GREEN VOLT

Technical Appendix 3.1

Offshore HRA Screening Report

Offshore EIA Report: Volume 2

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Green Volt Offshore Windfarm - Habitats Regulations Appraisal

Offshore HRA Screening Report

Client: Floatation Energy

Reference: PC2483-RHD-ZZ-XX-RP-Z-0002

Status: S0/P01.01

Date: 08 December 2021

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Open

Revision history

Revision	Date	Description	Prepared	Checked	Approved
1	22.11.2021	Internal Draft to go to Floatation Energy	Melina Jack, Ben Hughes, Anna Sweeney	Jen McMillan	Alexia Chapman
2	08.12.2021	Final	Ben Hughes	Alexia Chapman	Alexia Chapman

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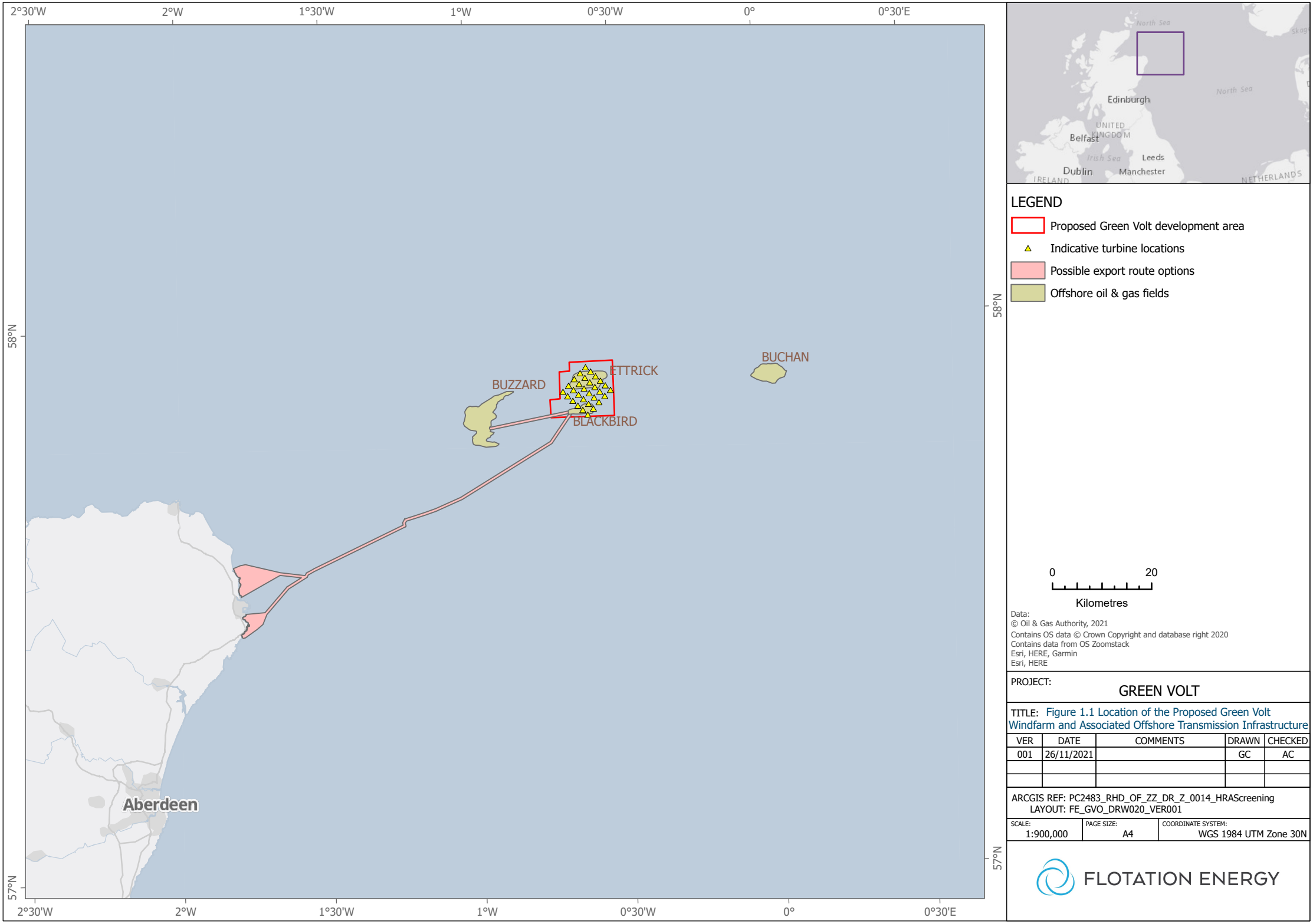
Acronyms/Abbreviations

Acronyms	Description
AA	Appropriate Assessment
ADD	Acoustic Deterrent Device
CAA	Civil Aviation Authority
CFD	Contract for Difference
CPEL	CNOOC Petroleum Europe Limited
DoL	Depth of Lowering
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EMS	Environmental Management System
FPSO	Floating Production Storage Offloading
FWPM	Freshwater Pearl Mussel
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Appraisal
INTOG	Innovation and Targeted Oil and Gas
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effect
MCA	Maritime & Coastguard Agency
MHWS	Mean High Water Springs
MSL	Mean Sea Level
MU	Management Unit
OfTI	Offshore Transmission Infrastructure
OnTI	Onshore Transmission Infrastructure
OSP	Offshore Substation Platform
OTM	Offshore Transmission Module
PAM	Passive Acoustic Monitoring
pSACs	Proposed Special Area of Conservation
pSPAs	Proposed Special Protected Area
ROV	Remotely Operated Vehicle
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SPA	Special Protection Area
SNH	Scottish Natural Heritage
WTG	Wind Turbine Generator
ZoI	Zone of Influence

