EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

Fall of Warness Habitat Regulations Screening Report

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Document History

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1 Introduction

1.1 Background

EMEC's grid-connected tidal energy test site (the Project) is located at the Fall of Warness (the Project area), just west of the island of Eday in the Orkney Islands. The Project area sits in a narrow channel between the Westray Firth and Stronsay Firth where tidal flow accelerates as water flows through the inter-island constriction on its way from the North Atlantic Ocean to the North Sea. The location of the Project area is shown in Figure 1-1.

The Project area was chosen for its high velocity marine currents which can reach almost 4 m/sec (7.8 knots) at spring tides. It currently provides seven tidal test berths at depths ranging from 12 m to 50 m in an area 2 km across and approximately 4 km in length. 11 kV sub-sea cables extend to the middle of the tidal stream from an electricity substation on the island of Eday which houses the main switchgear, backup generator and communications room. The substation controls the supply from each tidal device and includes connection to the National Grid. An adjacent laydown area provides developers with space to place their power conditioning equipment, required to convert electricity from the level at which it is generated to grid-compliant electricity. EMEC sells generated electricity on behalf of the developers, who receive a return. In addition to transporting electricity, the subsea cables also contain a fibre-optic core which allows developers to communicate with their devices and transmit data back to the EMEC data centre and office facilities in Stromness.

1.2 Project Overview

This Habitats Regulation Appraisal (HRA) Screening Report has been prepared to support the Section 36 Consent and Marine Licence applications for the Project area at Fall of Warness, Orkney and offshore export cable(s), herein referred to collectively as the Project. The Section 36 consent application, supported by this Screening, does not relate to a new project, but rather is a proposed change to the existing Fall of Warness site, Orkney to extend and expand the existing Section 36 consent for the site to allow a project duration to 2043 (in line with existing funding) and a site generating capacity up to 50 MW.

The key components of the revised Project are summarised below, with further details included in Section 3:

- Up to 35 devices in an array;
- Maximum of 20 berths;
- Tidal devices either at the surface, mid-water or seabed mounted;
- Associated mooring infrastructure for devices;
- Export cables associated with berths; and
- Foundation structure for each device.

The Project will be built out in stages, up to proposed maximum site area, over a timeline that will be dictated by when developers agree with EMEC to bring technology to site for testing.

The application relates to infrastructure and assets below the Mean High Water Spring (MHWS). The Project Design Envelope does not include any potential future onshore works, which would require consideration under the Town and Country Planning (Scotland) Act 1997.

1.3 Purpose of This Report

The requirement and process for consideration of potential impacts on plans and projects on European sites are required under the European Union's (EU) Habitat's Directive[1]. The Habitat Directive stipulate that an HRA must be carried out for any plans and projects likely to have Likely Significant Effects (LSE) on European sites, for example through spatial connectivity or designated features with an assumed connectivity. Further information on this process and requirements is detailed in Section 2 below.

This offshore HRA Screening Report informs the HRA process for the Project with respect to the LSE on European sites which could be affected by the Project. Where no potential LSE is predicted on a European site, then this site has been screened out and no further assessment will be conducted. Where initial screening identifies that LSE cannot be excluded, the assessment for European sites will be presented within the Report to Inform Appropriate Assessment (RIAA), which will be submitted alongside the Environmental Impact Assessment Report (EIAR) supporting the Marine Licence (ML) application for the Project.

This HRA Screening Report considers the potential effects arising during the installation, operation and maintenance, and decommissioning phases of the offshore elements of the Project. This HRA Screening Report uses existing information about the baseline environment in the Project area and the proposed activities. It also draws from comments received for the Project Scoping Opinion (MS-LOT, 2022), received in relation to the Project Scoping Report (EMEC, 2022a). Any further input derived from stakeholder engagement which may have consequences on the outcomes of this assessment will be captured and assessed within the RIAA.

[1] Council Directive 92/43 /EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206/7 22.7.1992) (the Habitats Directive)

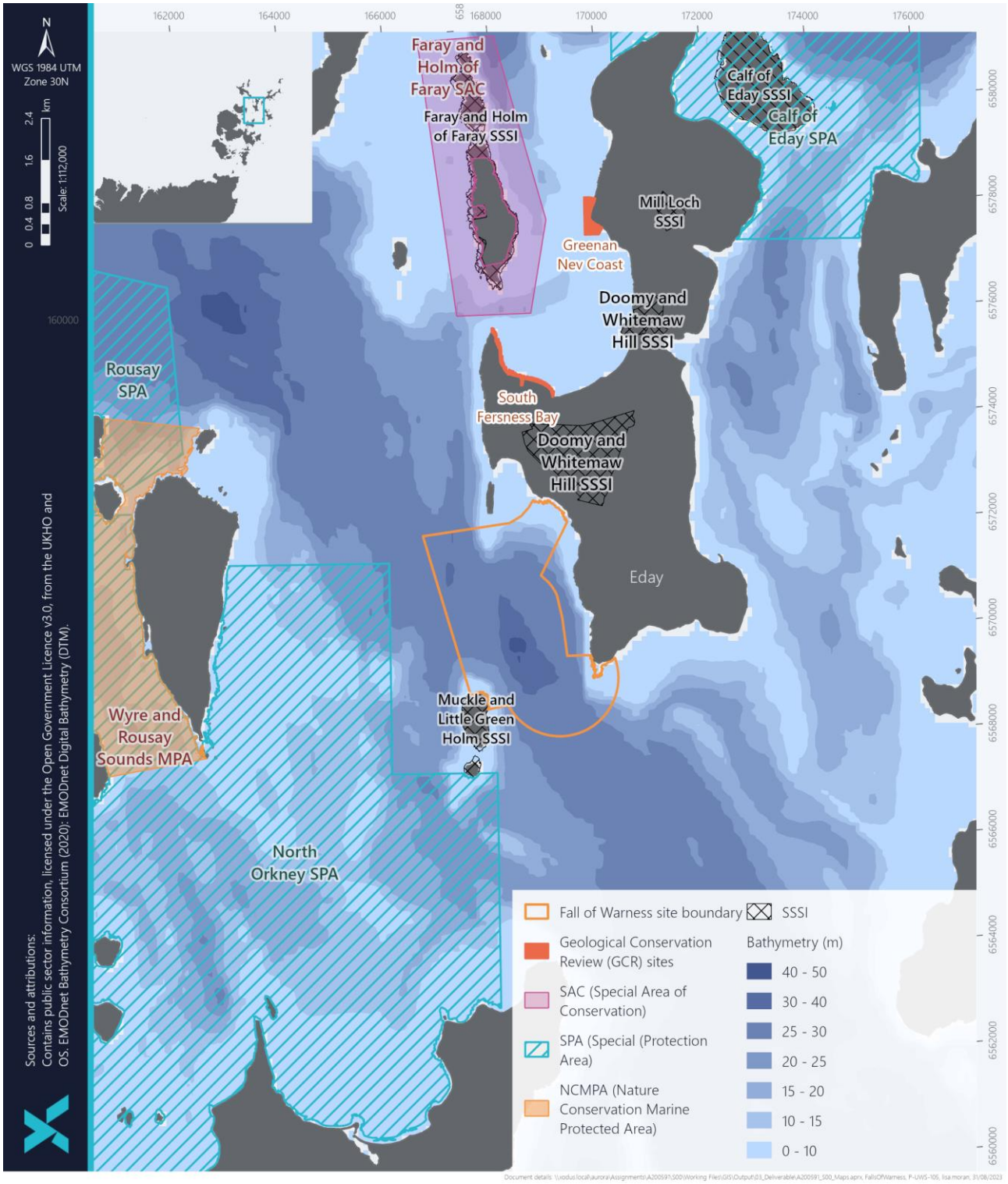


Figure 1-1 **Location of the Fall of Warness tidal test site**

2 The HRA Process

2.1 Legislative Context

The following legislation requires the consideration of potential effects of plans and projects on European sites ('The Habitats Regulations'):

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) – applicable to Marine Licence applications out to the 12 NM limit; and
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) – applicable to Marine Licence applications between the 12 and 200 NM limits.

The Habitats Regulations require evaluation of potential effects from proposed projects and plans on European sites. These include Special Areas of Conservation (SACs), candidate SACs (cSACs), Special Protection Areas (SPAs) potential SPAs (pSPAs), Sites of Community Interest (SCIs) and Ramsar sites. The determination of the potential for a plan or project to result in a LSE (either alone or in-combination with other plans or projects) on European sites must be carried out through the HRA process. Sites of Specific Scientific Interest (SSSIs) lie outwith the HRA process as they are not protected under the Habitats Regulations.

As the UK has exited the EU, the Habitats Regulations were amended in Scotland to allow for their continued application in Scotland's inshore and offshore waters. European sites within the UK now constitute the UK's National Site Network rather than being within the Natura 2000 network. The policies and procedures under the HRA Regulations remain unchanged (Scottish Government, 2020).

The procedural requirements to undertake HRAs for assessing potential effects on European sites are contained in the Habitats Regulations. The objectives in relation to the UK National Site Network include:

- To maintain or restore habitats and species listed in the Habitats Directive to favourable conservation status; and
- To 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.

2.2 HRA Process

A staged process for the assessment of plans or projects is articulated in the European Commission's (2021) guidance:

- Stage One: HRA Screening;
- Stage Two: Appropriate Assessment (AA) carried out by the Competent Authority and informed by the RIAA;
- Stage Three: Assessment of Alternative Solutions; and
- Stage Four: Assessment of 'Imperative Reasons of Overriding Public Interest' (IROPI).

Stage One of the HRA process is addressed through this Offshore HRA Screening Report. Stage Two of the HRA process will be reported within the full RIAA which is taking place in parallel with the Offshore EIA.

2.2.1 Stage One: HRA Screening

HRA Screening aims to identify aspects of the Project for which it is not possible to exclude the potential risk of significant effects on a European site (referred to as potential LSE), either alone or in combination with other projects.

2.2.2 Stage Two: AA

Where HRA screening cannot exclude potential LSE, a European site is progressed to AA. An RIAA is provided by a project, considering the effects of the project, alone and in-combination with other plans and projects, on the integrity of a designated site. The assessment is conducted with regard to the European site's structure and function and its Conservation Objectives. The Competent Authority carries out an AA on the implications for a European site considering the site's Conservation Objectives. This is required before the Competent Authority undertakes or gives any consent, permission, or other authorisation for, a plan or project.

An AA may extend to plans or projects out with the boundary of a European site to assess the implications of the plans or projects on the features for which the site is designated.

2.2.3 Stage Three: Assessment of Alternative Solutions

If the Competent Authority cannot reach a conclusion about no adverse effect on the integrity of a European site, alternative solutions are evaluated. This may include, for example, modifications to the design or location of a project.

2.2.4 Stage Four: Assessment of IROPI

If no alternative solutions exist for the plan or project. Following evaluation of alternative solutions for the plan or project, if the Competent Authority cannot conclude no adverse effect on the integrity of a European site, the development may not proceed. A development may only proceed by satisfying the principles IROPI, relating to human health, public safety or beneficial consequences of primary importance to the environment, or any other reasons, provided that the Competent Authority has had regard to the opinion of the Scottish Ministers in satisfying itself that there are such reasons.

Where the principles of IROPI are satisfied, compensatory measures must be put in place to maintain the coherence of the UK National Site Network and offset the adverse effects caused to the European site.

2.2.5 Mitigation

Following the outcome of the European Court of Justice in the People Over Wind and Sweetman case in 2018 (Case C323/17), NatureScot (previously-Scottish Natural Heritage (SNH)) provided guidance on the consideration of mitigation in the HRA process (SNH, n.d.).

NatureScot guidance outlines that mitigation measures intended to avoid or reduce harmful effects to a European site cannot be considered at the screening stage. Embedded mitigation measures which are not specifically designed to avoid or reduce effects on a European site, but do so incidentally, can be considered. However, this offshore HRA Screening Report does not consider mitigation measures that are specifically implemented to reduce or avoid effects on a European site

but does consider mitigation measures which are not specifically designed in relation to effects on European sites, for example Shipboard Oil Pollution Emergency Plans.

2.3 Guidance

Documents guiding the HRA process for offshore developments in Scotland include:

- Habitats Regulations Appraisal: Guidance for Plan-making Bodies in Scotland (Tyldesley and Associates, 2015);
- The handling of mitigation in Habitats Regulations Appraisal – the People Over Wind CJEU judgement (SNH, n.d.); and
- EU Exit: habitats regulations in Scotland (Scottish Government, 2020).

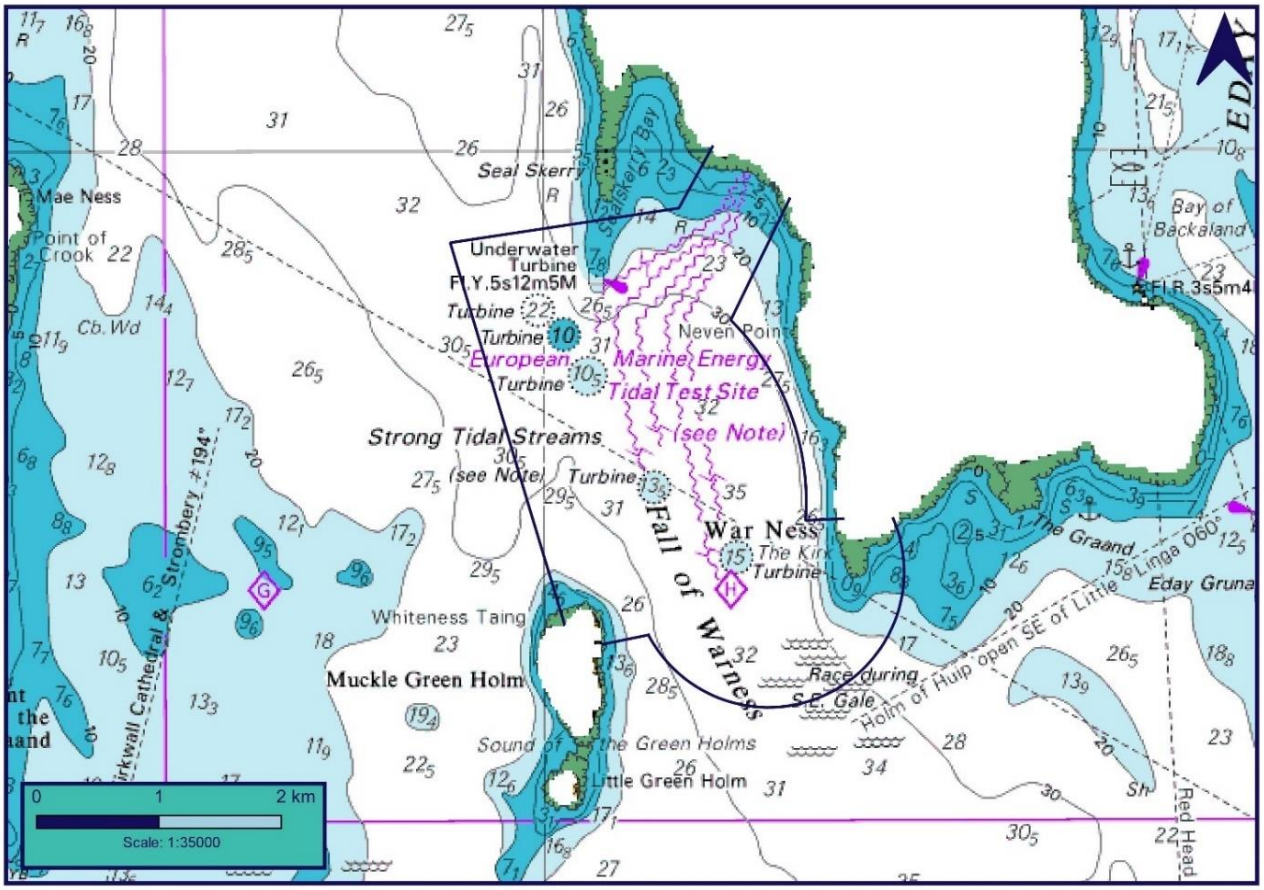
This HRA Screening Report has utilised the above-mentioned documents.

3 Project Description

3.1 Fall of Warness Tidal Site

Figure 3-1 provides an overview of the layout of the Fall of Warness tidal test site.

Figure 3-1 Existing Fall of Warness site



Each of the existing seven berths occupies a circular area of approximately 200 m radius from the cable end, within which developers can install their device(s) and undertake testing activities. The berths can accommodate single devices or small arrays as well as individual components or mooring structures. Each test berth is individually connected to EMEC's shore-based substation at Caldale in Eday via an 11 kV armoured subsea cable, allowing onward transmission of the energy generated by the devices to the National Grid.

Entering 2022, the test site had 4 MW export capacity under the existing Embedded Generation Connection Agreement. This has increased to 7.2 MW total export capacity to support the testing of multiple longer-term demonstrations on site.

3.2 Project Design Envelope

As the precise activities at the Fall of Warness site up until 2043 cannot be fully predicted or defined in the EIA, a Project Design Envelope has been developed to describe the worst-case scenarios and provide a scope for the assessment. This section provides an overview of the infrastructure and activities included in the Project Design Envelope, which each assessment topic will consider when appraising potential impacts and importance.

The test site will be operated with a maximum of 20 berths, accommodating up to 50 MW of tidal energy devices at any one time, thereby supporting the testing of small arrays. The test site will also allow for the testing of non-grid-connected devices, although such testing will limit the number of grid-connected devices able to test on the site due to available sea space.

The following activities and deployments are included within the Project Design Envelope:

- Testing activities associated with single device and array deployments, including regular installation, maintenance and decommissioning works;
- Testing of mooring systems and foundation arrangements (e.g., tripod support structures or individual stand-alone components of devices);
- Installation, maintenance and testing of subsea cables to the landfall;
- Deployment of scientific instrumentation and associated cabling;
- Testing of buoys (maximum of two simultaneous tests); and
- Potential for simultaneous operations, i.e., installation or maintenance activities, at more than one berth at the same time.

