0	0.0	0.1
St Kilda	0.00	0.01	0.01	0.2	0.4	0.0	0.6

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**Table A.11: Gannet**

<sup>1</sup> Breeding season apportioning values represent the SPA proportion multiplied by the adult:ratio proportion as presented in Volume 4, Annex 5.5: Offshore Ornithology Apportioning Technical Report of the Environmental Statement

Any SPA highlighted in blue has an apportioned impact that is effectively zero and therefore will not be considered in the ISAA.

SPA	Apportioning value			Mortality apportioned to SPA			Total
	Breeding season <sup>1</sup>	Post-breeding season	Pre-breeding season	Breeding season	Post-breeding season	Pre-breeding season	
Ailsa Craig	0.539	0.099	0.082	7.3	0.5	0.2	8.0
Saltee Islands	0.031	0.002	0.002	0.4	0.0	0.0	0.4
Grassholm	0.245	0.144	0.119	3.3	0.8	0.3	4.4
Flamborough and Filey Coast	-	0.000	0.010	0.0	0.0	0.0	0.0
Forth Islands	-	0.000	0.050	0.0	0.0	0.1	0.1
Hermaness, Saxa Vord and Valla Field	-	0.018	0.022	0.0	0.1	0.1	0.2
North Rona and Sula Sgeir	-	0.030	0.028	0.0	0.2	0.1	0.2
St Kilda	-	0.197	0.180	0.0	1.1	0.5	1.6
Sule Skerry and Sule Stack	-	0.015	0.014	0.0	0.1	0.0	0.1

## A.2 Migratory seabirds

A.2.1.1.1 In order to identify if there is the potential for LSE for any SPAs at which those migratory seabirds for which connectivity has been identified with the Morgan Generation Assets are qualifying features the predicted collision risk estimates in Volume 4, Annex 5.4: Offshore ornithology migratory bird CRM technical report of the Environmental Statement (Document Reference F4.5.4) have been compared to the baseline mortality of the relevant biogeographic population (Table A.12).

A.2.1.1.2 The proportion of the biogeographic population represented by the predicted collision risk from the Morgan Generation Assets is less than 1% in all cases and therefore all SPAs at which the relevant migratory seabirds are qualifying features are excluded from further consideration.

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**Table A.12: Determination of LSE for migratory seabird species**

Species	Scientific name	Collision risk estimate (99% avoidance rate)	Biogeographic population (largest BDMPS population)	Mortality rate	Baseline mortality	Proportion of baseline mortality represented by collision risk
European storm petrel	<i>Hydrobates pelagicus</i>	0.65	180,000	0.12	21,600	<0.01
Leach's storm petrel	<i>Oceanodroma leucorhoa</i>	1.57	450,000	0.13	58,500	<0.01

### A.3 Migratory waterbirds

- A.3.1.1.1 In order to identify if there is the potential for LSE for any SPAs at which those migratory waterbirds for which connectivity has been identified with the Morgan Generation Assets are qualifying features the predicted collision risk estimates in Volume 4, Annex 5.4: Offshore ornithology migratory bird CRM technical report of the Environmental Statement (Document Reference F4.5.4) have been compared to the baseline mortality of the relevant biogeographic population (Table A.13).
- A.3.1.1.2 The proportion of the biogeographic population represented by the predicted collision risk from the Morgan Generation Assets is less than 1% in all cases and therefore all migratory waterbirds are excluded from further consideration.

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**Table A.13: Determination of LSE for migratory waterbird species**

<b>Species</b>	<b>Scientific name</b>	<b>Collision risk estimate (98% avoidance rate)</b>	<b>Biogeographic population</b>	<b>Mortality rate</b>	<b>Baseline mortality</b>	<b>Proportion of baseline mortality represented by collision risk</b>
<b>Light-bellied brent goose (Canadian population)</b>	<i>Branta bernicla hrota</i>	0.02	710	0.10	71	0.02
<b>Greenland white-fronted goose</b>	<i>Anser albifrons flavirostris</i>	0.35	13,000	0.28	3,588	0.01
<b>Bewick's swan</b>	<i>Cygnus columbianus bewickii</i>	0.04	380	0.18	68	0.07
<b>Whooper swan</b>	<i>Cygnus cygnus</i>	0.93	19,500	0.20	3,881	0.02
<b>Shelduck</b>	<i>Tadorna tadorna</i>	0.22	14,610	0.11	1,666	0.01
<b>Shoveler</b>	<i>Spatula clypeata</i>	0.04	2,545	0.42	1,069	0.00
<b>Gadwall</b>	<i>Mareca strepera</i>	0.02	630	0.28	176	0.01
<b>Wigeon</b>	<i>Mareca penelope</i>	1.10	82,370	0.47	38,714	0.00
<b>Mallard</b>	<i>Anas platyrhynchos</i>	0.54	38,250	0.37	14,267	0.00
<b>Pintail</b>	<i>Anas acuta</i>	0.25	21,235	0.34	7,156	0.00
<b>Teal</b>	<i>Anas crecca</i>	5.17	480,010	0.47	225,605	0.00
<b>Pochard</b>	<i>Aythya ferina</i>	0.52	37,780	0.35	13,223	0.00
<b>Tufted duck</b>	<i>Aythya fuligula</i>	1.95	176,610	0.29	51,217	0.00
<b>Scaup</b>	<i>Aythya marila</i>	0.06	6,400	0.19	1,216	0.01
<b>Common scoter</b>	<i>Melanitta nigra</i>	0.09	135,000	0.22	29,295	0.00
<b>Long-tailed duck</b>	<i>Clangula hyemalis</i>	0.03	13,500	0.27	3,645	0.00
<b>Goldeneye</b>	<i>Bucephala clangula</i>	0.21	9,665	0.23	2,223	0.01
<b>Red-breasted merganser</b>	<i>Mergus serrator</i>	0.11	11,000	0.18	1,980	0.01
<b>Corncrake</b>	<i>Crex crex</i>	0.11	2,200	0.71	1,571	0.01
<b>Great crested grebe</b>	<i>Podiceps cristatus</i>	0.06	5,385	0.28	1,481	0.00