1 Introduction

1.1 Project Background

1. The Green Volt Offshore Windfarm is being developed by Green Volt Offshore Windfarm Ltd (herein referred to as Green Volt), a new company formed by Flotation Energy Plc and CNOOC Petroleum Europe Ltd (CPEL). The project proposes to develop a floating offshore windfarm to facilitate a first of its kind decarbonisation of the oil and gas industry, through the complete electrification of the Buzzard oil and gas field (operated by CPEL) with the support of a fully connected UK grid connection
2. The windfarm is expected to have an offshore array of up to 30 floating Wind Turbine Generators (WTG) to the Offshore Transmission Infrastructure (OfTI) via subsea inter-array cables. The windfarm is proposed to be located directly above the Ettrick and Blackbird oil and gas fields, approximately 80 km north-east of the Aberdeenshire coast (Figure 1.1) in water depths ranging from 100 to 110 m. The oil and gas developments ceased production in 2017 and are still (as of 2021) undergoing final decommissioning activities.
3. The OfTI will comprise an Offshore Substation Platform (OSP) which will provide the marshalling point for the WTG inter-array cables and the required voltage conversion transformers to enable export of electricity to the Buzzard facility and to the offshore export cable. The OSP will also provide relevant metering of power to/from Buzzard and to/from the onshore grid connection point. Offtake capacity for the Buzzard facility will be via an offshore export cable. An additional ~80 km offshore export cable will carry the power to a jointing pit located within 500 m landward of the Aberdeenshire coastline. An onshore export cable of ~30 km will connect to the offshore export cable and will transmit power back to the onshore substation; this is currently expected to be located adjacent to the New Deer substation where it will join the Onshore Transmission Infrastructure (OnTI).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Dublin
Manchester
IRELAND
NETHERLANDS
LEGEND
Proposed Green Volt development area
Indicative turbine locations
Possible export route options
Offshore oil & gas fields
0
20
Kilometres
Data:
© Oil & Gas Authority, 2021
Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack
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PROJECT:
GREEN VOLT
TITLE: Figure 1.1 Location of the Proposed Green Volt Windfarm and Associated Offshore Transmission Infrastructure
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ARCGIS REF: PC2483_RHD_OF_ZZ_DR_Z_0014_HRAScreening
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FLOTATION ENERGY

1.2 Oil and Gas Decarbonisation

4. As part of the UK's commitment to Net Zero, the oil and gas industry has committed itself to the UK Oil and Gas Transition Deal, which calls for significant reductions in the emissions caused by oil and gas production. For Scope 1 emissions, which relate to those from the process of oil and gas extraction, the UK oil and gas industry has committed to reductions of:
    - 10% CO_2 reduction by 2025
    - 25% CO_2 reduction by 2027
    - 50% CO_2 reduction by 2030
5. As of 2021, roughly 70% of Scope 1 emissions in the North Sea are caused by offshore power generation. Offshore wind is a proven and reliable source of green energy and with technological advances in floating wind, it offers a direct, sustainable and importantly, a timely solution to electrify oil and gas infrastructure (OGUK, 2021).

1.2.1 Crown Estate Scotland's Innovation Targeted Oil and Gas (INTOG) Decarbonisation Leasing

6. In August 2021, Crown Estate Scotland announced the Innovation and Targeted Oil and Gas (INTOG)(Scottish Government 2021) leasing round, which will take place in early 2022. INTOG has been designed to allow developers to apply for the rights to build offshore windfarms specifically for the purpose of providing low carbon electricity to power oil and gas installations and to help decarbonise the sector. The round will also examine opportunities for innovation projects in Scottish waters. INTOG expects to support the delivery of smaller (<100 MW) innovation projects and specifically targets larger (>100 MW) projects that seek to support the decarbonisation of the oil and gas sector, such as the Green Volt Offshore Windfarm.
7. Green Volt will seek to acquire a site lease in accordance with the INTOG process. At the time of writing in Q4 2021, the Green Volt Project Area falls entirely within the proposed area of search addressed by the INTOG process. Potential INTOG projects will be able to apply for exclusivity agreements at an early stage, although only project locations included within the final INTOG plan will be awarded Option Agreements. Projects that progress through the planning process will still require the appropriate marine licences and section 36 consent under the Marine (Scotland) Act 2010 and the Electricity Act 1989, respectively.
8. Whilst it is hoped that the Green Volt will achieve an award of seabed rights from Crown Estate Scotland through the INTOG leasing process, it has not done so to date and the project, as described in this screening report, is entirely subject to award, or not, of rights by Crown Estate Scotland within that process.
9. This report has been independently prepared by Flotation Energy for the Green Volt Offshore Windfarm and does not reflect the views or intentions of Crown Estate Scotland or any other party. Any references in this report to general terms of seabed rights or timetable in relation thereto are indicative only and do not represent any confirmation of commercial terms as between Crown Estate Scotland and Flotation Energy.

1.3 Green Volt Offshore Wind Ltd (Project Developer)

10. Flotation Energy is an offshore wind development company, headquartered in Edinburgh, UK. Founded in 2018, the company is pioneering the deployment of both floating and fixed offshore wind in the UK and Internationally. Flotation Energy's UK projects include:

- Green Volt Offshore Windfarm (this development);
- Morecambe Offshore Windfarm (480 MW offshore wind, awarded as part of the England and Wales Round 4 auction); and
- White Cross Floating Windfarm (100 MW offshore wind, southwest England)

11. The company is also active in Europe and internationally, with a total offshore wind development pipeline of over 10 GW capacity.
12. CPEL is the operator of the Buzzard, Golden Eagle and Scott platforms. CPEL is also the largest shareholder in the Buzzard oil field and is seeking to maximize the value of its existing portfolio, while creating new opportunities for global growth. CPEL fully supports the transition to Net Zero and the UK North Sea Transition Deal and recognises the importance of reducing the carbon intensity of UK oil and gas. As a shareholder in Green Volt, CPEL will work with Flotation Energy to deliver the windfarm in the rapid timescale required by the North Sea Transition Deal.

1.4 Purpose of this Report

13. This document provides the information to enable the screening of the Green Volt Offshore Windfarm (also referred to as the Project or Project Area) with respect to its potential to have Likely Significant Effects (LSE) on sites in the 'UK National site network'[1], as required by the Habitats Regulations.
14. Potential impacts of onshore components of the Project on onshore sites landward of Mean High Water Springs (MHWS) are outside the scope of this Screening report. However, any potential impacts from offshore effects that could impact receptors onshore will be considered in this report. Likewise, any impacts from sources onshore on offshore receptors will be considered in the onshore Screening report.
15. The screening exercise presented within this report is based on the current understanding of the baseline environment and proposed activities associated with the Project, which is based on project and site-specific information currently available. Any changes which may arise as a result of further environmental surveys, consultee responses, or refinements to the design of the Project will be reflected in subsequent Habitats Regulations Appraisal (HRA) reporting.
16. This report covers designated sites for Annex I habitats, Annex I birds and Annex II species and will be provided to the relevant stakeholders to seek agreement on the sites of the UK site network that should be considered further. This is the first stage in the development of information to support the HRA (all steps in the HRA process and associated reporting requirements are described in Section 3).
17. Designated sites are proposed to be "screened out" where no LSE from the Project is predicted, alone or in-combination with other plans and projects. Where LSE cannot be ruled out at this stage, the designated site(s) will be "screened in" and assessed further during the second stage in the development of information to support the HRA.