The following activities are ***not*** covered by the Project Design Envelope and would require further consultation and assessment:

- All onshore works (above MHWS) including installation of energy storage devices;
- Seabed preparation (e.g., seaweed clearance, rock grinding/blasting);
- Geotechnical and geophysical surveys (these are considered and, where necessary, licensed through the Notification of Site Survey procedures);
- Use of acoustic deterrent, active acoustic or acoustic communication devices; and
- Deployment and operational activities outside the parameters defined in the Project Design Envelope.

Table 3-1 provides an overview of the technologies and activities to be considered in the EIA and Table 3-2 details the maximum parameters which are considered in this EIA.

Table 3-1 Overview of technologies and activities included in the Project Design Envelope

DEVICE CATEGORIES AND OTHER POSSIBLE STRUCTURES	FOUNDATION AND MOORING METHODS	LIKELY MARINE WORKS AND CABLING	TYPICAL VESSELS	TYPICAL SCIENTIFIC INSTRUMENTS/TESTING
Device characteristics ○ Blades with exposed tips (may include multiple rotors, on single or multiple axles, horizontal and vertical); ○ Blades with enclosed tips (may include multiple rotors, on single or multiple axles, horizontal and vertical), including 'annular' and 'venturi' style devices); ○ Blades with contra-rotating mechanism (may include multiple rotors, on single or multiple axles, including horizontal and vertical); ○ Single or multiple Archimedes rotors; ○ Tethered tidal kite; and ○ Reciprocating hydrofoil (attached to an oscillating arm). Device structures ○ Floating surface structure; ○ Subsurface floating (neutrally buoyant) structure; ○ Seabed mounted subsurface structure; and ○ Seabed mounted structure with surface-piercing elements. Array configurations ○ Minimum spacing between devices notionally set at 50 m within a radius of the centre point of the device.	○ Mono/twin-pile(s) fixed into the seabed (non-percussive drilling only – no hammer piling); ○ Tripod structure, pinned to the seabed (non-percussive drilling only); ○ Foundation structure held on to the seabed by gravity; ○ Gravity-based anchors with mooring lines attached; ○ Rock anchors/bolts with mooring lines attached; ○ Embedment anchors with mooring lines attached; and ○ Other mooring structure pinned to the seabed (non-percussive drilling only) or held on the seabed by gravity.	Pre-installation† ○ ROV/diver surveys; ○ ADCP deployment/retrieval; Installation ○ Drilling and grouting; ○ Lowering foundation/anchors/nacelle; and ○ Cable works and connection to device. Testing of nacelle, gravity foundations, anchors or scientific equipment ○ ADCP deployments. Inspection & maintenance of devices ○ ROV inspection; ○ Diver activities; ○ Repairs below/above surface on site; and ○ Biofouling removal. Temporary retrieval & redeployment of nacelle, gravity foundations, anchors or scientific equipment	○ Tug; ○ Workboat; ○ Workboat Cat 2; ○ Workboat (Cat 2) with dive support capability; ○ Dive support boat; ○ Survey vessel (ROV compatible); ○ Multicat workboat (Class 1); ○ Jack-up barge; ○ Crane barge; ○ DP Class II Anchor Handler Tug; and ○ Specialist cable-laying vessel.	○ ADCPs - various types may be deployed; ○ Wave measurement buoys - e.g., waverider buoys, triaxis buoys (combined wave and current measurement); ○ Passive acoustic measurement devices - may be seabed mounted, mid-water moored buoys, device-mounted, or drifting hydrophones and associated equipment; ○ Marine robotics, including but not limited to, remotely operated autonomous underwater vehicles and drop camera surveys; ○ Testing of anti-fouling systems, biofouling and corrosion tests – this may be on static frames mounted on devices or on specific frames deployed for such tests; ○ Underwater cameras including baited cameras – this may be static, towed, or device-mounted; ○ Conductivity, temperature and depth (CTD) measurement instruments; and ○ Integrated monitoring pod which houses an array of the above instrumentation, including associated cabling or battery, to allow deployment across the test site.

DEVICE CATEGORIES AND OTHER POSSIBLE STRUCTURES	FOUNDATION AND MOORING METHODS	LIKELY MARINE WORKS AND CABLING	TYPICAL VESSELS	TYPICAL SCIENTIFIC INSTRUMENTS/TESTING
Temporary floating platforms ○ Possibility of temporary floating platforms for testing of device components, moored using clump weights only. Electrical hubs ○ Possibility of installing, testing, operating and decommissioning electrical hubs, particularly associated with device arrays, as an alternative to cabling devices back to shore individually.		Inspection, maintenance and replacement of cables and protection ○ ROV inspection; ○ Diver activities; ○ Cable lifting/laying; and ○ Placement of mattressing/rock armouring.		

† Geophysical and geotechnical surveys are out-with the scope of the Project Design Envelope

Table 3-2 Maximum parameters relevant to appraisals

PROJECT ELEMENT/ACTIVITY	MAXIMUM PARAMETER
INSTALLATION	
Device characteristics	
Number of simultaneous devices	35 devices
Maximum swept area of each device	5,000 m^2
Rotor diameter	Up to 28 m
Rotor depth	Minimum 2.5 m clearance from sea surface or seabed
Minimum spacing between arrays	50 m
Minimum spacing between devices in an array	<10 m
Device structures	
Total materials and weight used in device and substructure, excluding moorings/foundation	Total weight of material used per device: ○ Concrete/densecrete – 2,000 tonnes. ○ Steel/carbon steel – 2,000 tonnes. ○ Plastic/synthetic – 100 tonnes.
Distance above sea surface for surface-piercing elements	Maximum distance protruding from sea surface should not exceed 18 m (at MLWS), excluding navigational and communication equipment.
Length and width of floating structures	The sea surface area for surface piercing elements, when in operational mode, should be no greater than 780 m^2. For example, a permitted device could have a length of 100 m and width of 7 m or a length of 20 m and width of 39 m.
Subsea cables to shore (Export)[2]	
Cable length	Maximum of 5 km per array
Number of connected cables	Maximum of 8
Cable lay	Surface laid
Cable size	33 kV
Cable protection footprint	Maximum of 1 km^2
Electrical hub parameters	
Total materials and weight used in electrical hub	Total weight of material used per hub: ○ Concrete/densecrete – 500 tonnes. ○ Steel/carbon steel – 1,000 tonnes. ○ Plastic/synthetic – 100 tonnes.
Total direct seabed coverage	Maximum total area of 500 m^2 per hub, with a maximum of eight installed
Distance above sea surface for surface-piercing electrical hub	Maximum distance from sea surface should not exceed 18 m at MLWS, excluding navigational and communication equipment.
Mooring parameters	
Total weight of mooring mechanism	Maximum of 4,000 tonnes per device

[2] Inter-array/umbilical cables are not included within the scope of this Project, and will be dealt with on a device specific basis

PROJECT ELEMENT/ACTIVITY	MAXIMUM PARAMETER
Total materials and weight used in mooring weights/anchors/pins	Total weight of material used per device: ○ Concrete/densecrete – 4,000 tonnes. ○ Steel/carbon steel – 4,000 tonnes. ○ Plastic/synthetic – 100 tonnes.
Total mooring footprint per array[3]	Maximum total area of 0.1 km^2 per array
Total direct seabed coverage per device[4]	Maximum total area of 3,000 m^2 per device
Foundation parameters	
Total weight of seabed attachment mechanism excluding foundation substructure	Maximum of 4,000 tonnes per device
Total materials and weight used in foundation structure	Total weight of material used per device: ○ Concrete/ densecrete – 4,000 tonnes. ○ Steel/carbon steel – 4,000 tonnes.
Total direct seabed coverage per device[5]	Maximum total area of 750 m^2 per device
Total seabed preparation area per device	Maximum total area of 1875 m^2 per device
Maximum drill volume per device	Up to 200 m^3
Duration of marine works per array	
Pre-installation activities	Typical duration of up to 1 week
Installation activities	Typical duration of up to 1 month per device (maximum of 7 days of drilling per device)
Vessel specifications	
Tugs, workboats, dive support vessels, survey vessels	Maximum length 17 - 32 m depending on type Maximum speed 8 - 13 knots depending on type
DP Class II Anchor Handler Tug	Maximum length 94 m Maximum speed 18 knots
Jack-up barge, crane barge	Maximum length 48 m
Specialist cable-laying vessel	Maximum length 130 m Maximum speed 12.5 knots
Simultaneous marine works	
Simultaneous noisy installation activities	Maximum of four arrays simultaneously
Simultaneous inspection/maintenance activities*	Maximum of four arrays simultaneously
Vessels operating within whole site simultaneously	Maximum of 15 vessels
Testing of device components	
Deployment of temporary floating platforms	Maximum of five on the whole site at the same time

[3] Device footprint equates to the area of seabed directly below the device or mooring spread.

[4] The area of seabed with which the mooring mechanism has direct contact.

[5] The area of seabed which the foundation structure has direct contact.

PROJECT ELEMENT/ACTIVITY	MAXIMUM PARAMETER
OPERATION AND MAINTENANCE	
Inspection & maintenance of devices	Approximately 3 -12 months, activities may comprise ROV inspection, diver activities, repairs below / above surface on site, biofouling removal.
Inspection, maintenance and replacement of cables and protection	Approximately weekly, activities may comprise ROV inspection, diver activities, cable lifting/laying and placement of mattressing / rock armouring.
Temporary retrieval and redeployment of nacelle, gravity foundations, anchors or scientific equipment	Approximately monthly.
Scientific equipment deployment	Approximately monthly.
DECOMISSIONING	
The removal and dismantling of site infrastructure will largely be a reversal of the installation process and subject to the same constraints. The exception this may be for piled anchors, where if applicable to a developer, will be addressed within the developer specific assessment of impacts.	

3.3 Mitigation, Monitoring and Research

In addition to regulatory requirements, a number of designed-in measures (comprising mitigation, monitoring or research) have been proposed to reduce the potential for impacts to the environment across the receptor topics. The responsibility of implementing these measures will vary between EMEC and the client. Although the designed-in measures have been identified for the Fall of Warness Project, no mitigation measures are used to assess the potential for LSE on a European or Ramsar Site's integrity. Instead, these are summarised here to demonstrate the varying EMEC's ongoing commitment to limiting environmental impact, as well as the varying responsibilities for implementing the measures.

3.3.1 Management Plans

An important measure is the development of a Project-specific Environmental Monitoring Programme (PEMP), which is a requirement from every client, which is submitted as part of their Marine Licence application. Clients are expected to produce robust PEMPs, inclusive of manging impacts identified to lead to significant effects on receptors. The PEMP provides an opportunity to contribute to industry solutions in terms of developing good practice and new innovative approaches to industry-wide problems. In addition to the PEMP, further plans are proposed as part of the Project, including but not limited to the following:

- Construction Environmental Management Plan (CEMP);
- Offshore Construction Method Statement (CMS);
- Cable Plan;
- Operation Environmental Management Plan (OEMP);
- Vessel Management Plan (VMP);

- Marine Pollution Contingency Plan (MPCP);
- Marine Biosecurity Plan;
- Environmental Clerk of Works (ECoW); and
- Lighting and Marking Plan (LMP).

3.3.2 Embedded Project Mitigation, Monitoring and Research

As the EMEC Fall of Warness Tidal Site is a device demonstration site, additional monitoring, research and mitigation are frequently implemented to enable individual Clients to fully assess their devices. These monitoring and research activities would be an ongoing strategy during the proposed Project operation period.

4 Screening Methodology

4.1 Screening Process

4.1.1 Overview

This section outlines the HRA screening process which has been used throughout the report. The approach follows a stepwise approach and has been used consistently throughout the below receptor specific topic assessments:

- Section 5 – Annex I habitats;
- Section 6 – Marine mammal features (including cetaceans, pinnipeds and Eurasian otter); and
- Section 7 – Ornithology features.

4.1.2 Consideration of Diadromous Fish

'Diadromous' species spend a portion of their lifecycle in a freshwater environment and a portion of it in the marine environment. There are two categories of diadromous fish – catadromous and anadromous. Catadromous fish hatch or are born in the marine environment, but then migrate to freshwater environments where they spend most of their lives reaching maturity. Anadromous fish species are born in freshwater habitats but immediately swim to sea where they spend most of their lives, before returning to freshwater rivers to spawn.

By their nature, diadromous fish species are highly mobile and could foreseeably interact with the Project and the main potential impact pathways to such species associated with the Project are as follows:

- Installation and Decommissioning:
    - Underwater noise from foundation/mooring installation methods and vessels leading to auditory injury, death or disturbance.
- Operation and Maintenance:
    - Underwater noise from tidal devices operation;
    - Electromagnetic Field (EMF) effects;
    - Presence of tidal devices and associated infrastructure leading to a barrier effect; and
    - Collision with turbine blades leading to injury or death, in this respect relate to increases in suspended sediment concentration (SSC) during installation.

A range of contemporaneous regulatory advice regarding energy generation in the marine environment and associated transmission infrastructure to the coast have been reviewed to help inform this assessment, and to ensure the delivery of a high-quality proportionate document to Marine Directorate Licensing Operations Team (MD-LOT) and consultees. This includes advice provided to the Berwick Bank Wind Farm (BBWF) development (MD-LOT, 2023a), West of Orkney Offshore Wind Farm and – most recently – advice provided to the Cambois Connection Project (a HVDC cable development linked to the BBWF) (MD-LOT, 2023b). Based on this review, MD-LOT's current advice for comparable schemes notes the high degree of uncertainty related to diadromous fisheries:

'Diadromous fish–- With regards to the qualifying features to be considered, MD-LOT advises that due to the current uncertainty on where the species of Atlantic salmon, sea and river lamprey go within marine waters, these should be screened out from the HRA and instead must be considered through the Environmental Impact Assessment Report for the Proposed Works in line with the NatureScot representation'.

Although the advice relates to cable infrastructure and offshore wind developments, the advice is nonetheless considered to be applicable to the Project. The Project is located within the marine environment and would be generating up to 50 MW outputs, which is considerably lower than for the aforementioned developments.

On this basis and considering the very recent and clear NatureScot advice regarding assessment of diadromous fisheries, they are not considered further within this assessment. In line with the advice, consideration of the potential for impacts to diadromous species will be completed within the EIAR for the Project. EMEC seeks confirmation from MD-LOT and NatureScot on this approach.

4.1.3 Identification of European Sites and Features with Connectivity

The identification of European sites and features with connectivity to the Project is conducted with reference to the qualifying interests / features. This is achieved via:

- Identification of the range of effects the Project could have on qualifying feature(s) of a site (pathways for LSE); and
- Determination of connectivity with a site (e.g., if a qualifying interest / feature of the European site may overlap with the Project boundary or wider Zone of Influence (ZoI)[6]).

Factors which affect connectivity include life cycle, foraging, breeding, and migration of a site's qualifying features as well as the characteristics and potential effects associated with the Project. The criteria used to determine connectivity are defined in each particular receptor topic. This step produces a list of European sites and features with connectivity to the Project.

4.1.4 Determination of LSE

In those cases where connectivity is identified between the Project and a site's qualifying interests, further appraisal determines whether, potential LSE can be concluded due to the identified connectivity. To determine potential LSE it is necessary to:

- Determine whether that qualifying feature(s) would, due to its behavioural and foraging characteristics, be affected by a particular effect (species sensitivity); and
- Where a qualifying feature is likely to be affected by an effect, identify whether or not this is likely to have a significant effect on the conservation objectives for the site (conclusion of potential LSE or not).

The assessment of potential LSE uses data and information on effect pathways and characteristics of qualifying interests. This high-level appraisal assesses whether or not any of the site's

[6] The ZoI is the area beyond the Project which may be affected by the proposed activities. The ZoI is specific to different receptors and is variably defined based on the nature of the receptor(s).

conservation objectives may be undermined due to the potential effects. No potential LSE is concluded if there is no potential for the conservation objective to be undermined.

4.2 Stakeholder Consultation to Date

Stakeholder engagement is a key part of the HRA and EIA process. The aim of stakeholder engagement is to facilitate two-way communications about the Project with all relevant stakeholders. This allows any environmental concerns to be identified at an early stage and provides the opportunity for the EMEC team to ensure that these concerns can be adequately addressed during the EIA process. EMEC has already undertaken extensive stakeholder engagement in relation to the Fall of Warness site, considering issues relating to both the EIA and HRA. An overview of consultation to date is presented in Table 4-1.

Table 4-1 Consultation related to the current project

CONSULTEE	DESCRIPTION OF ENGAGEMENT
Marine Scotland	Summer 2021: Update meeting to introduce the proposed changes to the Fall of Warness site. Pre-scoping meeting, 14/04/2022: The results of the scoping work to date were presented to Marine Scotland, and feedback on the receptors that has been scoped in and out was sought. The initial approach to EIA and HRA was also presented, and similar feedback requested. The outcome of the engagement shaped the EMEC Fall of Warness Scoping Report (EMEC, 2022a), which included consideration of the impact pathways to designated sites and features within the Scoping Report and evaluation of the potential sites within the EIAR. The consultation also led to ongoing engagement on certain technical topics (e.g., collision risk assessment).
NatureScot	Summer 2021: Update meeting to introduce the proposed changes to the Fall of Warness site. Pre-scoping meeting, 14/04/2022: As above for Marine Scotland. Collision risk modelling meeting held on 05/07/2022. The meeting involved discussing the proposed collision risk modelling methodology, inputs and outputs to inform the EIA and HRA.

Feedback with respect to the Scoping Report (EMEC, 2022a) was obtained from the consultees through the Scoping Opinion (MS-LOT, 2022). Consultee comments relevant to this HRA Screening exercise have been incorporated into this report. In particular consultees necessitated the completion of a separate HRA Screening assessment, as opposed to the proposed approach of incorporating the information into the Scoping Report and EIAR. This HRA Screening Report is a direct response to the advice received within the Scoping Opinion.