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<b>Species</b>	<b>Scientific name</b>	<b>Collision risk estimate (98% avoidance rate)</b>	<b>Biogeographic population</b>	<b>Mortality rate</b>	<b>Baseline mortality</b>	<b>Proportion of baseline mortality represented by collision risk</b>
<b>Slavonian grebe</b>	<i>Podiceps auritus</i>	0.01	995	0.40	398	0.00
<b>Oystercatcher (breeding)</b>	<i>Haematopus ostralegus</i>	3.18	191,000	0.12	22,920	0.01
<b>Oystercatcher (non-breeding)</b>	<i>Haematopus ostralegus</i>	5.07	305,000	0.12	36,600	0.01
<b>Lapwing</b>	<i>Vanellus vanellus</i>	4.73	207,700	0.30	61,272	0.01
<b>Golden plover (breeding)</b>	<i>Pluvialis apricaria</i>	1.54	101,000	0.27	27,270	0.01
<b>Golden plover (non-breeding)</b>	<i>Pluvialis apricaria</i>	6.27	410,000	0.27	110,700	0.01
<b>Grey plover</b>	<i>Pluvialis squatarola</i>	0.14	6,315	0.14	884	0.02
<b>Ringed plover (breeding)</b>	<i>Charadrius hiaticula</i>	0.15	10,900	0.23	2,485	0.01
<b>Ringed plover (non-breeding)</b>	<i>Charadrius hiaticula</i>	0.60	42,500	0.23	9,690	0.01
<b>Dotterel</b>	<i>Charadrius morinellus</i>	0.02	850	0.27	230	0.01
<b>Whimbrel</b>	<i>Numenius phaeopus</i>	0.06	3,840	0.11	422	0.01
<b>Curlew (breeding)</b>	<i>Numenius arquata</i>	1.97	117,000	0.10	11,817	0.02
<b>Curlew (non-breeding)</b>	<i>Numenius arquata</i>	1.31	54,650	0.10	5,520	0.02
<b>Bar-tailed godwit</b>	<i>Limosa lapponica</i>	0.44	16,280	0.29	4,640	0.01
<b>Black-tailed godwit (Icelandic race)</b>	<i>Limosa limosa islandica</i>	0.64	41,000	0.06	2,460	0.03
<b>Turnstone</b>	<i>Arenaria interpres</i>	0.63	43,000	0.14	6,020	0.01
<b>Knot</b>	<i>Calidris canutus</i>	3.81	265,000	0.16	42,135	0.01
<b>Ruff</b>	<i>Calidris pugnax</i>	0.01	920	0.48	438	0.00
<b>Sanderling</b>	<i>Calidris alba</i>	0.29	20,500	0.17	3,485	0.01

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<b>Species</b>	<b>Scientific name</b>	<b>Collision risk estimate (98% avoidance rate)</b>	<b>Biogeographic population</b>	<b>Mortality rate</b>	<b>Baseline mortality</b>	<b>Proportion of baseline mortality represented by collision risk</b>
<b>Dunlin (sub-species schinzii and arctica)</b>	<i>Calidris alpina schinzii/arctica</i>	14.15	1,000,500	0.26	260,130	0.01
<b>Dunlin (sub-species alpina)</b>	<i>Calidris alpina alpina</i>	2.37	88,480	0.26	23,005	0.01
<b>Purple sandpiper</b>	<i>Calidris maritima</i>	0.16	9,900	0.21	2,030	0.01
<b>Snipe</b>	<i>Gallinago gallinago</i>	15.94	1,100,000	0.52	570,900	0.00
<b>Red-necked phalarope</b>	<i>Phalaropus lobatus</i>	0.00	128	0.14	18	0.01
<b>Redshank (breeding)</b>	<i>Tringa totanus</i>	0.68	44,000	0.26	11,440	0.01
<b>Redshank (Icelandic race - non-breeding)</b>	<i>Tringa totanus</i>	6.18	400,000	0.26	104,000	0.01
<b>Wood sandpiper</b>	<i>Tringa glareola</i>	0.00	60	0.46	28	0.00
<b>Greenshank</b>	<i>Tringa nebularia</i>	0.03	1,265	0.26	329	0.01
<b>Bittern</b>	<i>Botaurus stellaris</i>	0.02	795	0.30	239	0.01
<b>Osprey</b>	<i>Pandion haliaetus</i>	0.01	480	0.15	72	0.01
<b>Hen harrier</b>	<i>Circus cyaneus</i>	0.02	1,090	0.19	207	0.01
<b>Short-eared owl</b>	<i>Asio flammeus</i>	0.17	4,400	0.31	1,364	0.01
<b>Merlin</b>	<i>Falco columbarius</i>	0.07	49,000	0.38	18,620	0.00