[1] The UK National site network is made up of SACs and SPAs designated at various points in time before exit day (i.e., UK sites that formed part of the EU's Natura 2000 network prior to exit day), and any sites designated under the Habitats Regulations after exit day.

2 Project Description

18. Green Volt aims to develop a floating offshore windfarm which will be the world's first array of floating wind turbines connected to oil and gas platforms. It will provide the opportunity for the UK to take the first major step towards the decarbonisation of offshore oil and gas production in the UK North Sea through the electrification of oil and gas platforms (with the support of fully connected UK grid connection).
19. The Project will provide renewable energy to power the operations of Buzzard oil field, one of the largest oil and gas developments on the UK continental shelf (which produces around 100,000 barrels per day for the UK). Electrification of Buzzard is expected to mitigate 300,000 tonnes of CO_2 emissions per year.
20. Furthermore, the Green Volt Offshore Windfarm will establish a leading position for Scotland in the development and deployment of this novel technology, provide a steppingstone project between offshore renewables and the oil and gas sector and provide surplus renewable-generated electricity to the UK grid (enough to power a further 300,000 homes and mitigate an additional 200,000 tonnes of CO_2 emissions when used to replace the current mix of renewable / non-renewable power on the UK grid, achieving a Contract for Difference (CFD) for supply to the UK grid in the 2023 AR5 auction window).
21. The Project is also unique as it will demonstrate the technological feasibility of using floating offshore wind infrastructure at industrial output levels. Floating foundations open the possibility for future offshore windfarms to be located further from shore in deeper waters, eliminating any visual impacts on the Scottish coastline whilst accessing hitherto untapped wind resources. Floating structures also offer benefits over conventional fixed foundations in terms of reduced construction and installation costs, as extensive piling operations are not required minimising potential noise impacts upon sea mammals during construction and installation.
22. When considering longer term benefits, the floating offshore infrastructure of the Project is expected to survive the life of the Buzzard oil field, allowing the costs of windfarm installation to be amortised over a much longer period. With the opportunity to complete construction and begin operation by 2026, Green Volt can significantly contribute to the North Sea Transition deal target of a 25% reduction in offshore emissions associated with oil and gas activity by 2027.

2.1 Project Design Envelope

23. The project description, including the design envelope, will be detailed here as well as in the Environmental Impact Assessment Report (EIA) to provide an overview of proposed infrastructure of Green Volt Offshore Windfarm.
24. The Project Area is located to the north-east of Aberdeen. The Windfarm Site is proposed to sit within the 144 km^2 of the decommissioned Ettrick and Blackbird oil developments which stopped production in 2017 and are still currently (2021) undergoing their final decommissioning activities. A preliminary review of the site has confirmed that the site has broadly uniform water depths of 100-110 m and average wind speeds of 10.9 m/s. Therefore, the site has been confirmed to be suitable for floating wind.
25. The Windfarm Site is a 'brownfield' site that contains a significant volume of site data, captured over approximately 20 years as part of oil and gas operation and decommissioning activities. This will support the development of the Green Volt Offshore Windfarm by providing evidence for the eventual EIA, HRA and associated consent submissions.

2.2 Green Volt Project Infrastructure

26. Green Volt Offshore Windfarm infrastructure details are summarised within three categories:
    - Windfarm Site: details of the design envelope for the WTGs, floating substructures, moorings, inter-array cables, electrical substation.
    - Export Cables: providing details of the design envelope for the proposed export cable to Buzzard Oil Field, and the proposed export cable to shore.
    - Landfall: location for the onshore/offshore interface for the proposed export to shore cable.
27. Figure 1.1 provides an overview of the proposed location of the various Project assets.

2.2.1 Windfarm Site

28. It is anticipated that up to 30 floating WTGs will be deployed within the Windfarm Site. This infrastructure will harness average wind speeds of 10.93 m/s with an expected capacity factor of 55%.

2.2.1.1 Wind Turbine Generators

29. Each WTG will have a rated capacity of between 10-16 MW. The WTG/substructure design will ensure that the minimum blade height (blade clearance) is always at least 22 m above sea level. It is expected that turbine sizes of 12 MW+ will be the market norm and WTG of 16 MW rated capacity are likely to be available. A manufacturer has not been confirmed to date. The project expects to consider proposals from Siemens Gamesa, GE, and Vestas (successfully installed at the Kincardine Floating windfarm; Figure 2.1).

Figure 2.1: Vesta 9.5 MW turbine supported by the PPI Windfloat2 substructure on the Kincardine floating windfarm

30. Although floating wind is a novel technology, the project expects to be able to deploy commercially available offshore wind turbines without substantial modification. There is, therefore, a high degree of confidence in the overall technical specification of the WTG at this stage in the Project (Table 2.1).

Table 2.1: WTG design envelope

Type/Option	Design Envelope
WTG Capacity	10 MW – 16 MW per turbine
Development Size	Up to 30 turbines
WTG Hub Height (to centreline of hub)	Lowest Astronomical tide (LAT) Sea level +133 m
Operational wind speed	3.5 m/s - 30 m/s
WTG Blade Length (to centreline of hub)	111 m
WTG blade width	4.5 m
Effective Tip Height	Mean sea level (MSL) + 270 m
Blade Clearance	22 m above MSL
Colour	Matt light grey/off white
Navigation Lighting	As required by Civil Aviation Authority (CAA), Maritime and Coastguard Agency (MCA), etc

31. The final layout of the windfarm components shall be determined by environmental, technical and human use factors. Results of surveys and consultation may highlight constraints on the site that will influence the overall site layout. Design considerations for the final layout will be influenced by seabed characteristics; avoiding existing oil infrastructure left on the seabed following decommissioning. Geotechnical conditions, modelled metocean conditions, foundation type, and installation options will also influence final WTG layout.

2.2.1.2 Floating Substructures

32. A floating substructure will support each of the WTG. Floating substructures are a novel technology, and the Project is currently reviewing a number of designs which could be suitable for the Project. Table 2.2 provides the design envelope for the floating substructures.
33. It is anticipated that, due to soil conditions at the site, the WTGs will be restricted to a substructure which is moored using a catenary mooring system. This is the same type of mooring system which was previously employed by the Floating Production Storage Offloading (FPSO) vessel installed on the Ettrick and Blackbird oilfield and the Kincardine Floating Windfarm.