In addressing matters raised withing the Scoping Opinion, EMEC in association with Orbital Marine Ltd, have commissioned further surveys for monitoring ornithological and marine mammal species within the wider Westray Firth. Further consultation has been completed in relation to the survey strategy and ongoing survey, which include the following:

- Submission of a marine wildlife survey strategy (Jackson & Gordon, 2023), which set out the survey approach for completing ornithological surveys and marine mammal observations;
- Feedback on the marine wildlife survey strategy from NatureScot, received by email on 13/04/2023 (NatureScot, 2023), which provided some guidance and raised further points for discussion; and

- Consultation meeting and presentation held on 13/06/2023 (EMEC & Orbital, 2023a), which provided further detail on the survey strategy with some feedback on observations from the first few survey deployments and sought advice from NatureScot on the survey approach being implemented. Meeting minutes associated with this meeting were presented in EMEC & Orbital (2023b).

5 European Sites Designated for Annex I Habitats

5.1 Initial Screening Criteria

The results of the process to identify European sites with relevant Annex I habitats to be assessed of potential LSE are described in this Section.

The initial screening criteria applied to identify European sites with relevant Annex I habitats are:

- The tidal test boundary overlaps with one or more European sites designated for Annex I habitats; and
- The European site designated for Annex I habitats is located within a Zone of Influence (ZoI) of 25 km from the tidal test boundary. The buffer zone size (25 km) has been selected on the basis that the majority of sediment mobilised due to project activities is expected to remain within this area. The buffer zone is expected to encapsulate any cumulative effects on the benthic environment in conjunction with third-party activities.

5.2 Identification of Sites and Features with Connectivity

The sites that are found in the closest distance to the tidal test are shown in Table 5-1. Potential pathways for LSE on these European sites are shown below. The locations of the European sites are shown in Figure **5-1**.

Considering the initial screening criteria discussed above, there are no European sites with Annex I habitats that have a connectivity to the Project.

Table 5-1 Summary of the European sites designated for Annex I habitats with potential connectivity to the Project area

SITE NAME	QUALIFYING INTEREST / FEATURES	DISTANCE TO PROJECT (KM)
Sanday SAC	• Reefs; • Sandbanks which are slightly covered by seawater all the time; and • Mudflats and sandflats not covered by seawater at low tide.	11 km

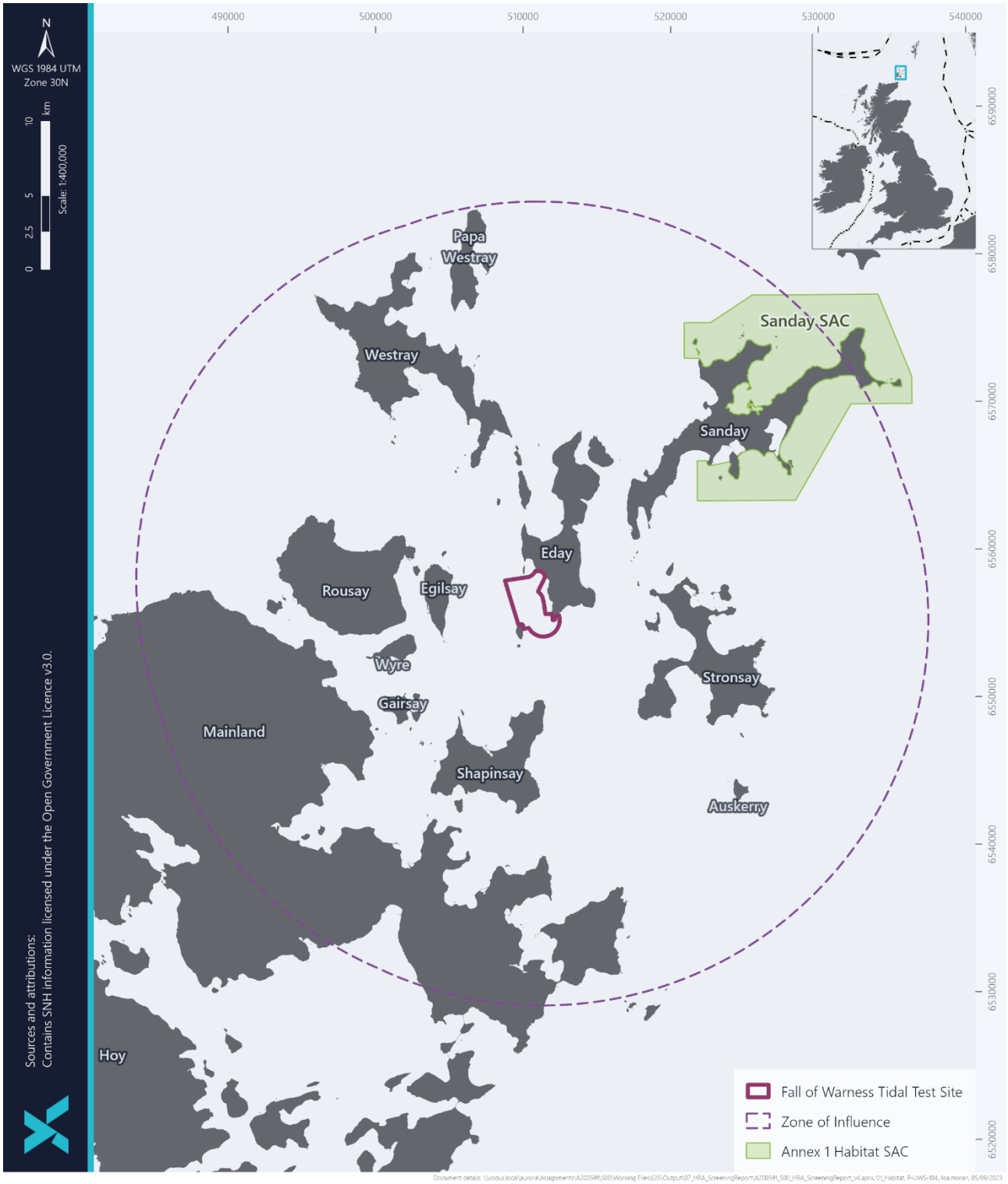


Figure 5-1 Location of European sites designated for Annex I habitats with potential connectivity to the Project area

5.3 Potential Pathways for LSE

The potential pathways to LSE that have been considered are the following:

- Installation and decommissioning
    - Habitat loss / damage;
    - Smothering by settlement of disturbed sediment or drill cuttings; and
    - Introduction of marine non-native species (via vessels, devices or other equipment).
- Operation and maintenance
    - Habitat creation;
    - Introduction/facilitation of marine non-native species (MNNS) (via vessels, devices, other equipment, or by provision of device and infrastructure as a stepping-stone in MNNS range expansion);
    - Changes to hydrodynamic and sediment regime (including scour around devices and cables);
    - Electromagnetic Field (EMF) effects; and
    - Thermal loading from cabling.

The only European site that meet the screening criteria outlined in Section 5.1 is the Sanday SAC. The Sanday SAC is designated for reefs, sandbanks, mudflats and sandflats (Table 5-1). This SAC is found 11 km northeast from the Project area. The only potential pathway that is relevant for this SAC is smothering by settlement of disturbed sediment or drill cuttings. The marine physical processes through the Project area are such that by the time the plume from any drilling activity reaches a distance of about 1 km, it is expected to be heavily diluted. Coarser gravel- or cobble-sized material may persist near the drilled pile sites until mobilised by storm events, and any boulder-sized material may remain in place permanently. It is assumed that all the cuttings material produced by the pile drilling activity will settle on the seabed in the immediate vicinity of the pile holes. The majority of the volume of drill cuttings is expected to be transported rapidly away from the Project area and deposited over a wide area in deep water to the northwest and southeast. It is therefore concluded that there is no connectivity between the Project and European sites designated for Annex I habitats and thus no potential LSE is concluded.

6 European Sites Designated for Marine Mammal Features

6.1 Initial Screening Criteria

The results of the process to identify European sites with relevant marine mammal species are shown in this Section.

The initial screening criteria applied to identify European sites with potential connectivity to the Project are:

- European sites which have a boundary that directly overlaps with the Project area; and
- European sites which are located within the range of connectivity (foraging range or management unit) of the Annex II marine mammal species for which they are designated.

This section considers five species of marine or aquatic mammal: the cetaceans harbour porpoise (*Phocoena phocoena*) and bottlenose dolphin (*Tursiops truncatus*), the harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*), and Eurasian otter (*Lutra lutra*). These species are the marine mammals listed on Annex II of the European Union Habitats Directive which require the designation of Special Areas of Conservation (NatureScot, 2019).

6.1.1 Fall of Warness surveys

Preliminary site-specific assessments of the use of the Fall of Warness site by marine mammals were carried out in 2005 to inform the original EIA for the tidal device testing site (Aurora, 2005). Following publication of the 2005 ES (Aurora, 2005), a land-based visual surface wildlife observation programme was initiated by EMEC in July 2005 based on regulatory recommendations. Initial analysis of the first three years of data was undertaken by SMRU (2006, 2007, 2009). The collection of wildlife observation data at the Fall of Warness site was funded by the Scottish Government until 31 October 2015 and extensive analysis of the dataset obtained has been undertaken. EMEC has also used both active and passive acoustic monitoring techniques to help assess the behaviour of marine mammals in close vicinity of an operating tidal turbine. There is therefore extensive site-specific data to inform the EIA, which will be used together with information on the relevant species from further afield.

In addition to the previous surveys across the Project area, as introduced in section 4.2, ongoing surveys monitoring for ornithological and marine mammal species within the wider Westray Firth are presently being completed, with the additional information being used to inform the EIAR and RIAA.

6.1.2 Cetaceans

The harbour porpoise was the most frequently sighted cetacean at the Fall of Warness test site. Other cetacean species recorded during the EMEC land-based wildlife observations included minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), white beaked dolphin (*Lagenorhynchus albirostris*) and Risso's dolphin (*Grampus griseus*) (Robbins, 2011). During the April 2013 to March 2014 reporting period, the majority of cetacean sightings were of white-beaked dolphin (EMEC, 2014c). Although other cetacean species could occur at the Project area, the above five species may, due to their relatively higher occurrence compared to other species, be regarded as appropriate species to consider in relation to the potential risks to other cetacean species as well.

Consequently, these five species were considered as part of environmental assessments for the Fall of Warness site conducted in 2014 (EMEC, 2014a, b). All five of these species are PMF in Scottish territorial and offshore waters. However, of these observed species, only harbour porpoise has SACs designated for its conservation.

The most frequently occurring cetacean species observed in Orkney waters generally were reported as being the above five species and the bottlenose dolphin, with more 'casual visitors' being Atlantic white-sided dolphin (*Lagenorhynchus acutus*), short-beaked common dolphin (*Delphinus delphis*), sperm whale (*Physeter macrocephalus*) and long-finned pilot whale (*Globicephala melas*) (Evans *et al.*, 2011).

6.1.3 Pinnipeds

Both harbour seals and grey seals are regularly sighted at the Fall of Warness site. Grey seals were observed more frequently than harbour seals, with the highest proportion of all grey seal observations coinciding with their pupping season during the autumn months.

Scotland hosts around 79% of the UK's population of harbour seals and the UK population represents around 30% of the European harbour seals population. They are widespread around the west coast of Scotland and throughout the Hebrides and Northern Isles, with a more limited distribution restricted to concentrations in the major estuaries on the east coast such as Firth of Tay, Moray Firth, The Wash and the Thames. Major declines have been documented around Scotland since 2000. The distribution of harbour seals across the Project area varied significantly, with highest observed densities around Sealskerry Bay on Eday.

Around 38% of the world's grey seal population breed in the UK, of which 88% breed in colonies in Scotland, with the majority in the Hebrides and Orkney. While numbers of grey seal pups have increased steadily since the 1960s, there is evidence that this growth is levelling off particularly in Orkney and possibly some of the colonies in the North Sea (SCOS, 2021). Grey seals also vary significantly in their distribution across the test site, with numbers concentrated around Muckle Green Holm to the west of the Project area (Robbins, 2011).

One of the main sensitivities identified at the test site were harbour seals, which haul out and pup on rocks to the north of the Project area. In addition to the land-based visual observation programme described above, EMEC has also undertaken an integrated environmental monitoring project which included monitoring of marine mammals in the close vicinity of an operating tidal turbine in order to assess the close-range behaviour and the potential risk of harm to marine species due to potential collision with devices. In addition to the monitoring undertaken by EMEC at the Project area, developers have undertaken their own monitoring using a range of methods, which includes underwater video and drop-camera as well as using strain gauges to identify potential collision events. There is therefore extensive site-specific data to inform the EIA, which will be used together with information on the relevant species from further afield.

6.1.4 Otters

Eurasian otters are a European Protected Species (EPS), legally protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and under the Wildlife and Countryside Act 1981 (as amended). Eurasian otters are additionally protected within the UK through their inclusion as a priority species in the Biodiversity Action Plan (BAP) 1995 and as a Priority Marine Feature (PMF) in Scotland (Tyler-Walters *et al.*, 2016). Historically, Eurasian otter populations were severely

depleted within the UK primarily due to the use of pesticides and the pollution of waterways, however, populations are now recovering strongly with an estimated population of around 8,000 individuals in Scotland alone (NatureScot, 2022). Threats to otters include but are not limited to pesticide use; hunting; pollution; static gear fishing; drainage management, modification of hydrographic function, inland water courses, and water levels; and infilling of freshwater sources, such as ponds, pools, marshes or potential freshwater sources, such as pits, dykes, and ditches (JNCC, 2007). However, the biggest source of mortality (excluding natural causes) in Scotland is road accidents (NatureScot, 2022).

As semi-aquatic mammals, otters use both marine and freshwater habitats for foraging purposes, but terrestrial habitats for all other biological functions (DECC, 2016). Otters predominantly socialise, rest and shelter on land. Eurasian otters are thought to spend nearly two-thirds of the day at rest sites (Beja, 1996) indicating the importance of their terrestrial shelters (i.e., holts) to their biological functions (Nolet and Kruuk, 1989). Coastal otters are seen to have much smaller home ranges (i.e., up to approximately 5 km of coastline) than those of riverine otters (32 km for male and 20 km for female), likely due to the abundance of prey in coastal waters (Carrs, 1995; NatureScot, 2022). As well as this, unlike the riverine otters, coastal otters are active during the day. Coastlines which have ample peat-cover, rich seaweed communities and a freshwater supply constitute optimal coastal marine habitat for otters (DECC, 2016).

Orkney represents important habitat for the UK otter population, though the distribution of this species varies across the islands (DECC, 2016). EMEC wildlife observations collected at the Fall of Warness site over the period of April 2013 to March 2014 recorded a total of 16 otter sightings (EMEC wildlife sightings 2013 - 2014).

6.2 Identification of Sites and Features with Connectivity

6.2.1 Cetaceans

The Fall of Warness site does not overlap with or lie in close proximity to any SACs designated for cetacean species. The nearest SACs with cetacean qualifying features are:

- The Moray Firth SAC, over 120 km south, which is designated to protect the inshore bottlenose dolphin population in that area (this population belongs to a distinct ecotype of bottlenose dolphin which remain within or near a particular area); and
- The Inner Hebrides and the Minches SAC approximately 178 km away and the Skerries and Causeway SAC in Northern Ireland, nearly 481 km away, both designated for the protection of harbour porpoise.

The Inter-Agency Marine Mammal Working Group (IAMMWG, 2015) defined Management Units (MUs) for the seven most common cetacean species found in UK waters, with updated abundance information provided by IAMMWG (IAMMWG, 2022). The MUs are geographical areas in which animals of a particular species are found and management of human activities is applied. Information from these reports is used below to assess the likelihood of connectivity between the above protected sites and the Fall of Warness test site.

6.2.1.1 Bottlenose dolphin

The Moray Firth SAC lies within the Coastal East Scotland MU for bottlenose dolphin. The Fall of Warness site also lies within the same MU, and although this population is known to range widely from the bounds of the SAC, especially off the east Grampian, Angus, Fife and East Lothian coasts of eastern Scotland, Orkney is not thought to represent key habitat for bottlenose dolphins of the Coastal East Scotland population (i.e., there is no recognised connectivity between the Moray Firth SAC and the Project area). It is therefore likely that any bottlenose dolphin encountered in the Project area would be of the wide-ranging offshore ecotype. Consequently, there is not expected to be any connectivity between the Fall of Warness site and the Moray Firth SAC with respect to bottlenose dolphin.

6.2.1.2 Harbour porpoise

The closest SACs designated for the conservation of harbour porpoise are the Inner Hebrides and Minches SAC and Skerries and Causeway SAC. These SACs lie within the West Scotland MU for harbour porpoise, whereas the Fall of Warness site lies within the North Sea MU. There are numerous other SACs for harbour porpoise within the North Sea MU, however these sites all lie a greater distance from the Fall of Warness. Although IAMMWG (IAMMWG, 2021) acknowledges that the boundary between these two MUs to the north of the UK is somewhat arbitrary and there will be an interchange of animals between the two areas, given the distance of the Fall of Warness site from any harbour porpoise SAC and the very small spatial scale of any potential impacts from the Project, there is not expected to be significant connectivity with these sites.

The spatial parameters for the Annex II cetacean species: harbour porpoise and bottlenose dolphin, which have been used to determine the search area for European sites under Criterion 2 are outlined in Table 6-1.