Table 2.2: Floating substructure design envelope

Type/Option	Design Envelope
Sub-Structure Type	Semi-submersible
Elevation Above Waterline	12 m
Geometry	Equilateral 3 or 4 sided
Horizontal Face Length	Max 100 m
Diameter of Vertical Columns	14 m
Access Points	Two boat-landings
Electrical Cable Access	Up to three J or I-tubes
Mooring Points	Up to 6-point mooring (expected 3-4)
Colour	Yellow
Navigation Lighting	As required by CAA, MCA, etc

2.2.1.3 Moorings

34. Floating substructures require moorings to anchors on the seabed to maintain position over the lifetime of the development. The type and number of anchors and moorings required will be subject to refinement upon selection of the substructure and a review of loading conditions.

35. Amongst competitive floating WTG substructure manufacturers, designs range from utilising three to six mooring lines per substructure. For the purposes of providing a conservative initial mooring design envelope, Green Volt will assume six mooring lines per substructure in the initial design (Table 2.3).

Table 2.3 Mooring system design envelope

Type/Option	Design Envelope
Number of Mooring lines per WTG	Maximum 6 (expected 3-4)
Mooring Type	Catenary
Anchor Type	Drag embedment anchors, torpedo anchors, gravity-based anchors, suction piles, pin piles (highly unlikely)
Maximum seabed displacement	10 x 10 m per anchor 18,000 m^2 total array
Mooring Lines	Anchor chain, mooring cables, polyester mooring lines
Pennant Wires/Buoys	Temporary surface buoys during construction
Pennant Wires/Buoys	Permanent submersible buoys at seabed for remotely operated vehicle (ROV) recovery
Mooring Line Radius	Max approx. 7.5 x water depth (circa 750-800 m)

36. A typical elevation sketch of a single mooring line with a corresponding drag embedment anchor is shown in Figure 2.2.

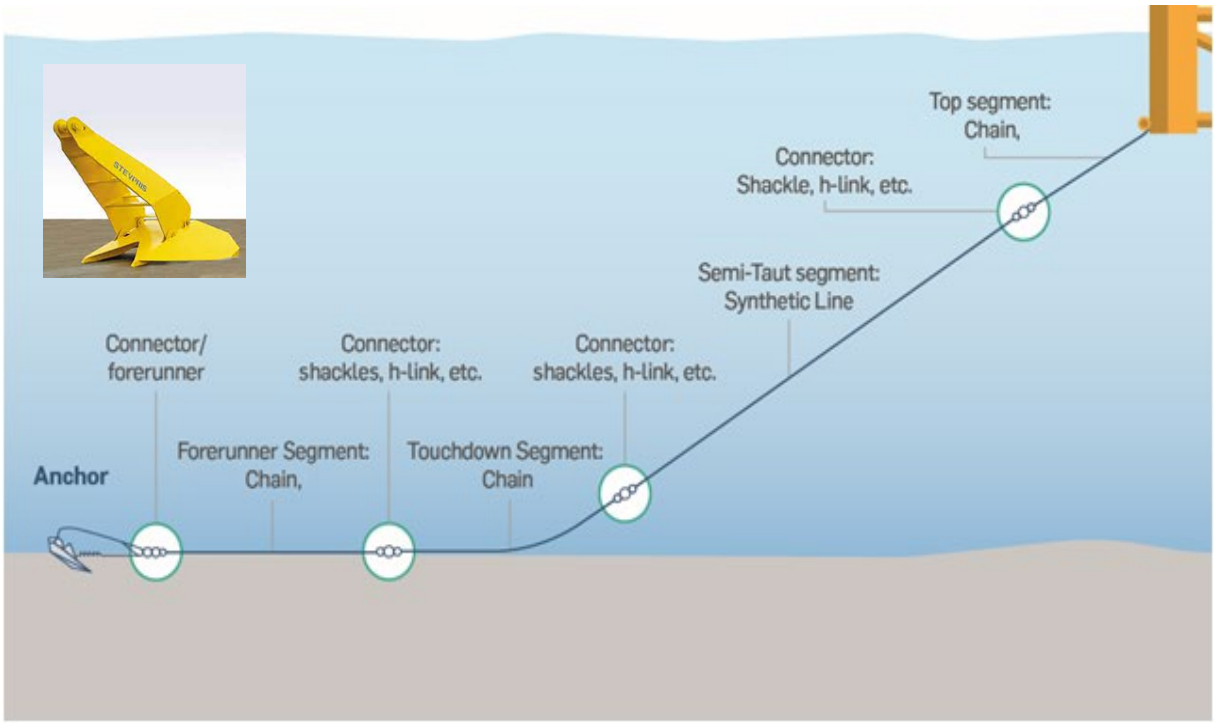


Figure 2.2: Elevation sketch of typical catenary mooring system, with a picture in the top left of a drag embedment anchor (18Te Stevpris Mk 6)

37. Studies to date (including 2021 site investigation surveys) have shown that there is a low risk of sediment scour around the anchors for the floating turbines at the Windfarm Site. Therefore, scour protection will not be required at the Windfarm Site.

2.2.1.4 Inter-Array Cables

38. Green Volt Offshore Windfarm will consist of up to 30 floating WTGs, each arranged within electrical strings of 5-6 units. A priority of the inter-array cabling is to provide redundancy, in the case of cable failure or breakdown, whilst seeking to ensure cable integrity. Further studies will be required to optimise the cable array once the turbine and foundation type have been confirmed.
39. Inter-array cabling will likely be surface laid and, where required, post lay buried for protection. It is currently proposed that the inter-array cables are not buried due to the lack of commercial fishing activity within the Windfarm Site and the placement of the mooring spreads for each structure. However, trenching of the inter-array cables will be considered as part of the initial engineering assessments.
40. Table 2.4 provides a summary of the expected design envelope for the inter-array cables.

Table 2.4: Inter-array cables design envelope

Parameter	Design Envelope
Number	Up to 35
Length	2.5 km each total 87.5 km
Cable Outer Diameter	250 mm
Total Area of Seabed Coverage	70,000 m^2
Rated Capacity	66 kV
Installation	Laid on seabed or trenched to agreed depth of lowering (DoL) – approx. 0.6 m - 1.5 m (if required)
Burial	Extent of burial to be confirmed.
Scour Protection	None anticipated, scour protection during installation if deemed necessary post further surveys prior to installation. Max 10% of total length rock protection is anticipated - 7 km (7,000 m^2)

2.2.1.5 Offshore Substation Platforms

41. Up to two OSPs will be required for the Green Volt Offshore Windfarm. These will likely be supported on a jacket structure which will provide the marshalling point for the WTG inter-array cables and the required voltage conversion transformers to enable export of electricity to the Buzzard facility and to the offshore export cable (connecting to OnTI). Green Volt is also reviewing the possibility of using floating substation technology for the OSPs. Additional clarity will be provided during initial project engineering, and this will be updated within the consenting process as more information is available. Table 2.5 presents the design envelope under consideration for the OSP.
42. If a fixed substation structure is chosen, this will require small scale pin piles (circa 1.5 - 2 m diameter) to secure the jacket to the seafloor. If a floating offshore substation is opted for, an anchoring infrastructure would be required similar to that of the floating WTG substructures. The selection of any substructure for the substation is likely to be based on the technology readiness levels of both floating offshore substations and the availability of dynamic export cables within the project development timeline.