Table 6-1 Summary of the European sites designated for cetaceans taken into consideration while assessing potential connectivity to the Project area

SITE NAME	COUNTRY	MANAGEMENT UNIT	MARINE MAMMAL QUALIFYING INTEREST/FEATURES	DISTANCE TO THE PROJECT AREA (KM)
Moray Firth SAC	United Kingdom	Coastal East Scotland	Bottlenose dolphin	122.6
Inner Hebrides and Minches SAC	United Kingdom	West Scotland	Harbour porpoise	177.8
Skerries and Causeway SAC	United Kingdom	West Scotland	Harbour porpoise	480.9
Southern North Sea	United Kingdom	North Sea	Harbour porpoise	458.3
Doggerbank	Germany	North Sea	Harbour porpoise	547.2
Doggersbank	Netherlands	North Sea	Harbour porpoise	545.2
Jyske Rev, Lillefiskerbanke	Denmark	North Sea	Harbour porpoise	603.9
Klaverbank	Netherlands	North Sea	Harbour porpoise	637.1
Sydlige Nordsø	Denmark	North Sea	Harbour porpoise	697.8

SITE NAME	COUNTRY	MANAGEMENT UNIT	MARINE MAMMAL QUALIFYING INTEREST/FEATURES	DISTANCE TO THE PROJECT AREA (KM)
Thyborøn Stenvolde	Denmark	North Sea	Harbour porpoise	678.3
Sylter Außenriff	Germany	North Sea	Harbour porpoise	722.7
Gule Rev	Denmark	North Sea	Harbour porpoise	660.2
Sandbanker ud for Thyborøn	Denmark	North Sea	Harbour porpoise	688.5
Sandbanker ud for Thorsminde	Denmark	North Sea	Harbour porpoise	710.2
SPA Östliche Deutsche Bucht	Germany	North Sea	Harbour porpoise	743.8
Agger Tange, Nissum Bredning, Skibsted Fjord og Agerø	Denmark	North Sea	Harbour porpoise	702.8
Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde	Denmark	North Sea	Harbour porpoise	761.0
Løgstør Bredning, Vejlerne og Bulbjerg	Denmark	North Sea	Harbour porpoise	722.7
Borkum-Riffgrund	Germany	North Sea	Harbour porpoise	788.4
NTP S-H Wattenmeer und angrenzende Küstengebiete	Germany	North Sea	Harbour porpoise	794.8
Store Rev	Denmark	North Sea	Harbour porpoise	714.8
Noordzeekustzone	Netherlands	North Sea	Harbour porpoise	801.5
Waddenzee	Netherlands	North Sea	Harbour porpoise	809.0
Lønstrup Rødgrund	Denmark	North Sea	Harbour porpoise	748.2
Nationalpark Niedersächsisches Wattenmeer	Germany	North Sea	Harbour porpoise	831.6
Knudegrund	Denmark	North Sea	Harbour porpoise	760.5
Helgoland mit Helgoländer Felssockel	Germany	North Sea	Harbour porpoise	848.0
Skagens Gren og Skagerak	Denmark	North Sea	Harbour porpoise	742.2
Steingrund	Germany	North Sea	Harbour porpoise	853.1
Unterems und Außenems	Germany	North Sea	Harbour porpoise	871.9
Hamburgisches Wattenmeer	Germany	North Sea	Harbour porpoise	886.3

SITE NAME	COUNTRY	MANAGEMENT UNIT	MARINE MAMMAL QUALIFYING INTEREST/FEATURES	DISTANCE TO THE PROJECT AREA (KM)
Unterelbe	Germany	North Sea	Harbour porpoise	915.3
Unterweser	Germany	North Sea	Harbour porpoise	919.4
Kosterfjorden-Väderöfjorden	Sweden	North Sea	Harbour porpoise	781.2
Voordelta	Netherlands	North Sea	Harbour porpoise	899.7
Vlaamse Banken	Belgium	North Sea	Harbour porpoise	908.7
Vlakte van de Raan	Netherlands	North Sea	Harbour porpoise	924.6
Vlakte van de Raan	Belgium	North Sea	Harbour porpoise	925.9
Westerschelde and Saeftinghe	Netherlands	North Sea	Harbour porpoise	933.4
SBZ 3 / ZPS 3	Belgium	North Sea	Harbour porpoise	939.8
SBZ 2 / ZPS 2	Belgium	North Sea	Harbour porpoise	935.5
Bancs des Flandres	France	North Sea	Harbour porpoise	922.2
SBZ 1 / ZPS 1	Belgium	North Sea	Harbour porpoise	943.5
Dunes de la plaine maritime flamande	France	North Sea	Harbour porpoise	952.4
Récifs Gris-Nez Blanc-Nez	France	North Sea	Harbour porpoise	946.6
Ridens et dunes hydrauliques du détroit du Pas-de-Calais	France	North Sea	Harbour porpoise	947.0
Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant	France	North Sea	Harbour porpoise	958.2
Baie de Canche et couloir des trois estuaires	France	North Sea	Harbour porpoise	989.4
Estuaires et littoral picards (baies de Somme et d'Authie)	France	North Sea	Harbour porpoise	1011.2
Littoral Cauchois	France	North Sea	Harbour porpoise	1043.6
Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	France	North Sea	Harbour porpoise	1046.6
Estuaire de la Seine	France	North Sea	Harbour porpoise	1091.1
Récifs et landes de la Hague	France	North Sea	Harbour porpoise	1044.5

SITE NAME	COUNTRY	MANAGEMENT UNIT	MARINE MAMMAL QUALIFYING INTEREST/FEATURES	DISTANCE TO THE PROJECT AREA (KM)
Baie de Seine occidentale	France	North Sea	Harbour porpoise	1064.4
Baie de Seine orientale	France	North Sea	Harbour porpoise	1088.5

6.2.2 Pinnipeds

Foraging ranges for Annex II pinniped species which were used to initially determine the search area for European sites are outlined in Table 6-2. Additionally, the North Coast and Orkney Seal Management Area which the Project lies within and designated haul-out sites within the vicinity of the Project area were also considered.

Table 6-2 Search area used to identify pinniped SACs with potential connectivity to the Project

SPECIES	JUSTIFICATION	SEARCH AREA (KM)[7]
Grey seal	Grey seals may forage more than 100 km from their haul-out sites, but foraging is generally concentrated closer to haul-out sites, especially during the breeding season (Carter *et al.,* 2020). SACs designated for grey seal within 20 km of the Project have been screened in.	20
Harbour seal	Harbour seals typically forage around 30 - 50 km from the coastline, with highest densities near haul out sites (Bailey *et al.,* 2014). SACs designated for harbour seal within 50 km of the Project have been screened in.	50

Although the Fall of Warness site does not sit within or directly adjacent to any existing designated SAC, there are three SACs within the North Coast and Orkney Seal Management Area (SMA):

- Sanday SAC, with harbour seal as a qualifying feature;
- Faray and Holm of Faray SAC, with grey seal as a qualifying feature; and
- North Rona SAC, with grey seal as a qualifying feature.

There are also a number of designated haul-out sites [8]within the immediate vicinity of the Project area. These include Seal Skerry for harbour seals, Muckle Green Holm and Little Green Holm for grey seal breeding colonies, the eastern coastline of Egilsay, Rusk Holm and off the point at War Ness for both species of seal.

[7] At sea distance

[8] Although protected, the haul-out sites are not designated under the same legislation for which this HRA Screening exercise is completed. The designated haul-out sites will be considered further within the EIA process.

6.2.2.1 Harbour seal

The largest breeding colony of harbour seals in Orkney is in Sanday, located approximately 11 km from the Fall of Warness site. The southern coast of Sanday is designated as an SAC for harbour seal. The EMEC test site is well within the foraging range of harbour seals from this breeding site, so it is likely that some of the seals from this SAC use the Fall of Warness site for foraging and/or transit. However, this distance, plus the presence of other (albeit smaller) harbour seal haul-outs in the vicinity of the Fall of Warness site and wider Orkney area, make it highly likely that a large proportion of the harbour seals present are not associated with the Sanday SAC. Also, there is good availability of quality foraging habitat near Sanday that makes it unlikely that the Fall of Warness site is particularly important for this population.

Harbour seals currently have an 'unfavourable declining' status; however, it is notable that this declining trend precedes any activity at the Fall of Warness site and reflects trends throughout the north and east of Scotland.

6.2.2.2 Grey seal

Faray and Holm of Faray SAC is located approximately 4 km to the north of the Fall of Warness site and is one of the most important breeding and haul out sites for grey seals in Orkney. The site supports the third largest breeding colony of grey seals in the UK (and the fourth in the world).

North Rona SAC, approx. 170 km west of the Fall of Warness site, historically supported the third-largest breeding colony in the UK, representing some 5% of annual UK pup production. Grey seals are found over much of the island and use many of the submerged sea caves that are found around the coast. As this SAC is designated to protect the breeding population of grey seals, and the distance between North Rona SAC and the Fall of Warness site is >20 km, it is unlikely that breeding grey seals from North Rona will occur at the Fall of Warness site. Therefore, this SAC has not been considered further in this assessment.

The EMEC test site is within the foraging range of grey seals from Faray and Holm of Faray, so it is likely that many of the seals from this SAC use the Fall of Warness site for foraging and/or transit. However, there are several other grey seal haul outs in the vicinity and in Orkney generally, including some with even greater proximity to the Fall of Warness site (e.g., Muckle Green Holm and Little Green Holm, and Seal Skerry). Consequently, it is highly likely that a large proportion of the grey seals present in the Fall of Warness site are not associated with the Faray and Holm of Faray SAC. The grey seal population at this SAC is currently considered to have a 'favourable maintained' status.

The spatial parameters for the Annex II pinniped species: harbour seal and grey seal, which have been used to determine the search area for European sites under Criterion 2 are outlined in Table 6-2.

Table 6-2 Summary of the European sites designated for seals taken into consideration while assessing potential connectivity to the Project area

SITE NAME	QUALIFYING INTEREST / FEATURES	DISTANCE TO PROJECT AREA (KM)
Sanday SAC	Harbour seal	11
Faray and Holm of Faray SAC	Grey seal	4
North Rona SAC	Grey seal	170

6.2.3 Eurasian otter

Otters form a qualifying feature (but not primary reason for site selection) of the Loch of Isbister SAC (straight-line distance: 26.4 km north-northeast – see Table 6-3), which offers freshwater habitat for this species. There are no other SACs designated for Eurasian otter in Orkney. As otters are unlikely to make long crossings of open water, SACs beyond Orkney have not been considered further.

Table 6-3 Summary of the European sites designated for Eurasian otter taken into consideration while assessing potential connectivity to the Project area

SITE NAME	QUALIFYING INTEREST / FEATURES	DISTANCE TO PROJECT AREA (KM)
Loch of Isbister SAC	Eurasian otter	26.4

6.2.4 Initial Screening Results

Based on the initial screening criteria a number of European sites designated for marine mammals have been screened in requiring further consideration. These are shown below in Table 6-4 and Figure 6-1. The list of European sites has followed advice mentioned in the Scottish Ministers Scoping Opinion.

The Project does not overlap with European sites that have been designated for marine mammals. Based on the pathways identified within the Scoping Report and mentioned in the Scottish Ministers Scoping Opinion, it is considered that evidence exists for potential connectivity between SACs that have been designated for marine mammals and the Project area. As such, these European sites are considered below.

Table 6-4 Summary of the European sites designated for marine mammals taken forward for determination of potential LSE

SITE NAME	COUNTRY	MARINE MAMMAL QUALIFYING INTEREST / FEATURES	DISTANCE TO THE PROJECT (KM)
Sanday SAC	United Kingdom	Harbour seal	11
Faray and Holm of Faray SAC	United Kingdom	Grey seal	4
Loch of Isbister SAC	United Kingdom	Eurasian otter	26.4

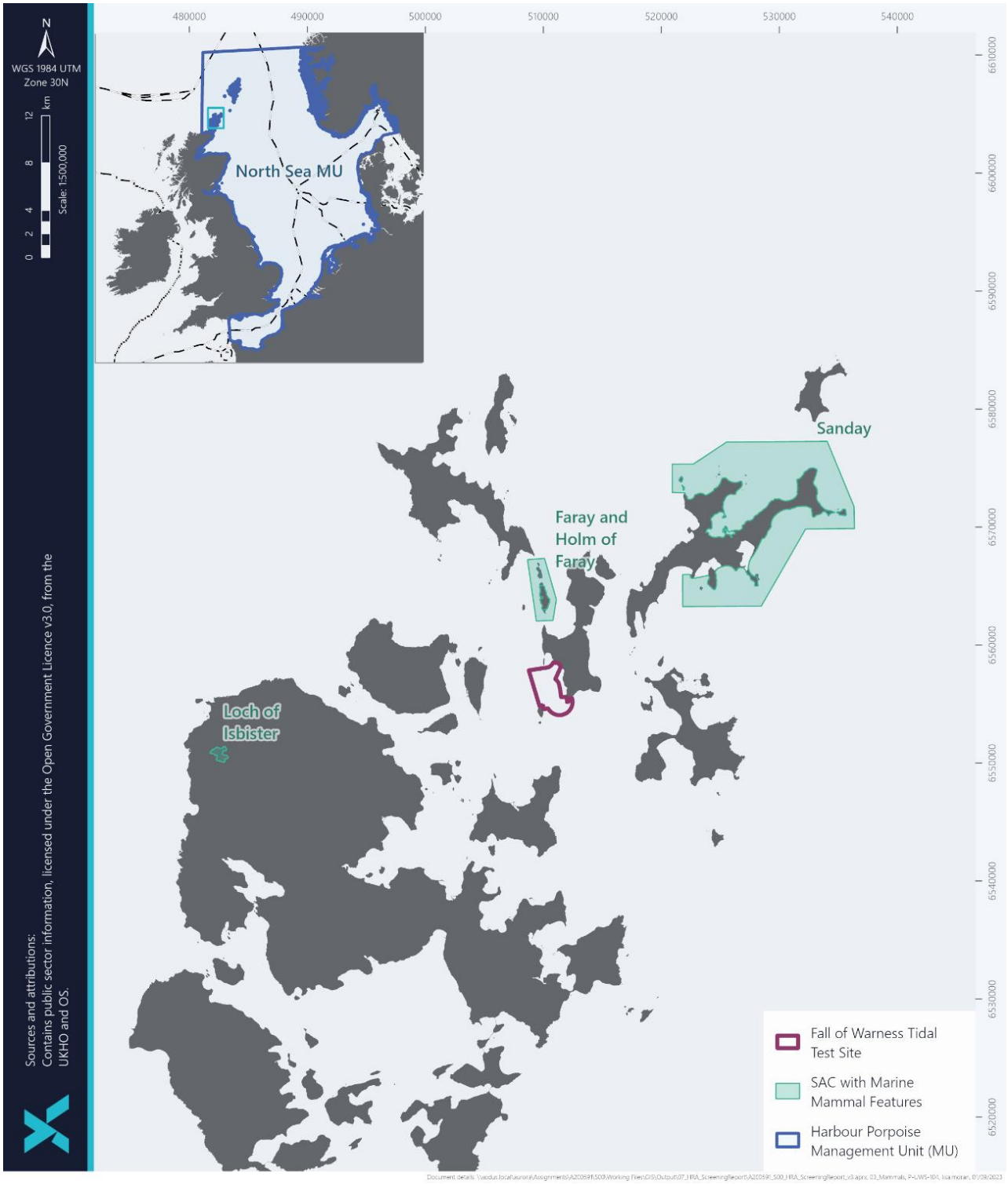


Figure 6-1 Location of SACs designated for marine mammal features with potential connectivity to the Project

6.3 Potential Pathways for LSE

The potential pathways to LSE that have been considered for marine mammals (cetaceans and pinnipeds are the following:

- Installation and Decommissioning
    - Installation vessel(s) transits and manoeuvring leading to disturbance;
    - Underwater noise from foundation/mooring installation methods and vessels leading to auditory injury, death or disturbance;
    - Increased suspended sediment/turbidity (including release of drill cuttings); and
    - Entanglement in lines, cabling or ghost net fishing gear leading to injury or death.
- Operation and Maintenance
    - Maintenance vessel transits and manoeuvring leading to disturbance;
    - Other maintenance activities (i.e., non vessel-based) leading to disturbance.
    - Underwater noise from turbine operation leading to disturbance;
    - Entanglement in lines or cabling leading to injury or death.
    - Changes to hydrodynamic sediment regime;
    - Collision with turbine blades leading to injury or death;
    - Entanglement in lines, cabling or ghost net fishing gear leading to injury or death; and
    - Presence of tidal device(s) and associated infrastructure leading to barrier effects.

For Eurasian otters, the potential pathways to LSE during Installation and Decommissioning are considered as:

- Habitat loss/damage;
- Vessel presence; and
- Underwater noise disturbance.

Given the restricted use by otters of the offshore parts of the Project area, operation and maintenance activities, which will occur largely in that area, are not assessed further here.

6.4 Determination of Potential LSE

The results of the assessment to determine potential LSE on SACs designated for marine mammal features are shown in Table 6-5. Justification for whether no potential LSE can be concluded is also provided.

Where no potential LSE is concluded, the site / pathway for LSE has been greyed out. When all potential pathways for LSE across all Project phases have been greyed out, then the European site has been greyed / screen out.

Table 6-5 Determination of potential LSE for European sites designated for marine mammals

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Harbour seal	Sanday SAC	Installation and Decommissioning	Installation vessel(s) transits and manoeuvring leading to disturbance.	Potential LSE concluded	Activity of vessels in close proximity to designated haul-out sites could lead to disturbance (haul-out sites are protected under the Protection of Seals (Designation of Haul-out Sites) (Scotland) Order 2014).
			Underwater noise from foundation/mooring installation methods and vessels leading to auditory injury, death or disturbance.	Potential LSE concluded	Importance will depend upon the range and frequency of noise sources (including background noise), duration and intensity of activity and the likelihood of seals in the area.
			Increased suspended sediment/turbidity (including release of drill cuttings).	No potential LSE concluded	Harbour seals are not thought to be particularly sensitive to increased suspended sediment. Tidal sites are typically dynamic locations where suspended material generated during installation / decommissioning will disperse quickly and widely.
			Entanglement in lines, cabling or ghost net fishing gear leading to injury or death.	No potential LSE concluded	It is unlikely that harbour seals will be exposed to this potential interaction during installation procedures as any cables or lines not under tension would be likely to be present for only very short duration. Thus, it is concluded that during the installation phase, there is no plausible mechanism for entanglement, either with cables, lines, or ghost fishing gear.
Harbour seal	Sanday SAC	Operation and Maintenance	Maintenance vessel transits and	Potential LSE concluded	Activity of vessels in close proximity to designated haul-out sites could lead to disturbance (haul-out sites are protected under the Protection of Seals (Designation of Haul-out Sites) (Scotland) Order 2014)

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
			manoeuvring leading to disturbance.		
			Other maintenance activities (i.e., non vessel-based) leading to disturbance.	No potential LSE concluded	Maintenance activities include inspection (e.g., divers/ROV), repairs or temporary retrieval or replacement of nacelles by winch. In all cases it is the presence of the accompanying vessel that presents the primary disturbance risk, which is appraised separately.
Harbour seal	Sanday SAC	Operation and Maintenance	Underwater noise from turbine operation leading to disturbance	Potential LSE concluded	Importance will depend upon the range and frequency of noise sources (including background noise), duration and intensity of activity and the likelihood of seals in the area.
			Entanglement in lines, cabling or ghost net fishing gear leading to injury or death.	Potential LSE concluded	Although direct evidence is not available, seals are intuitively of a size and mobility that greatly limits the potential for this interaction. However, the potential for ghost fishing gear to snag on subsea structures creates an additional plausible entanglement risk, and for this reason the risk to harbour seals has been screened in.
			Changes to hydrodynamic and sediment regime	Potential LSE concluded	The relationship between hydrodynamics conditions and the importance of area for seals is at present poorly understood, but it is possible that tidal front systems present disproportionately valuable foraging opportunities for some species. Consequently, a precautionary view is taken at present that extraction of tidal energy could have biological implications for seals.
			Collision with turbine blades leading to injury or death.	Potential LSE concluded	Potential for impact is poorly understood, but importance may depend upon turbine location & spacing, (including water depth), the physical and rotational characteristics of turbines, and the likelihood of seals passing through the risk window.

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Harbour seal	Sanday SAC	Operation and Maintenance	Presence of tidal device(s) and associated infrastructure leading to barrier effects.	Potential LSE concluded	Seals may utilise or move through sounds and firths that may also present opportunity for tidal development. The significance of any barrier effects caused by the installation of tidal turbines will depend upon the spatial occupancy of the channel by the turbines themselves (in three dimensions), the physical and rotational characteristics of the devices (e.g. clearance between rotor swept area and the sea surface) and the importance of the location for the passage of seals. Considering the location of the Fall of Warness site, any barrier effect would be limited to a short diversion around the Project area, if it was perceived as a block. However, as the behaviour of harbour seals in relation to tidal arrays has not been investigated in much detail, the precautionary view is taken at present and the risk of possible barrier effects on seals has been screened in.
Grey seal	Faray and Holm of Faray SAC	Installation and Decommissioning	Installation vessel(s) transits and manoeuvring leading to disturbance.	Potential LSE concluded	Activity of vessels in close proximity to designated haul-out sites could lead to disturbance (haul-out sites are protected under the Protection of Seals (Designation of Haul-out Sites) (Scotland) Order 2014).
			Underwater noise from foundation/mooring installation methods and vessels leading to auditory injury, death or disturbance.	Potential LSE concluded	Importance will depend upon the range and frequency of noise sources (including background noise), duration and intensity of activity and the likelihood of seals in the area.
			Increased suspended sediment/turbidity	No potential LSE concluded	Grey seals are not thought to be particularly sensitive to increased suspended sediment. Tidal sites are typically dynamic locations where suspended material will disperse quickly and widely.

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
			(including release of drill cuttings).		
			Entanglement in lines, cabling or ghost net fishing gear leading to injury or death.	No potential LSE concluded	It is unlikely that grey seals will be exposed to this potential interaction during installation procedures as any cables or lines not under tension would be likely to be present for only very short duration. Thus, it is concluded that during the installation phase, there is no plausible mechanism for entanglement, either with cables, lines, or ghost fishing gear.
Grey seal	Faray and Holm of Faray SAC	Operation and Maintenance	Maintenance vessel transits and manoeuvring leading to disturbance.	Potential LSE concluded	Activity of vessels in close proximity to designated haul-out sites could lead to disturbance (haul-out sites are protected under the Protection of Seals (Designation of Haul-out Sites) (Scotland) Order 2014)
			Other maintenance activities (i.e., non vessel-based) leading to disturbance.	No potential LSE concluded	Maintenance activities include inspection (e.g., divers/ROV), repairs or temporary retrieval or replacement of nacelles by winch. In all cases it is the presence of the accompanying vessel that presents the primary disturbance risk, which is appraised separately.
			Underwater noise from turbine operation leading to disturbance	Potential LSE concluded	Importance will depend upon the range and frequency of noise sources (including background noise), duration and intensity of activity and the likelihood of seals in the area.
			Entanglement in lines, cabling or ghost net fishing gear leading to injury or death.	Potential LSE concluded	Although direct evidence is not available, seals are intuitively of a size and mobility that greatly limits the potential for this interaction. However, the potential for ghost fishing gear to snag on subsea structures creates an additional plausible entanglement risk, and for this reason the risk to grey seals has been screened in.

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Grey seal	Faray and Holm of Faray SAC	Operation and Maintenance	Changes to hydrodynamic and sediment regime	Potential LSE concluded	The relationship between hydrodynamics conditions and the importance of area for seals is at present poorly understood, but it is possible that tidal front systems present disproportionately valuable foraging opportunities for some species. Consequently, a precautionary view is taken at present that extraction of tidal energy could have biological implications for seals.
			Collision with turbine blades leading to injury or death.	Potential LSE concluded	Potential for impact is poorly understood, but importance may depend upon turbine location & spacing, (including water depth), the physical and rotational characteristics of turbines, and the likelihood of seals passing through the risk window.
			Presence of tidal device(s) and associated infrastructure leading to barrier effects.	Potential LSE concluded	Seals may utilise or move through sounds and firths that may also present opportunity for tidal development. The significance of any barrier effects caused by the installation of tidal turbines will depend upon the spatial occupancy of the channel by the turbines themselves (in three dimensions), the physical and rotational characteristics of the devices (e.g. clearance between rotor swept area and the sea surface) and the importance of the location for the passage of seals. Considering the location of the Fall of Warness site, any barrier effect would be limited to a short diversion around the Project area, if it was perceived as a block. However, as the behaviour of grey seals in relation to tidal arrays has not been investigated in much detail, the precautionary view is taken at present and the risk of possible barrier effects on seals has been screened in.
Eurasian otter	Loch of Isbister SAC	Installation and Decommissioning	Habitat loss/damage	No potential LSE concluded	Damage to or loss of subtidal foraging habitat by device foundation or cable/infrastructure installation and deployment is unlikely to result in a significant loss of important marine habitat for a predominantly terrestrial species, as the Project envelope is located more than 20 km away from the SAC. Moreover, installation activities may take place out with the range of marine habitat use for Eurasian otters, which predominantly forage for short periods adjacent coastlines (Nolet and Kruuk, 1989). Moreover,

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
					vessels employed for installation activities within the Project Envelope are unlikely to utilise the shallow water habitat targeted by this species, due to limitations from the draft of the vessel. As such, no loss or damage to marine habitats are anticipated from activities taking place at the Fall of Warness site. There may be potential for highly spatially and temporally limited exclusion from onshore habitats in the events landfalls are required for any new cable routes.
Eurasian otter	Loch of Isbister SAC	Installation and Decommissioning	Vessel presence	No potential LSE concluded	Otters may be sensitive to vessel presence and associated activities taking place in the nearshore environment. Importance will depend upon the duration and intensity of vessel activity, the location in which it takes place (including distance from shore), habitat use by otters in the area, and the opportunity for those animals to avoid areas of disturbance. The area surrounding the Fall of Warness site is not used to a great extent by otters and therefore are unlikely to be disturbed by vessel presence.
Eurasian otter	Loch of Isbister SAC	Installation and Decommissioning	Underwater noise disturbance	No potential LSE concluded	Hearing sensitivity in this species is greatly reduced compared to marine mammals (e.g., dolphins, whales and seals). Non-percussive foundation drilling or non-percussive pile-driving operations have the potential to produce low-frequency continuous underwater sounds which range between 0.01 Hz – 100 Hz (Kvaerner Cementation Foundations, Ltd., 2002; Rice, 1983). Whilst in-water hearing by Eurasian otters is not yet fully understood, studies on the hearing ability of another semi-aquatic carnivore, the sea otter (Enhydra lutris), have shown that hearing levels peak at high frequencies around 8 kHz (NMFS, 2018; Ghoul and Reichmuth, 2014; Au et al., 2000). Evidence also suggests that sea otters, which are likely to have adapted better in-water hearing than Eurasian otters which spend 4.5 times more time on land (Nolet and Kruuk, 1989), are poorly equipped at separating acoustic signals from background noise if frequencies are below 2 kHz (Ghoul and Reichmuth, 2014). As

MARINE MAMMAL QUALIFYING INTEREST / FEATURE	SITE NAME	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
					foundation and mooring installation will emit sound at low frequencies which are likely be inaudible to Eurasian otters, and which will take place more than 20 km away from the boundaries of this SAC, beyond the range of marine habitat use for this species, it is unlikely that installation activities will cause a disturbance to otters.

7 European Sites Designated for Ornithological Features

7.1 Initial Screening Criteria

The initial screening criteria used to identify relevant European sites in relation to the Project is described below:

- European sites that overlap with the Project and are designated for bird features (this includes direct overlap between the Project boundary and SPAs and Ramsar sites);
- The foraging ranges of ornithological qualifying features, as set out in Table 7-1, define the search radius for European sites, based on the species which occur within the Project area. The identified European sites are presented as a long list of potential connectivity in Table 7-2; and
- Consideration is also given to designated sites with bird qualifying features that have migratory ranges that may overlap with the Project.

7.2 Identification of Sites and Features with Connectivity

7.2.1 Ornithology Features with Potential Connectivity

A variety of bird species are likely to occur within the Project boundary and surrounding areas. These species have been grouped into categories to assist with the high level screening process. The categories have been established from a variety of factors including breeding biology, feeding, habitat use and migratory pathways. The categories are:

- Breeding seabirds;
- Non-breeding seabirds; and
- Terrestrial birds (which includes waterfowl).

7.2.1.1 Breeding seabirds

During the breeding season foraging birds may travel some distance from their breeding colonies. Available information on the foraging distances of breeding birds will vary dependant on the species. Thaxter *et al.,* (2012) provides foraging ranges of a number of species, many of the species foraging ranges been updated from the most recent data (Woodward *et al.,* 2019). The most recent study also provides the mean maximum distance travelled for certain studies. For purposes of screening, for most of the species the foraging range used is the mean maximum distance plus one standard deviation (MMFR + 1SD) as presented in Woodward *et al.* (2019), inline with NatureScot advice set out in the EMEC Fall of Warness Scoping Opinion (MS-LOT, 2022). Based on the consultee comments (MS-LOT, 2022), the long list of European sites designated for breeding seabirds based on the foraging ranges of species that occur within the Project area (Table 7-1), is set out in Table 7-2 (Section 7.2.1.4).

Additionally, NatureScot provided specific advice for the HRA screening of the Pentland Floating Offshore Wind Farm Development (PFOWF) (NatureScot, 2022) with regards to gannet, razorbill and guillemot. Given the relatively close proximity of the PFOWF to the Project (approximately 80

km to the southwest), it is considered that this advice is also relevant to the Project and is therefore implemented. The NatureScot (2022) advice for PFOWF is as follows:

- For gannet, NatureScot advise consideration of site-specific maximum foraging ranges for Forth Islands SPA (590 km), St Kilda SPA (709 km) and Grassholm SPA (517 km); and
- For guillemot and razorbill, NatureScot advise use of MMFR + 1SD, including data from Fair Isle, for all Northern Isles designated sites. For all designated sites south of the Pentland Firth (including North Caithness Cliffs SPA), they advised use of MMFR + 1SD discounting Fair Isle values.

Table 7-1 Mean maximum breeding season foraging ranges for qualifying seabird species

SP. CODE	SPECIES	DISTANCES USED FOR HRA SCREENING (KM)[9]	FORAGING RANGE METRIC[10]
AC	Arctic skua[11]	100	Data deficient
AE	Arctic tern	40.5	MMFR + 1SD
E.	Common eider	22.5	Maximum
CA	Cormorant	33.9	MMFR + 1SD
SA	European shag	23.7	MMFR + 1SD
TM	European storm petrel	336.0	Maximum
F.	Fulmar	1200.2	MMFR + 1SD
GX	Gannet	509.4	MMFR + 1SD
GB	Great black-backed gull	73.0	Maximum
NX	Great skua	931.2	MMFR + 1SD
GU	Guillemot, north of Pentland Firth	153.7	MMFR + 1SD
GU	Guillemot, south of Pentland Firth	95.2	MMFR + 1SD
HG	Herring gull	85.6	MMFR + 1SD
KI	Kittiwake	300.6	MMFR + 1SD
PU	Puffin	265.4	MMFR + 1SD
RA	Razorbill, north of Pentland Firth	164.6	MMFR + 1SD
RA	Razorbill, south of Pentland Firth	122.2	MMFR + 1SD
RH	Red-throated diver	9.0	Maximum
E.	Common eider	22.5	Maximum
CA	Cormorant	33.9	MMFR + 1SD

[9] For species other than gulls, the distance used for screening is based on the shortest sea route, in recognition that these species are not likely to choose foraging routes that pass over the land.

[10] Based on Woodward *et al*., (2019).

[11] In the absence of information on the foraging metrics of Arctic skua, it is assumed that this species forages up to 100 km from breeding sites, a figure slightly greater than the MMFR + 1SD value for herring and great black-backed gull, but below the value for great skua.

SP. CODE	SPECIES	DISTANCES USED FOR HRA SCREENING (KM)[9]	FORAGING RANGE METRIC[10]
SA	European shag	23.7	MMFR + 1SD
TM	European storm petrel	336.0	Maximum
MX	Manx shearwater	Not included - the species does not regularly occur at the Project area	
TL	Leache's petrel	Not included - this species does not occur at the Project area	
TY	Black guillemot	Not included as no SPAs for this species	

7.2.1.2 Non-breeding seabirds

Seabirds species are highly mobile and widely dispersed during the non-breeding seasons and effects on SPA populations may still be noticeable during these periods. Species are not constrained by the breeding locations and it is not possible to make a general assumption that there will be no potential LSE on all species within an SPA area. It can be predicted that lower densities of the species will be present during this period and lower apportioning values would be more appropriate to use. A long list of European sites designated for non-breeding seabirds is determined based on the foraging ranges of species that occur within the Project area is set out in Table 7-2 (Section 7.2.1.4).

7.2.1.3 Terrestrial birds (which includes waterfowl)

The movement of migratory waders, wildfowl, raptors and passerines is characterised by long distance flights, which occur as a series of flights between discrete staging areas. Migrations typically occur across broad fronts at high altitudes when flying long distances, but when birds such as waders and wildfowl encounter unfavourable weather, are in sight of land or are flying relatively short distances, it is likely that they will descend to lower heights following landscape features such as coastlines until they reach suitable staging areas. A long list of European sites designated for non-breeding seabirds is determined based on the foraging ranges of species that occur within the Project area is set out in Table 7-2 (Section 7.2.1.4).

7.2.1.4 Long List of European Sites Designated for Ornithological Features with Potential Connectivity to the Project

As introduced in Section 7.2.1.1, consultee comments provided in the EMEC Fall of Warness Scoping Opinion (MS-LOT, 2022) necessitated that a long list of European sites with designated ornithological features with potential connectivity with the Project based on foraging ranges is considered. Consultees also stated that the foraging range distance to apply in determining the potential connectivity long list should be the mean maximum plus one standard deviation as set out in Woodward *et. al.* (2019). Therefore, this metric is applied in determining the relevant long list of designated sites as present in Table 7-2 (Section 7.2.1.4).