43. There will be a single offshore substation jacket structure, supporting up to two substations. Each substation will be of the Offshore Transmission Module (OTM) type which is a standardised design offered by the main power systems designers/manufacturers, see Table 2.5 below.

Table 2.5 Indicative design envelope for the OSP

Type/option	Design Envelope
Dimensions	26 x 26 x 15 m
Structure Type	Jacket
Weight	3,000 Tonnes
Minimum Height Above Water	22 m
Pin Piles	3 or 4 per leg

2.2.2 Export Cables

44. The Green Volt Offshore Windfarm will connect directly to the Buzzard platform via an electrical cable from the OSP; expected to be approximately 15 km in length. An offshore export cable of approximately 90 km will carry power to the Landfall location along the Aberdeenshire shore.

45. The Project will have a maximum of two, dual redundant export cables to Landfall. It is expected that both export cables will run in close proximity and within the same cable corridor. Table 2.6 provides a summary of the expected design envelope for array cables.

Table 2.6 Export cable design envelope

Parameter	Design Envelope
Number	2
Length	Up to 120 km
Length Offshore	75 km
Cable Outer Diameter	<500 mm
Installation Method Offshore	Trenching, laying and burial
Trench Width Per Cable	3 m
Trench Depth	1.5 m
Separation Distance Between Cables	Up to 250 m
Cable Corridor Width	1,000 m
Rated Capacity	220 to 275 kV
Burial at Landfall	Horizontal Directional Drilling (HDD) or trenching (where HDD is not possible)
Burial Offshore if DoL not achieved	Rock dumping in trench to bury cable if the sediment removed from trench does not provide sufficient material to bury cable. Max anticipated 25% of cable length 90 km each cable 15 km total
Scour Protection	None considered – to be monitored during operational phase

46. Cable burial/armouring requirements will be assessed following the completion of side scan and sub bottom profiling surveys. Should any sections of the marine cable require additional protection following combined lay/burial operation, this will be provided by post lay jet burial, engineered, localised rock dumping or mattressing. Sections of cable may also be fitted with additional cast iron or synthetic external cladding to provide localised protection in certain areas. It is expected that this additional protection will be needed for the inshore portion of the export cables (within approximately 15 km of shore). Such protection would replicate the practice for all of the pipeline installations in the local area, the export cable for Hywind Scotland and also the planned NorthConnect cable, which is located next to the Green Volt Export Cable Route for a significant amount of the offshore export cable length.

2.2.3 Landfall

47. The Landfall location for the export cable has not yet been determined; however, two principal areas are currently under consideration:

- North of Peterhead, with various possible locations for an onshore / offshore jointing pit and onward cable to New Deer. Locations to the north allow the project to avoid the Buchan Ness to Collieston Special Protection Area (SPA) and Special Area of Conservation (SAC) but provide a more complex path onshore with a number of river crossings on route to New Deer.
- South of Peterhead with various possible locations for an onshore / offshore jointing pit and onward cable to New Deer. Locations to the south may require crossing the Buchan Ness to Collieston SPA and SAC but may provide a clearer path to New Deer.

48. It is expected that for either location, HDD will be used to take the cable from the jointing pit to a location 200-300 m offshore. Open trenching will only be used in the event that HDD cannot be used due to technical or engineering constraints; no open trenching is proposed within the Buchan Ness to Collieston SAC or SPA to avoid direct impacts on the vegetated sea cliff features.

2.3 Green Volt Project Timeline

49. The overarching aim of the Green Volt Offshore Windfarm is to decarbonise the production of offshore oil and gas fields from the earliest possible time point. A high-level project schedule is shown in Figure 2.3.

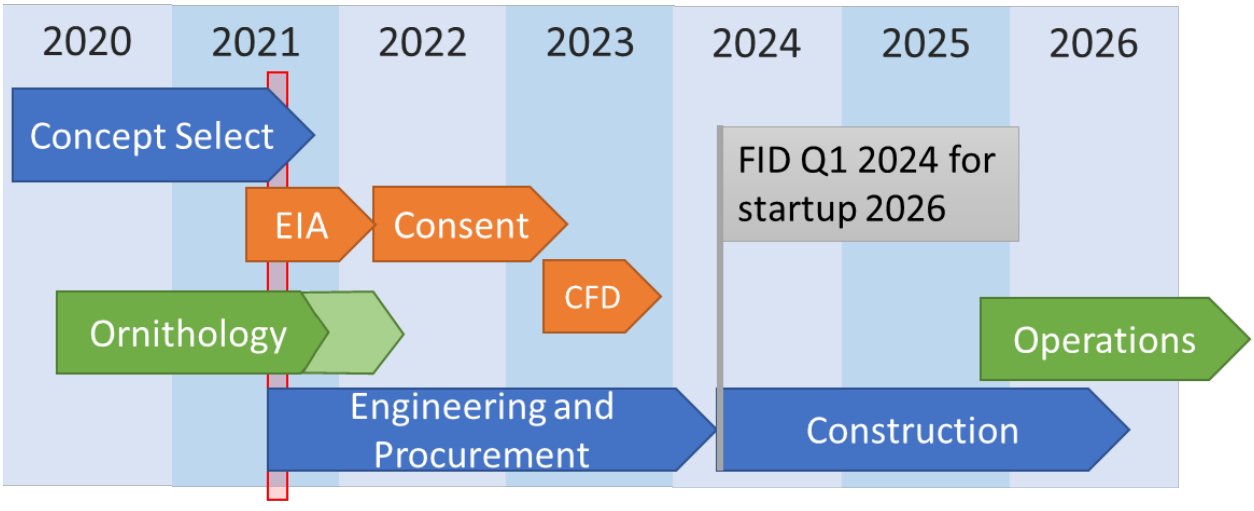


Figure 2.3: Green Volt Offshore Windfarm proposed timeline

50. The following sections outline the offshore construction schedules based on what is known at this stage in the planning stages of the Green Volt Offshore Windfarm Project.