Table 7-2 Long list of European sites designated for ornithological features with potential connectivity to the Project based on foraging ranges

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
Scotland				
North Orkney (Marine SPA) (1)	European shag, non-breeding	0.7	Yes	In
	Great northern diver, non-breeding		Yes	In
	Red-throated diver, breeding (marine foraging grounds)		Yes	In
	Slavonian grebe, non-breeding		Yes	In
	Velvet scoter, non-breeding		Yes	In
Rousay (2)	Arctic skua, breeding	5	Yes	In
	Arctic tern, breeding		Yes	In
	Fulmar, breeding		Yes	In
	Common guillemot, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Calf of Eday (3)	Cormorant, breeding	12	Yes	In
	Fulmar, breeding		Yes	In
	Great black-backed gull, breeding		Yes	In
	Common guillemot, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
West Westray (4)	Arctic skua, breeding	14	Yes	In
	Arctic tern, breeding		Yes	In
	Fulmar, breeding		Yes	In
	Common guillemot, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Razorbill, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Orkney Mainland Moors (5)	Red-throated diver, breeding	16	Yes (vessel transit route)	In
	Hen harrier, breeding and non-breeding		No, terrestrial species	Out
	Short-eared owl, breeding		No, terrestrial species	Out

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
Auskerry (6)	Arctic tern, breeding	16	Yes	In
	European storm petrel, breeding		Yes	In
Papa Westray (North Hill and Holm) (7)	Arctic skua, breeding	21	Yes	In
	Arctic tern, breeding		Yes	In
Copinsay (8)	Fulmar, breeding	26	Yes	In
	Great black-backed gull, breeding		Yes	In
	Common guillemot, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Marwick Head (9)	Common guillemot, breeding	35	Yes	In
	Kittiwake, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Hoy (10)	Arctic skua, breeding	58	Yes	In
	Fulmar, breeding		Yes	In
	Great black-backed gull, breeding		Yes	In
	Common guillemot, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Great skua, breeding		Yes	In
	Puffin, breeding		Yes	In
East Caithness Cliffs (11)	Seabird Assemblage, breeding	60	Yes	In
	Fulmar, breeding		Yes	In
	Great black-backed gull, breeding		Yes	In
	Common guillemot, breeding		Yes	In
	Herring gull, breeding		No	Out
	Kittiwake, breeding		Yes	In
	Razorbill, breeding		Yes	In
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Fair Isle (12)	Arctic skua, breeding	79	Yes	In
	Fulmar, breeding		Yes	In
	Common guillemot, breeding		Yes	In

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
	Gannet, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Great skua, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		Yes	In
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
North Caithness Cliffs (11)	Fulmar, breeding	85	Yes	In
	Common guillemot, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Sule Skerry and Sule Stack (14)	Common guillemot, breeding	90	Yes	In
	Gannet, breeding		Yes	In
	Puffin, breeding		Yes	In
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
	European storm petrel, breeding		Yes	In
Foula (13)	Fulmar, breeding	115	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		Yes	In
	Great skua, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Sumburgh Head (15)	Fulmar, breeding	119	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Cape Wrath (16)	Fulmar, breeding	136	Yes	In
	Common guillemot, breeding		No	Out

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
	Kittiwake, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Mousa (17)	European storm petrel, breeding	138	Yes	In
Noss (18)	Fulmar, breeding	156	Yes	In
	Common guillemot, breeding		No	Out
	Gannet, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Great skua, breeding		Yes	In
	Puffin, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Troup, Penan and Lion's Heads (20)	Fulmar, breeding	162	Yes	In
	Common guillemot, breeding		No	Out
	Gannet, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Razorbill, breeding		No	Out
	Herring gull, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
North Rona and Sula Sgeir (22)	Fulmar, breeding	170	Yes	In
	Common guillemot, breeding		No	Out
	Gannet, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
	European storm petrel, breeding		Yes	In
Ronas Hill - North Roe and Tingon (21)	Great skua, breeding	171	Yes	In
Handa (19)	Fulmar, breeding	174	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		Yes	In

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
	Great skua, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Buchan Ness to Collieston Coast (24)	Fulmar, breeding	193	Yes	In
	Common guillemot, breeding		No	Out
	Herring gull, breeding		No	Out
	Kittiwake, breeding		Yes	In
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Fetlar (23)	Fulmar, breeding	206	Yes	In
	Great skua, breeding		Yes	In
	Seabird Assemblage, breeding		Yes	In
Flannan Isles (29)	Fulmar, breeding	206	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Hermaness, Saxa Vord and Valla Field (25)	Fulmar, breeding	214	Yes	In
	Common guillemot, breeding		No	Out
	Gannet, breeding		Yes	In
	Kittiwake, breeding		Yes	In
	Great skua, breeding		Yes	In
	Puffin, breeding		No	Out
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Shiant Isles (27)	Fulmar, breeding	225	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	European shag, breeding		No	Out

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
	Seabird Assemblage, breeding		Yes	In
Priest Island (Summer Isles) (26)	European storm petrel, breeding	227	Yes	In
Fowlsheugh (28)	Fulmar, breeding	260	Yes	In
	Common guillemot, breeding		No	Out
	Herring gull, breeding		No	Out
	Kittiwake, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Forth Islands (31)	Common guillemot, breeding	361	No	Out
	Gannet, breeding		Yes	In
	Herring gull, breeding		No	Out
	Kittiwake, breeding		No	Out
	Puffin, breeding		No	Out
	Razorbill, breeding		No	Out
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
St Kilda (32)	Fulmar, breeding	364	Yes	In
	Common guillemot, breeding		No	Out
	Gannet, breeding		Yes	In
	Great skua, breeding		Yes	In
	Puffin, breeding		Yes	In
	Razorbill, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
	European storm petrel, breeding		No	Out
St Abb's Head to Fast Castle	Guillemot, breeding	368	No	Out
	Herring gull, breeding		No	Out
	Kittiwake, breeding		No	Out
	Razorbill, breeding		No	Out
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		No	Out
Canna and Sanday	Common guillemot, breeding	373	No	Out

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
	Herring gull, breeding		No	Out
	Kittiwake, breeding		No	Out
	Puffin, breeding		No	Out
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		No	Out
Rum (30)	Common guillemot, breeding	373	No	Out
	Kittiwake, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Trechnish Isles	European storm petrel, breeding	402	No	Out
Mingulay and Berneray (33)	Fulmar, breeding	406	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		No	Out
	Puffin, breeding		No	Out
	Razorbill, breeding		No	Out
	European shag, breeding		No	Out
	Seabird Assemblage, breeding		Yes	In
Rathlin Island (34)	Fulmar, breeding	558	Yes	In
	Common guillemot, breeding		No	Out
	Kittiwake, breeding		No	Out
	Razorbill, breeding		No	Out
Ailsa Craig	Common guillemot, breeding	630	No	Out
	Gannet, breeding		No	Out
	Herring gull, breeding		No	Out
	Kittiwake, breeding		No	Out
	Seabird Assemblage, breeding		No	Out
Republic Of Ireland				
Tory Island (36)	Fulmar, breeding	574	Yes	In
West Donegal Coast (37)	Fulmar, breeding	634	Yes	In
Duvillaun Islands (39)	Fulmar, breeding	754	Yes	In
Clare Island (40)	Fulmar, breeding	786	Yes	In

SITE NAME (ID IN FIGURE 7-1)	ORNITHOLOGY QUALIFYING INTEREST/FEATURES	AT-SEA DISTANCE TO THE PROJECT (KM)	POTENTIAL CONNECTIVITY WITH THE PROJECT	SCREENED IN OR OUT
High Island, Inishshark and Davillaun (41)	Fulmar, breeding	810	Yes	In
Horn Head to Fanad Head (35)	Fulmar, breeding	810	Yes	In
Lambay Island (38)	Fulmar, breeding	824	Yes	In
Cliffs of Moher (42)	Fulmar, breeding	905	Yes	In
Kerry Head (44)	Fulmar, breeding	943	Yes	In
Dingle Peninsula (45)	Fulmar, breeding	956	Yes	In
Blasket Islands (47)	Fulmar, breeding	974	Yes	In
Saltee Islands (43)	Fulmar, breeding	992	Yes	In
Iveragh Peninsula (46)	Fulmar, breeding	1008	Yes	In
Puffin Island (48)	Fulmar, breeding	1014	Yes	In
Skelligs (51)	Fulmar, breeding	1016	Yes	In
Deenish Island and Scariff Island (50)	Fulmar, breeding	1031	Yes	In
Beara Peninsula (49)	Fulmar, breeding	1045	Yes	In

7.2.2 Initial Screening Results

Based on the criteria set out in Section 7.1, the SPAs and Ramsar sites where potential connectivity with the Project may occur is shown in Figure 7-1 as introduced in Table 7-2. Sites determined to have connectivity with the Project will be further assessed to determine potential LSE. Furthermore, the sensitivity of species to tidal projects have also been considered further using Furness *et al.* (2012). The key offshore species present in the area which have an increased sensitivity to tidal turbines includes;

- European shag (*Phalacrocorax Aristotelis*);
- Great cormorant (*Phalacrocorax carbo*);

- Common guillemot (*Uria aalge*);
- Razorbill (*Alca torda*);
- Black guillemot (*Cepphus grylle*);
- Atlantic puffin (*Fratercula arctica*); and
- Red-throated diver (*Gavia stellata*).

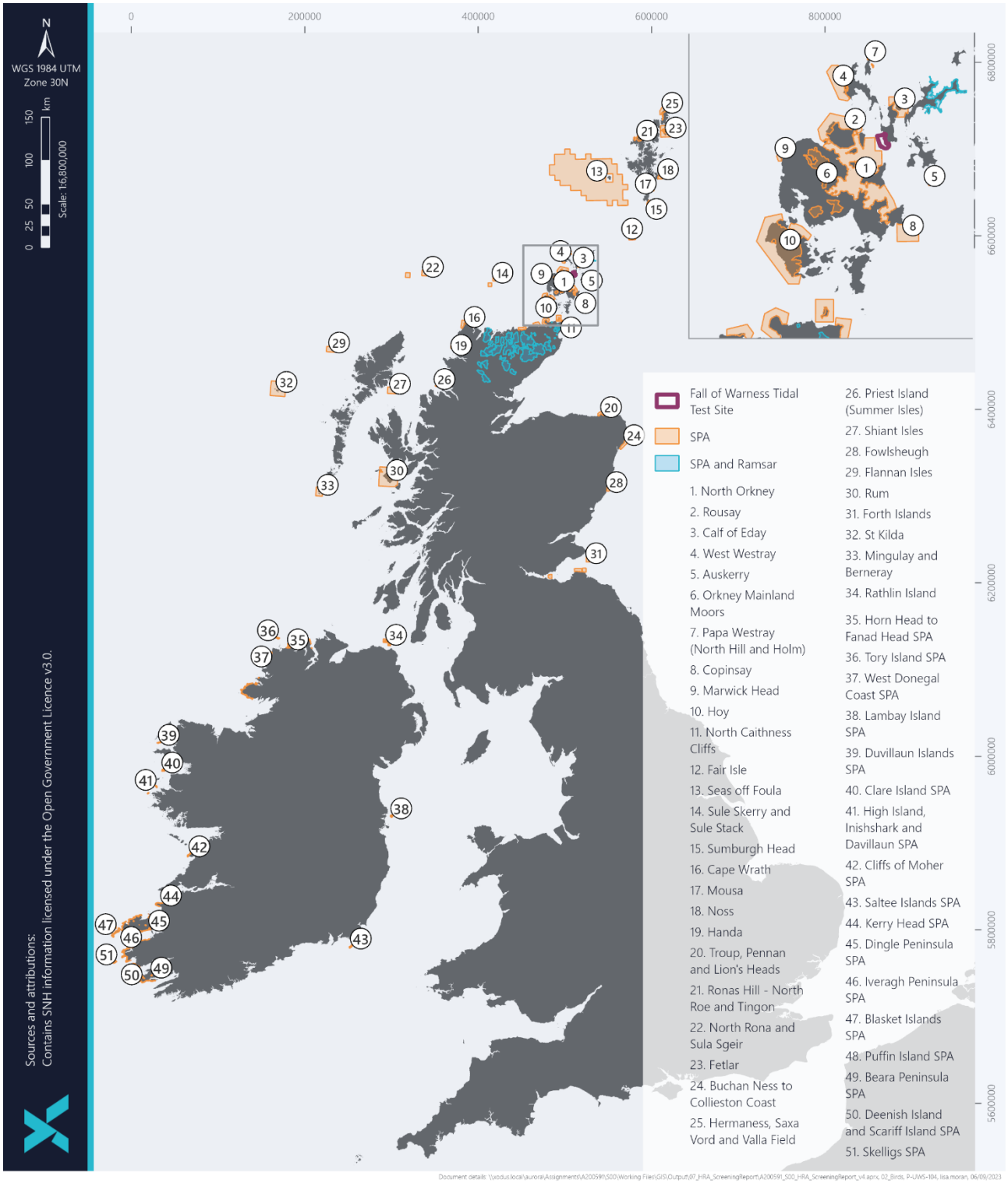


Figure 7-1 Location of SPAs and Ramsar sites designated for qualifying features with potential connectivity with the Project

7.3 Potential Pathways for LSE

A number of potential pathways for LSE on qualifying features of SPAs, and Ramsar sites with potential connectivity with the Project have been identified. The potential LSE pathways share some commonalities with windfarms, however, due the nature of tidal turbines some of the potential pathways for LSE will be varied. The potential pathways which have been identified to have a LSE from the installation, operation and maintenance, and decommissioning stages of the Project includes:

- Installation and decommissioning:
    - Disturbance; and
    - Bright lighting.
- Operation and maintenance
    - Disturbance;
    - Collision with tidal devices;
    - Bright lighting; and
    - Displacement.

7.3.1 Installation and Decommissioning: Disturbance

During the installation and decommissioning phase there is a potential for disturbance to bird species which use the marine and intertidal habitats. Disturbance impacts arise from visual disturbances, noise, vessel lighting and movement. It is predicted for these potential impacts to be highly localised and temporary.

Bird species with a higher sensitivity to underwater noise includes diving species which forage for fish and shellfish such as auks, divers (e.g., red-throated diver), cormorant, guillemot and seaduck species. In particular, these species are considered to have moderate vulnerability to visual and noise disturbance from vessels and other project activities (Furness *et al.,* 2012). Disturbance of these species has potential to cause displacement from marine habitat and effect birds' time and energy budgets. Common guillemot and razorbill with attendant dependent young (June - August) have additional vulnerability due to the responsibility of caring for their young.

Gull and tern species have been recorded to shown no obvious responses to piling activity (Leopold and Camphuysen, 2007) and are considered low risk for any potential noise impacts from the Project.

Designated sites which have waterfowl and waders as qualifying features and lie outside of the Project boundary are not considered to be vulnerable to disturbance and / or disturbance during installation and decommissioning phases.

7.3.2 Installation and Decommissioning: Bright Lighting

Nocturnal petrel species and wintering seaduck species are vulnerable to disorientation due to high intensity work lights on project vessels, leading to increased risk of collision with vessels and surface-piercing infrastructure and increased predation risk, especially during conditions of low visibility.

Fledgling storm petrels from breeding colonies within 10 km of light sources are at particular risk. There are at least two small colonies within 10 km of Project area.

7.3.3 Operation and Maintenance: Disturbance

The presence of tidal turbines may result in disturbance to birds. The sensitivity of species varies and studies have highlighted that displacement is only likely to occur in the operating area of the tidal turbines or from the maintenance vessels (McCluskie *et al.,* 2012). It is predicted for these potential impacts to be highly localised and temporary. Therefore, only designated sites which overlap with the project boundary will be considered for potential disturbance and / or displacement during the operations and maintenance phase in the determination for potential LSE assessment.

7.3.4 Operation and Maintenance: Collision risk

During the operational period the tidal device will have different collision risks than a windfarm. There is a potential risk of collision with the tidal turbine rotors and associated infrastructure which may result in injury or fatality to birds within the Project area. These risks will be associated with diving birds during feeding behaviours. This is particularly the case for diving species which forage deeper than 5 m below the sea surface, i.e., auk, diver, cormorant and seaduck species, and gannet, where Furness *et al.,* 2012 indicates these species have potential vulnerability to collision with tidal stream devices.

Collision risk is sensitive to device operating depth and seabed depth, and the amount of time a bird spends at depth. Common guillemot has particularly high vulnerability. Shag, black guillemot and eider, have high vulnerability where seabed depth is <30 m. The risk of collision with tidal turbines is influenced by a variety of factors such as, avoidance rate, turbine location and size. It is noted that more information specific to bird tidal turbines avoidance rates is required but highlight similarities to collision risk modelling in wind turbines (Wilson *et al.,* 2006; Cook *et al.,* 2018).

Only designated sites which have diving bird species and either overlap or have migratory pathways and have been taken forward for determination of potential for LSE.

7.3.5 Operation and Maintenance: Bright Lighting

Bright lighting during the operation and maintenance phase may result in and effects from Project activities. Nocturnal petrel species and wintering seaduck species are vulnerable to disorientation due to high intensity work lights on project vessels, leading to increased risk of collision with vessels and surface-piercing infrastructure and increased predation risk, especially during conditions of low visibility. Fledgling storm petrels from breeding colonies within 10 km of light sources are at particular risk. There are at least two small colonies within 10 km of Project area.

Designated sites which have waterfowl and waders as qualifying features and lie outside of the Project boundary are not considered to be vulnerable to bright lighting during the operation and maintenance phase.

7.3.6 Operation and Maintenance: Displacement

This effect pathway primarily relates to diver and auk species, whereby these species may avoid tidal devices by up to a few hundred metres from the vicinity of surface-piercing marine fixed-structures, leading to displacement and effectively depriving them of marine habitat. No other species are considered to be vulnerable to this effect pathway.

7.4 Determination of Potential LSE

The results of the assessment to determine the potential for LSE of the Project on SPAs and Ramsar sites designated for ornithological features are presented in Table 7-3. Justification for the conclusions for potential LSE is provided. The criteria for concluding potential LSE (or LSE that cannot be ruled out) is as follows:

- Individuals of the qualifying species from the SPA under consideration potentially have connectivity to the Project area as identified in Table 7-2;
- The species regularly utilises the Project area or anticipated local vessel transit routes (i.e., routes through North Orkney marine SPA); and
- The species has either High or Moderate vulnerability to the one or more of the various potential effects of tidal projects (as outlined in Furness *et al*, 2012).

The impact pathways during the Project phases are as introduced in Section 7.3, noting that the disturbance and bright lighting which occur during the installation and decommissioning phase are also present during the operation and maintenance phase. The pathways are therefore considered irrespective of the Project phase in Table 7-3.

Each possible site where the conclusion of a potential LSE cannot be ruled out is discussed and appraised to determine whether:

- There is no potential LSE upon the SPA and Ramsar Site or qualifying feature (and so screening out of any future RIAA can take place). In this instance the particular site / pathway has been greyed out; or
- It is likely that no potential LSE cannot be concluded and hence further consideration within a RIAA is required to assess affects upon the integrity of the SPA and Ramsar site.

Table 7-3 Determination of potential LSE for SPAs designated for ornithological features

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
SCOTLAND AND UNITED KINGDOM					
North Orkney SPA (SPA is 0.7 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Great northern diver, non-breeding; • Slavonian grebe, non-breeding; • Red-throated diver, breeding; • European shag, non-breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	Potential LSE cannot be ruled out.	The close proximity of this SPA to the Project (0.7 km) and the potential connectively and the vulnerability of designated species within this SPA, means potential for LSE cannot be ruled out for all project phases and species.
Rousay SPA (SPA is 5 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Arctic skua, breeding; • Arctic tern, breeding; • Breeding bird assemblage; • Fulmar, breeding • Guillemot, breeding; • Kittiwake, breeding; and • Seabird colony, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for Arctic skua, fulmar and kittiwake.	Artic skua, fulmar and kittiwake have no vulnerability to collision and low vulnerability to disturbance. There is therefore no potential for disturbance to these species.
				Potential LSE cannot be ruled out for Arctic tern and guillemot, and breeding seabird assemblage.	There is potential for disturbance to breeding Arctic tern and guillemot from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by Project vessels. There is a potential collision risk for breeding guillemot.
Calf of Eday SPA	• Great cormorant, breeding;	• Installation and decommissioning; and	• Disturbance (all Project phases);	No potential for LSE concluded for fulmar,	Fulmar, great black-backed gull and kittiwake have low vulnerability to disturbance and no vulnerability to collision.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
(SPA is 14 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Great black-backed gull, breeding; • Kittiwake breeding; • Fulmar, breeding; • Guillemot, breeding; and • Seabird assemblage, breeding.	• Operation and maintenance.	• Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	great black-backed gull and kittiwake.	
				Potential LSE cannot be ruled out for guillemot and cormorant, and breeding seabird assemblage.	There is potential for disturbance to guillemot and cormorant from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by construction and decommissioning vessels. There is a potential collision risk for breeding great cormorants and guillemot.
West Westray SPA (SPA is 16 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Arctic skua, breeding; • Arctic tern, breeding; • Guillemot, breeding; • Kittiwake, breeding; • Razorbill, breeding; • Fulmar, breeding; and • Seabird colony, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar, Arctic skua and kittiwake.	Artic skua, fulmar and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for Arctic tern, guillemot, razorbill, and breeding seabird assemblage.	There is potential for disturbance to Arctic tern, guillemot and razorbill from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by Project vessels. There is a potential collision risk for breeding guillemot and razorbill.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Auskerry SPA (SPA is 12 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• European storm-petrel, breeding; and • Arctic tern, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for European storm petrel.	European storm petrel has no vulnerability to disturbance or collision.
				Potential LSE cannot be ruled out for Arctic tern.	There is potential for disturbance to Arctic tern from Project vessels during the breeding season and migration. Arctic tern also has moderate vulnerability to collision risk.
Orkney Mainland Moors SPA (SPA is 14 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Red throated diver, breeding	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	Potential LSE cannot be ruled out for red-throated diver.	Red throated diver has high vulnerability to collisions and disturbance, therefore there is potential for disturbance and collision to this species during all Project phases.
Papa Westray SPA (SPA is 21 km) to the Project, so is within the MMFR + 1SD foraging range	• Arctic skua, breeding; and • Arctic tern, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for European Artic skua.	Arctic skua have low vulnerability to disturbance and no vulnerability to collision risk.
				Potential LSE cannot be ruled out for Arctic tern.	There is potential for disturbance to Arctic tern from Project vessels during the breeding season and migration. Arctic tern

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
for qualifying features					also has moderate vulnerability to collision risk.
Copinsay SPA (SPA is 26 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Guillemot, breeding; • Great black-backed gull, breeding; • Kittiwake, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for great cormorant, great black-backed gull, kittiwake and fulmar.	Great cormorant, great black-backed gull, kittiwake and fulmar have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for guillemot and breeding seabird assemblage.	There is potential for disturbance to guillemot from Project vessels during the breeding season. There is a potential collision risk for breeding guillemot. During migration, there is potential for designated seabirds to be disturbed by Project vessels.
Marwick Head SPA (SPA is 35 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Guillemot, breeding; • Seabird assemblage, breeding; and • Kittiwake, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for kittiwake.	Kittiwake has no collision vulnerability and low disturbance vulnerability.
				Potential LSE cannot be ruled out for guillemot and breeding seabird assemblage.	Guillemot has high vulnerability to collision with Project vessels and moderate vulnerability to disturbance. During migration, there is potential for designated seabirds to be disturbed by Project vessels.
Hoy SPA (SPA is 58 km) to the Project,	• Arctic skua, breeding; • Fulmar, breeding;	• Installation and decommissioning; and	• Disturbance (all Project phases);	No potential for LSE concluded for Arctic skua,	Arctic skua, fulmar, great black-backed gull, great skua, kittiwake have low vulnerability

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
so is within the MMFR + 1SD foraging range for qualifying features	• Great black-backed gull, breeding; • Great skua, breeding; • Guillemot, breeding; • Kittiwake, breeding; • Atlantic puffin, breeding; and • Seabird assemblage, breeding.	• Operation and maintenance.	• Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	fulmar, great black-backed gull, great skua, kittiwake.	to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for guillemot, Atlantic puffin and breeding seabird assemblage.	There is potential for disturbance to guillemot (only) from Project vessels during the breeding season, as well as potential collision risk for breeding guillemot and Atlantic puffin. During migration, there is potential for designated seabirds to be disturbed by Project vessels.
East Caithness Cliffs SPA (SPA is 60 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Kittiwake, breeding; • Herring gull, breeding; • Great black-backed gull, breeding; • Guillemot, breeding; • Razorbill, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and herring gull, great black-backed gull, and kittiwake.	Fulmar, herring gull, great black-backed gull, and kittiwake have low disturbance vulnerability and no vulnerability to collision.
				Potential LSE cannot be ruled out for guillemot and razorbill.	There is potential for disturbance to guillemot and razorbill from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by Project vessels. There is a potential collision risk for breeding guillemot, and razorbill.
Fair Isle SPA (SPA is 79 km) to the Project,	• Arctic skua, breeding; • Fulmar, breeding; • Gannet, breeding;	• Installation and decommissioning; and	• Disturbance (all Project phases);	No potential for LSE concluded for Arctic skua,	Arctic skua, fulmar, great skua, kittiwake have low vulnerability to disturbance and no vulnerability to collision.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
so is within the MMFR + 1SD foraging range for qualifying features	• Great skua, breeding; • Guillemot, breeding; • Kittiwake, breeding; • Atlantic puffin, breeding; • Razorbill, breeding; and • Seabird assemblage, breeding.	• Operation and maintenance.	• Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	fulmar, great skua and kittiwake.	
				Potential LSE cannot be ruled out for guillemot, Atlantic puffin, gannet, razorbill, and breeding seabird assemblage.	There is potential for disturbance to guillemot and razorbill from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by Project vessels. There is a potential collision risk for breeding guillemot, Atlantic puffin, gannet and razorbill.
North Caithness Cliffs SPA (SPA is 85 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Kittiwake, breeding; • Atlantic puffin, breeding; • Guillemot, breeding; • Razorbill, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and kittiwake.	Fulmar, kittiwake have low vulnerability to disturbance and no vulnerability to vessel collision.
				Potential LSE cannot be ruled out for guillemot, Atlantic puffin, razorbill and breeding seabird assemblage.	There is potential for disturbance to guillemot and razorbill from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by Project vessels. There is a potential collision risk for breeding guillemot, razorbill, and Atlantic puffin.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Sule Skerry and Sule Stack SPA (SPA is 90 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Gannet, breeding; • Seabird assemblage, breeding; • European storm petrel • Guillemot, breeding; and • Atlantic puffin, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE for European storm petrel.	European storm petrel has no vulnerability to disturbance or collision.
				Potential LSE cannot be ruled out for guillemot, Atlantic puffin, gannet, and breeding seabird assemblage.	There is potential for disturbance to guillemot (only) from Project vessels during the breeding season. During migration, there is potential for designated seabirds to be disturbed by Project vessels. There is a potential collision risk for breeding guillemot, storm gannet and Atlantic puffin.
Seas off Foula SPA (SPA is 115 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding and non-breeding; • Great skua, breeding and non-breeding; • Kittiwake, breeding; • Atlantic puffin, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE for fulmar, great skua, and kittiwake.	No disturbance to all species from Project activities breeding and non-breeding season, while fulmar, great skua, and kittiwake have no vulnerability to collision.
				Potential LSE cannot be ruled out for Atlantic puffin, and breeding seabird assemblage.	There is a potential collision risk for breeding Atlantic puffin, only.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Sumburgh Head (SPA is 119 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Kittiwake, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar, kittiwake, or breeding seabird assemblage.	Fulmar and kittiwake both have no vulnerability to collision and low vulnerability to disturbance, therefore there is no potential for LSE through these pathways.
Cape Wrath SPA (SPA is 136 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Kittiwake, breeding; • Atlantic puffin, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar, kittiwake.	Fulmar and kittiwake both have no vulnerability to collision and low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for Atlantic puffin, and breeding seabird assemblage.	During migration, there is potential for designated seabirds to be disturbed by Project vessels, with Atlantic puffin being the only species with moderate collision vulnerability.
Mousa SPA (SPA is 138 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• European storm petrel, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for European storm petrel.	Storm petrels have no vulnerability to collision and no vulnerability to disturbance, there is therefore no potential for LSE on this species from this site.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Noss SPA (SPA is 156 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Gannet, breeding; • Great skua, breeding; • Kittiwake, breeding; • Puffin, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar, great skua and kittiwake.	All species have low vulnerability to disturbance, while only fulmar, great skua and kittiwake have no vulnerability to collision.
				Potential LSE cannot be ruled out for gannet, Atlantic puffin, and breeding seabird assemblage.	There is a potential collision risk to gannet and Atlantic puffin only.
Troup, Pennan and Lions' Head SPA (SPA is 162 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Gannet, breeding; • Kittiwake, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and kittiwake.	Fulmar and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for gannet and breeding seabird assemblage.	Gannet has moderate vulnerability to collision.
North Rona and Sula Sgeir spa (SPA is 170 km) to the	• European storm petrel, breeding; • Fulmar, breeding; • Gannet, breeding;	• Installation and decommissioning; and	• Disturbance (all Project phases);	No potential for LSE concluded for fulmar, European storm petrel and kittiwake.	None of the qualifying species have vulnerability to disturbance from Project vessels. Fulmar, European storm petrel and kittiwake have no vulnerability to collision.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Project, so is within the MMFR + 1SD foraging range for qualifying features	• Kittiwake, breeding; • Puffin, breeding; and • Seabird assemblage, breeding.	• Operation and maintenance.	• Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	Potential LSE cannot be ruled out for gannet, Atlantic puffin and breeding seabird assemblage.	Only gannet and Atlantic puffin have moderate vulnerability to collision.
Ronas Hill – North Roe and Tingon SPA (SPA is 171 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Great skua, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for great skua.	Great skua has no vulnerability to collision and low vulnerability to disturbance from Project vessels
Handa SPA (SPA is 174 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Great skua, breeding; • Kittiwake, breeding; • Puffin, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar, great skua and kittiwake.	Fulmar, great skua and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for Atlantic puffin and breeding seabird assemblage.	Atlantic puffin is the only species with vulnerability to collision risk.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Buchan Ness and Collieston Coast SPA (SPA is 193 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Kittiwake, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential LSE concluded for fulmar, kittiwake or breeding seabird assemblage.	Neither qualifying species has vulnerability to disturbance from Project vessels or collision.
Fetlar SPA (SPA is 206 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Great skua, breeding; and • Seabird assemblage, breeding	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential LSE concluded for fulmar, great skua or breeding seabird assemblage.	Neither qualifying species has vulnerability to disturbance from Project vessels or collision.
Flannan Isles SPA (SPA is 206 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Atlantic puffin, breeding; • Kittiwake, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and kittiwake.	Fulmar and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for Atlantic puffin and breeding seabird assemblage.	Atlantic puffin is moderately vulnerable to collision.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Hermaness, Saxa Vord and Valla Field SPA (SPA is 214 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Gannet, breeding; • Great skua, breeding; • Kittiwake, breeding; • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar, great skua and kittiwake.	Fulmar, great skua and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for gannet and breeding seabird assemblage.	Gannet has a moderate vulnerability to collision.
Shiant Isles SPA (SPA is 225 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Atlantic puffin, breeding; • Kittiwake, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and kittiwake.	Fulmar and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for Atlantic puffin and breeding seabird assemblage.	Atlantic puffin is moderately vulnerable to collision.
Priest Island (Summer Isles) SPA (SPA is 227 km) to the Project, so is within the MMFR + 1SD foraging range	• European storm petrel, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential LSE for European storm petrel.	European storm petrel does not have vulnerability to collision risk or disturbance from Project vessels.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
for qualifying features					
Fowlsheugh SPA (SPA is 260 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; • Kittiwake, breeding; • Atlantic puffin, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and kittiwake.	Fulmar and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				Potential LSE cannot be ruled out for Atlantic puffin and breeding seabird assemblage.	Atlantic puffin is moderately vulnerable to collision.
Forth Islands SPA (SPA is 361 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Gannet, breeding; • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	LSE cannot be ruled out for gannet and breeding seabird assemblage.	Whilst gannet has low vulnerability to disturbance from Project vessels, the species shows moderate vulnerability to collision.
St Kilda SPA (SPA is 364 km) to the Project, so is within the MMFR + 1SD foraging range	• Fulmar, breeding; • Gannet, breeding; • Great skua, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and great skua.	Fulmar and kittiwake have low vulnerability to disturbance and no vulnerability to collision.
				LSE cannot be ruled out for gannet and breeding seabird assemblage.	Whilst gannet has low vulnerability to disturbance from Project vessels, the

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
for qualifying features					species shows moderate vulnerability to collision.
Rum SPA (SPA is 373 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded breeding seabird assemblage.	SPA is designated for breeding seabird assemblage. There is no evidence for vulnerability to disturbance from Project vessels or collision risk.
Mingulay and Berneray SPA (SPA is 406 km) to the Project, so is within the MMFR + 1SD foraging range for qualifying features	• Fulmar, breeding; and • Seabird assemblage, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar and breeding seabird assemblage.	Fulmar has low vulnerability to disturbance and no vulnerability to collision.
Rathlin Island SPA (SPA is 558 km) to the Project, so is within the MMFR + 1SD foraging range	• Fulmar, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar.	Fulmar has low vulnerability to disturbance and no vulnerability to collision.

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
for qualifying features					
REPUBLIC OF IRELAND					
Tory Island	• Fulmar, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar.	SPAs are located within the mean maximum plus one standard deviation foraging range for breeding fulmar. Fulmar has low vulnerability to disturbance and no vulnerability to collision risk.
West Donegal Coast					
Duvillaun Islands					
Clare Island					
High Island, Inishshark and Davillaun					
Horn Head to					

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Fanad Head	• Fulmar, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar.	SPAs are located within the mean maximum plus one standard deviation foraging range for breeding fulmar. Fulmar has low vulnerability to disturbance and no vulnerability to collision risk.
Lambay Island					
Cliffs of Moher					
Kerry Head					
Dingle Peninsula					
Blasket Islands					
Saltee Islands					
Iveragh Peninsula					

SITE NAME (PROXIMITY TO PROJECT)	QUALIFYING INTEREST / FEATURE	PROJECT PHASE	POTENTIAL PATHWAY FOR LSE	CAN IT BE CONCLUDED THAT THERE WILL BE POTENTIAL LSE?	JUSTIFICATION
Puffin Island Skelligs Deenish Island and Scariff Island Beara Peninsula	• Fulmar, breeding.	• Installation and decommissioning; and • Operation and maintenance.	• Disturbance (all Project phases); • Bright lighting (all Project phases); • Collision with tidal devices (O&M); and • Displacement (O&M).	No potential for LSE concluded for fulmar.	SPAs are located within the mean maximum plus one standard deviation foraging range for breeding fulmar. Fulmar has low vulnerability to disturbance and no vulnerability to collision risk.

8 In-combination assessment

8.1 Approach

This section outlines the approach to the identification of projects for in-combination assessment in the RIAA. The Habitats Regulations require consideration of potential effects on European sites from a project in-combination with other plans or projects. The in-combination assessment will consider projects that are:

- Under construction;
- Permitted applications(s), but not yet implemented;
- Submitted applications(s) which have not yet received a determination; and
- Any plan or project which is considered 'reasonably foreseeable' (i.e., a development for which there is sufficient design information in the public domain e.g., marine projects at Scoping stage).

Other offshore activities and industries to be considered include (but are not limited to):

- Marine renewables (offshore wind, wave and tidal, electrification);
- Coastal projects, for example port and harbour projects;
- Marine aggregate extraction, dredging and licensed disposal sites;
- Oil and gas activities;
- Carbon capture and storage; and
- Subsea cables and pipelines.

Identification of relevant in-combination projects, plans and activities for consideration within the HRA will follow the same approach as the EIA:

- Step 1: Compilation of the project long list based on defined ZoI's for each receptor. The ZoI's provide the maximum search areas for other projects to be screened into the in-combination project long list. The long list will be developed based on the status of plans or projects up to an agreed 'cut off' date with stakeholders and will be provided to stakeholders for comment and agreement following this date. Operational projects will only be screened in if there is potential for an ongoing effect from that project type (e.g., marine mammal displacement). For most receptors, operational projects will constitute part of the existing baseline and be considered within the Project specific effect assessment. These projects are therefore not considered within the in-combination effect assessment.
- Step 2: Compilation of the project short-list, taking into account potential pathways of effect (e.g., temporal and physical overlap of effects). Additional information collated for each project within the long list will be used to determine the potential for in-combination effects. This will take into consideration potential effect pathways and / or the potential for physical or temporal overlap of effects from other project activities and those of the Project. The most up-to-date publicly available information in relation to the relevant project parameters will be used to inform the in-combination assessment.

There is an inherent level of uncertainty with respect to the assessment of potential effects as some proposed projects may not be taken forward and built out as currently described. This uncertainty (which is typically correlated with the stage of development of a project) will be considered when drawing conclusions on in-combination effects.

8.2 Project Long List for In-combination Assessment (Step 1)

The features identified for which the potential for LSE has been concluded are presented below, with the associated sites and impact pathways summarised further in Section 9. The designated features for which there is the potential for LSE along with the foraging ranges are used to inform the long list of projects for in-combination assessment.