2.4 Construction

51. Construction is expected to start mid-2024 and is scheduled over two seasons, with the aim of connecting the Buzzard oil field to the UK grid by Q2 2025 and completing and energizing Green Volt Offshore Windfarm by 2026. Construction of the substation, offshore export cable and final connection to Buzzard oil field is expected to start in the first half of 2025. An Environmental Management System (EMS) compliant with the ISO 14001 standard will be developed and implemented prior to the installation of the windfarm at the site.
52. The typical construction phases would include:
    - construction site is mobilised, local manufacturer commences, and windfarm components are delivered;
    - civil engineering works are undertaken for the onshore substation connection to the export cable;
    - substructure moorings are installed and pre-tensioned;
    - the WTG is towed to site and moored on position;
    - following connection at the agreed Landfall point, the export cables are laid between the shore and site;
    - installation of turbines;
    - inter-array cables within the windfarm are installed; and
    - systems are tested and commissioned, and the construction plant is demobilised.
53. Pre-installation of the moorings will be conducted prior to arrival of the substructures and WTGs at the Windfarm Site. This work can be conducted by a suitably equipped anchor-handling vessel. By eliminating the use of piled anchors for attachment of the mooring lines to the seabed, we anticipate that the final configuration will include drag embedment anchors, with associated chain, clump weights and wire rope in the arrangement. Following deployment of the pre-installed/tensioned the mooring system, cable ends would be buoyed off temporarily, for later recovery and attachment to the WTG/sub-structure assembly following its arrival on site.
54. Following installation and partial commissioning of the WTG on the completed sub-structure alongside the fabrication facility, or inshore, each completed unit would be towed out to site by anchor handling tugs.
55. Installation of the OSP foundations (piling) will implement all required noise mitigation, as identified from the impact assessment (primarily marine mammal impact assessment). This may include using a soft start method for piling with no simultaneous piling, use of a marine mammal observer and/or passive acoustic monitoring (PAM), and use of an acoustic deterrent device (ADD), amongst others. The piling procedure will use mud mats positioned on the seabed for piles to be inserted through stab guides. Each pile will take approximately 8-10 hours to install followed by a wait period of 24 hours to allow grout to set before testing.
56. The preferred method of cable installation would involve the simultaneous lay and burial of the cable from a dedicated cable installation vessel; this will be reviewed following the completion of the engineering work and export cable survey. If DoL is not achieved, remedial rock protection or mattresses will be used to achieve it.

57. Cable pull-in at Landfall will, most likely, be achieved via a directionally drilled conduit. At the Landfall, if cable routing is via HDD, care will be taken to engineer the arrangement so that it conforms to consenting or engineering requirements. Drill mud discharge will be kept to a minimum and will be water-based, rather than oil-based, with minimum drilling lubricants used during the final exit phase onto the seabed.

2.5 Operation and Maintenance

58. During the operational period, scheduled and unscheduled monitoring and maintenance of offshore infrastructure will be required. During the project life, it is likely that some refurbishment or replacement of offshore infrastructure will be required. All offshore infrastructure, including WTGs, floating substructures, cables and offshore platforms will be included in monitoring and maintenance programmes.

59. Operation and maintenance activities may be required at any time, 24 hours per day, 365 days per year. The majority of control activities will be undertaken remotely from shore using a control centre; however, offshore access and intervention will be required to maintain and potentially repair or refit plant and equipment. Maintenance can be generally separated into three categories:

- Planned maintenance: this includes general inspection and testing, investigation of faults and minor fault rectification, as well as replacement of consumables. It is anticipated that these events will be undertaken during summer months as the weather is likely to be more favourable, offering an increased maintenance window. Scheduled maintenance and inspection is likely to occur every six to twelve months. Inspections of subsea cables will be performed on a periodic basis.
- Unplanned maintenance: this applies to defects occurring that require rectification out-with the planned maintenance periods. The scope of such maintenance would range from small defects on non-critical systems to failure or breakdown of main components potentially requiring them to be repaired or replaced.
- Periodic overhauls: these will be carried out in accordance with equipment manufacturer's warranty and specifications. These are likely to be planned for execution in periods of the year with the best access conditions.

60. The Crown Estate Scotland lease for Green Volt Offshore Windfarm will likely be for 50 years, with the design life of the turbines and other components of the windfarm being of a similar period of time when repowering is considered.

2.6 Decommissioning

61. A Decommissioning Programme will be prepared prior to construction, in line with the requirements of the Energy Act 2004 (as amended). However, for the purpose of this Screening Report, the following has been assumed: floating substructures components would be removed, where practicable, with mooring lines, and piles to be cut just below seabed and removed. The approach to decommissioning, including cable decommissioning, will be reviewed as part of the Decommissioning Programme. It is expected that decommissioning will require similar vessels to those used in construction and take a similar period of time.

2.7 Summary of the Green Volt Offshore Windfarm

62. Below summarises the key elements of the Green Volt Offshore Windfarm, as currently planned.

Table 2.7: Summary of the Green Volt Offshore Windfarm

Project Component	Parameter	Current assumed values
Site	Project Area	144 km^2
	Water depth	100 - 115 m
	Distance to shore from closet WTG	75 km
	Mean Wind Speed	8.7 – 9.5 m/s
Turbine	WTG Capacity	10 MW – 16 MW per turbine
	Development Size	Up to 30 turbines
	WTG Hub Height (to centreline of hub)	LAT Sea level +133 m
	Operational wind speed	3.5 m/s - 30 m/s
	WTG Blade Length (to centreline of hub)	111 m
	WTG blade width	4.5 m
	Effective Tip Height	MSL + 270 m
	Blade Clearance	22 m MSL
	Colour	Matt light grey/off white
	Navigation Lighting	As required by CAA, MCA, etc
Substructure	Sub-Structure Type	Semi-submersible
	Elevation Above Waterline	12 m
	Geometry	Equilateral 3 or 4 sided
	Horizontal Face Length	Max 100 m
	Diameter of Vertical Columns	14 m
	Access Points	Two boat-landings
	Electrical Cable Access	Up to three J or I-tubes
	Mooring Points	Up to 6-point mooring (expected 3-4)
	Colour	Yellow
	Navigation Lighting	As required by CAA, MCA, etc
Moorings	Number of anchors	Up to 6 point mooring (expected 3-4)
	Anchor Type	Drag embedment anchors, torpedo anchors, gravity-based anchors, suction piles, pin piles (highly unlikely)
	Maximum seabed displacement	10 x 10 m per anchor 18,000 m^2 total array
	Potential dimensions on seabed	Up to 10m2
	Height above seabed	Up to 2 m, but full burial in seabed planned
	Mooring type	Catenary
	Number of mooring lines	Up to 6 per WTG 180 total array
	Mooring line radius	Up to 7.5 x water depth and touchdown within 250 m
	Buoys	Temporary surface buoys during construction and Permanent submersible buoys at seabed for ROV recovery. 1 per mooring lines, 180 total array
Inter-array Cables	Number	Up to 35
	Length	2.5 km each total 87.5 km
	Cable outer diameter	250 mm
	Total area of seabed coverage	Up to 70,000 m^2
	Rated capacity	66 kV
	Installation	Laid on seabed or trenched to agreed DoL – approx. 0.6 m - 1.5 m (if required)
	Burial	Extent of burial to be confirmed.