- Marine mammals:
    - Harbour seal (50 km); and
    - Grey seal (20 km).
- Ornithology:
    - Great northern diver, non-breeding (10 km)[12];
    - Slavonian grebe, non-breeding (10 km)[12];
    - Red-throated diver, breeding (9 km);
    - European shag, non-breeding (23.7 km);
    - Arctic tern, breeding (40.5 km);
    - Gannet, breeding (509.4 km);
    - Atlantic puffing, breeding (265.4 km);
    - Guillemot, breeding (153.7 km);
    - Great cormorant, breeding (33.9 km);
    - Razorbill, breeding (164.6 km); and
    - Breeding seabird assemblages of the above species.

Based on the identified species, the largest foraging range relates to gannets, with just over 500 km, with the majority being under 50 km. Therefore, projects within 50 km of the Project area described in section 8.2.1 below, with those over 50 km presented as a summary in Section 8.2.2.

The presented project lists are based on relevant projects up to the end of August 2023. It is proposed that a cut-off date of the 31st October 2023 is applied in updating the project lists presented in the following section. The proposed date is approximately three-months prior to the submission of the EIAR and RIAA. Any additional projects to be considered in relation to the long list and its relevance to Step 2, will be presented within the RIAA. Step 2 in in terms of determining the project short-list and the potential for in-combination effects will be completed within the RIAA.

[12] For these species, no foraging range is available, therefore, a nominal foraging distance of 10 km is applied in determining the project long list for in-combination assessment.

8.2.1 Projects up to 50 km from the EMEC Fall of Warness Tidal Test Site

The potential for LSE is most likely to be present associated with projects up to 50 km from the Project area, as most of the identified designated features have foraging ranges that are less than the applied distance. Identified projects proposed to be taken forward for further assessment within the RIAA are presented in Table 8-1. Up to 101 aquaculture sites occur within the 50 km from the EMEC tidal test site and comprise fin fish, shellfish and seaweed aquaculture facilities, with the closest being 2.5 km away. However, all of these sites are operational with no further information available on proposed sites, hence no aquaculture projects are listed in Table 8-1 for in-combination effects. All oil and gas infrastructure, pipelines, ports and harbours within 50 km are again all operational. There are no

Table 8-1 In-combination projects long list of projects that are up to 50 km from the EMEC Fall of Warness tidal test site

PROJECT	DESCRIPTION	STATUS	DISTANCE (KM)
MARINE RENEWABLES			
Westray South	Orbital Marine Ltd, planned tidal development site	Agreement/Option for Lease	0.1
Shapinsay Sound	EMEC Ltd tidal development site, constructed in 2011	Operational	14.0
Deer Sound	Orbital Marine Ltd, tidal development site	Operational	18.2
Scapa Flow	EMEC Ltd, wave energy test site	Operational	26.4
Deerness	Mocean Energy Ltd, wave energy test site	Operational	28.8
Bilia Croo	EMEC Ltd, wave energy test site	Operational	34.7
OFFSHORE WIND			
Ayre	ScotWind, planned offshore windfarm development site	Agreement/Option for Lease	34.3
Costa Head	Offshore windfarm development, off Costa Head on Mainland Orkney	Consented	21.3
PORTS AND HARBOURS			
Faray extension	Extension of the slipway and landing jetty at the harbour	Application	4.2
Hatson Expansion	Hatston Pier and Terminal expansion.	Pre-application (Scoping)	17.4
Scapa Deep Water Quay	Creation of a deep water quay and laydown area in the Bay of Deepdale	Pre-application (Scoping)	23.9
CABLES[13]			
Orkney - Hoy	Cable replacement between Orkney and Hoy North and Central	Consented	32

[13] There are a number of operational / active and disused cables, which are considered to be part of the baseline and there is not considered to be the pathway for ongoing effect for the species for which there is considered to be the potential for LSE, so these are not considered further. The presented list only considers projects which are consented or in development.

8.2.2 Projects over 50 km from the EMEC Fall of Warness Tidal Test Site

For projects over 50 km, Table 8-2 summarises the projects for which there is the potential for in-combination effects on the designated features. For some project types, such as cables, oil and gas and ports and harbour, it is the case that the potential for pathways only exists during the construction phase. As these types of projects are over 100 km from the EMEC Project, a summary of the number of projects are provided in Table 8-2. A more detailed description of projects is provided for Marine Renewables and offshore wind, for which there are pathways for in-combination effects during multiple project phases. No aquaculture projects in a planning or pre-consent stage were identified in the applied search radius and are therefore not included in Table 8-2.

Table 8-2 In-combination projects long list of projects that are between 50 km and 510 km from the EMEC Fall of Warness tidal test site

PROJECT	DESCRIPTION	STATUS	DISTANCE (KM)
MARINE RENEWABLES			
Inner Sound	MeyGen Ltd tidal development constructed in 2015.	Operational	54.1
Shetland Tidal Array	600 kW Nova Innovation Ltd tidal development within Bluemull Sound in the Shetland Islands.	Operational	198.7
Connel Sound	Sustainable Marine Energy Ltd tidal development off mainland Scotland.	Operational	334.7
Sound of Islay	Single 50 kW Swimmer Turbine.	Application	417.1
Fair Head Tidal	100 MW tidal energy development off the North Antrim Coast, Northern Ireland.	Consented	476.6
International projects	The Zone of Influence extends over the EEZs of other European countries in the North Sea and may overlap with international projects.		
OFFSHORE WIND			
West of Orkney Offshore Wind Farm	OWF within the N1 Plan Option area (northwest Scottish continental shelf), with the proposed development of up to 125 fixed and floating turbines, with a generating capacity of up to 2.25 GW.	Pre-consent (Scoping)	65.5
Pentland Floating Offshore Wind Farm	Floating OWF, with up to 10 turbines and generating capacity of up to 100 MW, located within the Pentland Firth.	Application	77.8
Caledonia Offshore Wind Farm	OWF within the NE4 Plan Option area, Moray Firth, with the proposed development of 84 – 150 fixed and floating turbines, with a generating capacity of up to 2 GW.	Pre-consent (Scoping)	83.4
Other offshore wind farms in Scottish, English and Welsh waters	There are a further 13 pre-consent / consented offshore wind farm developments in Scottish, including those located within the North Sea, with the closest being over a 150 km away.	Pre-consent / consented	>100

PROJECT	DESCRIPTION	STATUS	DISTANCE (KM)
Other offshore wind farms in European waters	There are six pre-consent / consented offshore wind farm developments in European waters (Irish and Norwegian), with the closest being over 400 km away.	Pre-consent / consented	>400
ONSHORE WIND			
Onshore wind projects	Approximately 100 onshore wind projects / developments, comprising single or multiple turbines, with the closest being around 58 km away.	Pre-consent and consented	>50
CABLES			
Cable projects	There are approximately 13 projects in planning with the closest being approximately 189 km away.	Pre-consent and consented	>100
OIL AND GAS			
Oil and gas infrastructure projects	There are approximately 14 projects in planning, comprising field development or single platforms. The closest is approximately 127 km away.	Pre-consent and consented	>100
PORTS AND HARBOURS			
Port and harbour projects	There are nine projects relating to ports and harbours, ranging from defence works to capital projects. The closest is approximately 230 km away.	Pre-consent and consented	>100

9 Summary

Table 9-1 below provides a summary of the European sites and their qualifying features for which no potential LSE cannot be concluded. These European sites have been screened in for further assessment within the RIAA.

Table 9-1 European sites for which no potential LSE cannot be ruled out

DESIGNATED SITE	QUALIFYING INTEREST / FEATURES	PROJECT STAGE	POTENTIAL PATHWAYS FOR LSE
European sites designated for marine mammals			
Sanday SAC	Harbour seal	Installation and Decommissioning	• Installation vessel(s) transits and manoeuvring leading to disturbance • Underwater noise from foundation/mooring installation methods and vessels leading to auditory injury, death or disturbance
		Operation and Maintenance	• Maintenance vessel transits and manoeuvring leading to disturbance • Underwater noise from turbine operation leading to disturbance • Changes to hydrodynamic and sediment regime • Collision with turbine blades leading to injury or death
Faray and Holm of Faray SAC	Grey seal	Installation and Decommissioning	• Installation vessel(s) transits and manoeuvring leading to disturbance • Underwater noise from foundation/mooring installation methods and vessels leading to auditory injury, death or disturbance
		Operation and Maintenance	• Maintenance vessel transits and manoeuvring leading to disturbance • Changes to hydrodynamic and sediment regime • Collision with turbine blades leading to injury or death
European sites designated for ornithology			
North Orkney SPA	• Great northern diver, non-breeding; • Slavonian grebe, non-breeding; • Red-throated diver, breeding; and • European shag, non-breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Rousay SPA	• Arctic tern, breeding; • Guillemot, breeding; and • Breeding seabird assemblage.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting

DESIGNATED SITE	QUALIFYING INTEREST / FEATURES	PROJECT STAGE	POTENTIAL PATHWAYS FOR LSE
			• Displacement
Calf of Eday SPA	• Great cormorant, breeding; • Guillemot, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
West Westray SPA	• Arctic tern, breeding; • Guillemot, breeding; • Razorbill, breeding; and • Seabird colony, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting Displacement
Auskerry SPA	• Arctic tern, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Orkney Mainland Moors SPA	• Red-throated divers, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Papa Westray SPA	• Arctic tern, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Copinsay SPA	• Guillemot, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Marwick Head SPA	• Guillemot, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement

DESIGNATED SITE	QUALIFYING INTEREST / FEATURES	PROJECT STAGE	POTENTIAL PATHWAYS FOR LSE
Hoy SPA	• Guillemot, breeding; • Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
East Caithness Cliffs SPA	• Guillemot, breeding; • Razorbill, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
Fair Isle SPA	• Gannet, breeding; • Guillemot, breeding; • Atlantic puffin, breeding; • Razorbill, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
North Caithness Cliffs SPA	• Atlantic puffin, breeding; • Guillemot, breeding; • Razorbill, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Sule Skerry and Sule Stack SPA	• Gannet, breeding; • Seabird assemblage, breeding; • Guillemot, breeding; and • Atlantic puffin, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Seas off Foula SPA	• Atlantic puffin, breeding; and • Seabird assemblage, breeding and non-breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Cape Wrath SPA	• Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Noss SPA	• Gannet, breeding;	Installation and decommissioning	• Disturbance • Bright lighting

DESIGNATED SITE	QUALIFYING INTEREST / FEATURES	PROJECT STAGE	POTENTIAL PATHWAYS FOR LSE
	• Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Troup, Pennan and Lions' Head SPA	• Gannet, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
North Rona and Sula Sgeir SPA	• Gannet, breeding; • Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Handa SPA	• Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Flannan Isles SPA	• Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Hermaness, Saxa Vord and Valla Field SPA	• Gannet, breeding; and • Seabird assemblage, breeding	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Shiant Isles SPA	• Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
Fowlsheugh SPA	• Atlantic puffin, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement

DESIGNATED SITE	QUALIFYING INTEREST / FEATURES	PROJECT STAGE	POTENTIAL PATHWAYS FOR LSE
Forth Islands SPA	• Gannet, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement
St Kilda SPA	• Gannet, breeding; and • Seabird assemblage, breeding.	Installation and decommissioning	• Disturbance • Bright lighting
		Operation and maintenance	• Disturbance • Collision with tidal devices • Bright lighting • Displacement

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APPENDIX A ACRONYMS

ACRONYM	DEFINITION
AA	Appropriate Assessment
ADCP	Acoustic Doppler Current Profiler
BAP	Biodiversity Action Plan
BBWF	Berwick Bank Wind Farm
CEMP	Construction Environmental Management Plan
CES	Coastal East Scotland
CMS	Construction Method Statement
CTD	Conductivity, Temperature and Depth
DECC	Department of Energy and Climate Change
DP	Dynamical Position
ECoW	Environmental Clerk of Works
EEC	European Economic Community.
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMEC	European Marine Energy Centre
EMF	Electromagnetic Field
EPS	European Protected Species
EU	European Union
HRA	Habitats Regulations Appraisal
HVDC	High Voltage Direct Current
IAMMWG	Inter-Agency Marine Mammal Working Group
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
KM	Kilometres
LMP	Lighting And Marking Plan
LSE	Likely Significant Effects
MD-LOT	Marine Directorate Licensing Operations Team
MHWS	Mean High Water Spring
ML	Marine Licence
MLWS	Mean Low Water Springs
MMFR	Mean Maximum Foraging Range
MNNS	Marine Non-Native Species
MPCP	Marine Pollution Contingency Plan
MS-LOT	Marine Scotland Licensing Operations Team

ACRONYM	DEFINITION
MU	Management Units
NM	Nautical Miles
NMFS	National Marine Fisheries Service
OEMP	Operation Environmental Management Plan
PEMP	Project-Specific Environmental Monitoring Programme
PFOWF	Pentland Floating Offshore Wind Farm Development
PMF	Priority Marine Feature
pSPA	Potential Special Protection Areas
RIAA	Report To Inform Appropriate Assessment
ROV	Remotely Operated Vehicle
SAC	Special Areas of Conservation
SCIs	Sites Of Community Interest
SCOS	Special Committee on Seals
SD	Standard Deviation
SMA	Seal Management Area
SMRU	Sea Mammal Research Unit
SNH	Scottish Natural Heritage
SPA	Special Protection Areas
SSC	Suspended Sediment Concentration
SSSI	Sites Of Specific Scientific Interest
VMP	Vessel Management Plan

APPENDIX B GLOSSARY

TERM	DESCRIPTION
Annex I habitat	A habitat listed under annex i of the habitats directive (council directive 92/43/EEC). Annex I habitats can be designated as a qualifying feature of a special area of conservation (sac), to ensure the conservation of these habitats. The protection of annex i habitats within sacs persists in UK law following EU exit.
Annex II species	A species listed under Annex II of the Habitats Directive (Council Directive 92/43/EEC). Annex II species can be designated as a qualifying feature of a SAC, to ensure the conservation of these species. The protection of Annex II species within SACs persists in UK law following EU Exit.
Appropriate Assessment	An assessment to determine the implications of a plan or project on a European site in view of that site's conservation objectives. An Appropriate Assessment forms part of the Habitats Regulations Appraisal/Assessment and is required when a project or plan (either alone or in-combination with other plans or projects) is likely to have a significant effect on a European site.
EMEC Project	The tidal test site at Fall of Warness, Orkney and offshore export cable(s).
Competent Authority	Authority granting consent.
Environmental Impact Assessment (EIA) Report (EIAR)	A report documenting the findings of the environmental impact assessment for the offshore Project in accordance with relevant regulations.
European site	SAC, Special Protection Areas (SPAs) and Sites of Community Importance (SCI) that were originally designated under European (EU) legislation. Prior to the UK's withdrawal from the EU, the United Kingdom's (UK's) European sites contributed to the Natura 2000 and were referred to as Natura 2000 sites. They now are part of the UK's National Site Network.
Habitats Regulations	Collectively the term used to refer to the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) - applicable to Marine Licence applications out to the 12 nautical miles (NM) limit (approximately 22.2 km), the Conservation of Offshore Marine Habitats and Species Regulations 2017 – applicable to Marine Licence applications between the 12 and 200 NM limits,
Habitats Regulations Appraisal (HRA)	Process of the identification and assessment of the potential for a development to have an adverse effect on the integrity of a European site.
Likely Significant Effect (LSE)	Any effect of a plan or project that may affect the conservation objectives of the qualifying features for a European site which cannot be ruled out on the basis of objective information, either individually or in combination with other plans and projects (Tyldesley and Associates, 2015).
Ramsar site	Wetlands of international importance designated under the Ramsar Convention.
Migratory waterbirds	Species of waders and waterfowl that are ecologically dependant on wetlands and which make regular migrations along the coast of the UK and / or non-breeding individuals that overwinter in the UK.
Seabirds	Birds that spend most of their lives feeding and living on the open ocean, coming ashore only for breeding.
Special Area of Conservation (SAC)	SACs are designated for the conservation of certain plant and animal species listed in the Habitats Directive.
Candidate Special Area of	Candidate SACs are sites that were submitted to the European Commission before the end of the Transition Period following the UK's exit from the EU, but not yet formally designated.

TERM	DESCRIPTION
Conservation (cSAC)	
Site of Community Importance (SCI)	Defined in the Habitats Directive as a site which, in the biogeographical region or regions to which it belongs, contributes significantly to the maintenance or restoration at a favourable conservation status of a natural habitat type in Annex I, or of a species in Annex II and may also contribute significantly to the coherence of the Natura 2000 network (or UK National Site Network). The site may also contribute significantly to the maintenance of biological diversity within the biogeographic region or regions concerned. For animal species ranging over wide areas, SCIs shall correspond to the places within the natural range of such species which represent the physical or biological factors essential to their life and reproduction.
Site of Special Scientific Interest (SSSI)	An SSSI is an area of protected land or water defined by the European Union's Habitats Directive as containing unique species or habitats of high scientific value for conservation.
Special Protection Area (SPA)	Special Protection Areas (SPAs) are sites that are designated to protect rare or vulnerable birds (as listed on Annex I of the Directive 2009/147/EC on the conservation of wild birds), as well as regularly occurring migratory species.
stakeholder engagement	Non-statutory stakeholder engagement.
stakeholder consultation	Statutory stakeholder consultation.
UK Site Network	SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network. The 2019 Regulations have created a National Site Network on land and at sea, including inshore and offshore marine areas in the UK. The National Site Network includes existing SACs and SPAs; new SACs and SPAs designated under these Regulations
worst-case scenario	The maximum design parameters for the different elements of the Project considered to be a worst case for any given assessment.
Zone of Influence	The ZoI is the area beyond the project which may be affected by the proposed activities. The ZoI is specific to different receptors and is variably defined based on the nature of the receptor(s).

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