Project Component	Parameter	Current assumed values
	Scour protection	None anticipated, scour protection during installation if deemed necessary post further surveys prior to installation. Max 10% of total length rock protection is anticipated - 7 km (7,000 m2)
Offshore Substation Platform	Dimensions	26 x 26 x 15 m
	Structure Type	Jacket
	Weight	3,000 Tonnes
	Minimum Height Above Water	22 m
	Pin Piles	3 or 4 per leg
Export Cable	Number	2
	Length	Up to 120 km
	Length offshore	75 km
	Cable outer diameter	<500 mm
	Installation method offshore	Trenching, laying and burial
	Trench width per cable	3 m
	Trench depth	1.5 m
	Separation distance between cables	Up to 250 m
	Cable Corridor Width	1,000 m
	Rated capacity	220-275 kv
	Burial at Landfall	HDD or trenching (where HDD is not possible)
	Burial offshore if 1.5m depth not achieved	Rock dumping in trench to bury cable if the sediment removed from trench does not provide sufficient material to bury cable. Max anticipated 25% of cable length 90 km each cable 15 km total
	Scour protection	None considered – to be monitored during operational phase

3 The HRA Process

3.1 Legislative Context

63. The HRA process covers features designated under the European Council Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') and European Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').

64. The Habitats Regulations is the collective term for the regulations which implement the Habitats Directive, and certain aspects of the Birds Directive, in Scotland. The following regulations are applicable:

- The Conservation of Habitats and Species Regulations 2017
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (referred to as the "Offshore Marine Regulations 2017") (applies to Marine Licence and Section 36 consent applications within Scottish waters beyond 12 nm).

65. The UK exited the European Union on 31st January 2020. However, the application of the HRA process currently remains largely unchanged due to the introduction of the EU Exit Regulations 2019[2]. Policy on the protections and standards afforded by the Habitats Regulations remains unchanged, but there have been some changes in terminology and the Scottish Ministers now exercise some functions that were previously carried out by the European Commission. This report will hereafter refer to the 'Habitats Regulations' as including any changes enacted by the EU Exit Regulations.

3.1.1 The Birds Directive

66. The Birds Directive provides a framework for the conservation and management of wild birds in Europe. The relevant provisions of the Directive are the identification and classification of SPAs for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4 of the Birds Directive). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.

3.1.2 The Habitats Directive

67. The Habitats Directive provides a framework for the conservation and management of natural habitats, wild fauna (except birds) and flora in Europe. Its aim is to maintain or restore natural habitats and wild species at a favourable conservation status. The relevant provisions of the Directive are the identification and classification of SACs (Article 4) and procedures for the protection of SACs and SPAs (Article 6). SACs are identified based on the presence of natural habitat types listed in Annex I and populations of the species listed in Annex II. The Directive requires national Governments to establish SACs and to have in place mechanisms to protect and manage them.

[2] *Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019 (the "EU Exit Regulations")*

3.1.3 The Ramsar convention

68. The Convention on Wetlands of International Importance especially as Waterfowl Habitat, as amended in 1982 and 1987 (the 'Ramsar Convention') is an international treaty for the conservation and sustainable use of wetlands of international importance. Ramsar site selection has had an emphasis on wetlands of importance to waterbirds; however, non-bird features are increasingly considered, both in the selection of new sites and when reviewing existing sites.

3.1.4 The Habitats Regulations

69. The Habitats Regulations (see Section 3.1) transpose the Habitats and Birds Directives into Scottish national legislation.

70. The Habitats Regulations require than an HRA must be carried out where a plan or project is likely to have a significant effect upon a European site (previously known as a 'Natura 2000' site, now known as 'UK National site network', but for the purposes of this document they are referred to as 'designated sites') either individually or in combination with other plans or projects.

71. The Habitats Regulations place an obligation on 'competent authorities' to carry out an appropriate assessment (AA) of any proposal likely to affect a designated site before any decision to give consent for any plan or project that is not directly connected with or necessary to the [conservation] management of a European site and which could significantly affect that site (either alone or in combination with other known plans or projects). The competent authority should seek advice from NatureScot and not approve an application that would have an adverse effect on a designated site except under very tightly constrained conditions that involve decisions by the Scottish Ministers. The competent authority in the case of the proposed project will be the Scottish Ministers. It is necessary, in the first instance, for the competent authority to determine whether it is possible to conclude that there is no LSE on the site. Only where it is not possible to conclude this, does an AA need to be carried out by the competent authority.

72. In Scotland, paragraph 211 of the Scottish Planning Policy document (2014) states that Ramsar sites designated under the Ramsar Convention are also UK National site network and protected under the same statutory regimes. Paragraph 210 of the Scottish Planning Policy also affords the same level of protection to proposed SPAs (pSPAs) and proposed SACs (pSACs)[3].

3.1.5 Policy and Guidance

73. In addition to the legislation outlined above, all relevant guidance and policies will be considered during the development of the Information to Support HRA, including the following guidance:
    - Scottish Natural Heritage (SNH) HRA guidance document 'HRA of Plans. Guidance for Plan-making Bodies in Scotland' (David Tyldesley and Associates 2015).
    - Scottish Government, (2018). Marine Scotland Consenting and Licensing Guidance: For Offshore Wind, Wave and Tidal Energy Applications
    - SNH (2001). Natura Casework Guidance: Consideration of Proposals affecting SPA and SAC Guidance Note Series
    - European Commission (2001). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC. November 2001.
    - European Commission (2020): EU Guidance on wind energy development in accordance with EU nature directives.

[3] *pSPAs and pSACs are sites which have been approved by Scottish Ministers for formal consultation but which have not yet been designated.*

- Department of Energy and Climate Change (DECC 2015): Guidelines on the Assessment of Transboundary Impacts of Energy Developments on Natura 2000 Sites outside the UK.
- SNH (2018). HRA on the Moray Firth: A Guide for developers and regulators
- SNH (2020). Bird impact assessment guidance workshop for offshore wind: Report and Presentations

3.2 Overview of HRA Process

74. Where a plan or project may affect the qualifying interest features of a designated site (whether the plan or project is in, adjacent to the site, or regardless of location), the Habitats Regulations require the competent authority to undertake a HRA.

75. Neither the Habitats Directive, nor the Habitats Regulations explicitly define the assessment process to be undertaken to test the effects of plans or projects on European sites or UK National Site, respectively. However, HRA is generally recognised as a four-stage process built around the wording of Article 6(3) of the Habitats Directive, with the outcome at each stage of the process defining the requirement for, and scope of the next stage. These are described further below and in various guidance documents as listed in Section 3.1.5.

3.2.1 Stage 1 – Screening (this report)

76. For all plans and projects which are not wholly, directly connected with or necessary to the conservation management of a site's qualifying features (such as the proposed Green Volt Offshore Windfarm), Stage 1 Screening is required, as a minimum.

77. In Stage 1, habitats sites are screened for LSE (either alone or in combination with other plans or projects)[4]. Where it can be determined that there is no potential for LSE to occur to qualifying features of a site, that site is sought to be 'screened out'. It is important to note that the burden of evidence is to show, on the basis of objective information, that there will be no LSE; if the effect may cause LSE, or is not known, this would trigger the need for an AA (Tyldesley, D and Associates, 2015).

78. In accordance with the 2018 European Court of Justice ruling in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17), mitigation, including embedded mitigation has not been taken into account in State 1 Screening.

3.2.2 Stage 2 – Appropriate Assessment

79. For those sites where LSE cannot be excluded in Stage 1, further information to inform the assessment is prepared. The assessment will determine whether the project alone or in-combination could adversely affect the integrity of the habitats site in view of its conservation objectives. The assessment and conclusions of this stage will be reported in the form of a report to inform Appropriate Assessment (RIAA). Mitigation of potential impacts on site integrity can be used in an AA to support a conclusion of no adverse effects on site integrity. However, case law (Briels and Others v Minister van Infrastructuur en Milieu (C-521/12)) has established that compensatory measures cannot be used to support a conclusion of no adverse effect on site integrity.

[4] *https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra/habitats-regulations-appraisal-hra-likely*

80. AA is undertaken by the Scottish Ministers based on information supplied by the developer, and with advice provided by NatureScot, and if considered appropriate by Marine Scotland Licensing Operations Team (MS-LOT), other relevant consultees and Marine Scotland Science (MSS).

3.2.3 Stage 3 and 4 – HRA Derogation

81. Where the competent authority cannot conclude, beyond reasonable scientific doubt, that there is no adverse effect on site integrity from a plan or project, alone or in-combination, consent should not be granted unless the project satisfies each of the following tests:

- There are no feasible alternative solutions that would be less damaging or avoid damage to the site (Stage 3 – Assessment of Alternatives);
- The proposal needs to be carried out for imperative reasons of overriding public interest (IROPI) (Stage 4 – Assessment of IROPI); and
- Compensation measures are put in place to ensure that the overall coherence of the network of European sites is maintained.

3.3 Screening Methodology

82. The types of effects associated with windfarm development will vary in their magnitude and significance, depending on a range of factors including the type of technology and process involved and the location and timing of activity. In respect of designated habitats and species populations, these effects may be direct (e.g., habitat loss associated with infrastructure installation) or indirect (e.g., via changes in water quality).

83. Screening is based on a conceptual 'source-pathway-receptor' approach:

- **Source:** the origin of a potential effect (noting that one source may have several pathways and receptors), e.g., piling.
- **Pathway**: the means by which the effect of the activity could impact a receptor, e.g., noise from piling.
- **Receptor:** the element of the receiving environment that is impacted, e.g., marine mammals within the direct range of the noise disturbance.

84. This approach identifies potential effects resulting from the proposed construction, operation and maintenance, and decommissioning of the project. Where there is no pathway, or the pathway has sufficient distance such that the effect from the source has dissipated to a negligible level before reaching the receptor, there may be justification for the screening out of that particular receptor (i.e., qualifying feature) for the site in question.

85. Sites are screened in if, for any one of their qualifying features (i.e., a species or habitat), a source-pathway-receptor relationship and potential for LSE cannot be ruled out (including in combination effects). However, each qualifying feature of that site will be considered separately, and it may be that the screening process rules out LSE for some features at this stage.

86. As described in Section 3.2.1, mitigation is not taken into account at this stage but will be considered where relevant in the AA.

87. The approach to screening for each receptor is outlined in Sections 5 to 7 and is based on the known distribution, ecology and sensitivities of each receptor group and, therefore, the potential for being affected by the Green Volt Offshore Windfarm. Where there is insufficient information available at this stage to screen out a site, the site is screened in for further consideration.

3.3.1 In Combination Screening Methodology

88. The Habitats Regulations require that the potential effects of a project on designated sites are considered both alone and in-combination with other plans or projects.

89. Offshore plans or projects that may be considered include, but are not limited to:

- Other offshore windfarms
- Other renewables developments
- Mariculture
- Aggregate extraction and dredging
- Licenced disposal sites
- Shipping and navigation
- Planned construction sub-sea cables and pipelines
- Potential port/harbour development
- Carbon capture storage;
- Oil and gas development and operation, including seismic surveys
- UXO clearance

90. Discussions will be held with MS-LOT and other statutory consultees, including NatureScot, to identify any other relevant plans and projects that should be included. For each project, a review of all available information will take place and the current position with the project or plan will be identified.

3.4 Consultation

91. This section will provide a summary of the consultation undertaken in relation to HRA screening. Early consultation with NatureScot was carried out on 15 October 2021 with relation to birds as a receptor.

4 Habitats

92. The following section details the results of the process to identify the designated sites with habitats as a qualifying feature to be taken forward for determination of LSE based on the methodology outlined in Section 3.

4.1 Approach to Screening

93. Direct or indirect effects on habitats sites which have benthic habitats (Habitats Directive Annex I) as a qualifying feature have been considered for HRA screening. Potential effects may arise from the permanent or temporary physical presence or activities relating to the construction, operation or decommissioning of the Green Volt Offshore Windfarm.

94. This HRA screening exercise considers sites which meet the following criteria:

- A component of the proposed project directly overlaps a site whose qualifying features include a habitat; and / or
- The distance between the proposed project and the offshore habitat qualifying feature is within the range for which there could be an interaction (i.e., within a Zone of Influence (ZOI) for a physical process change resulting from the Green Volt Offshore Windfarm).

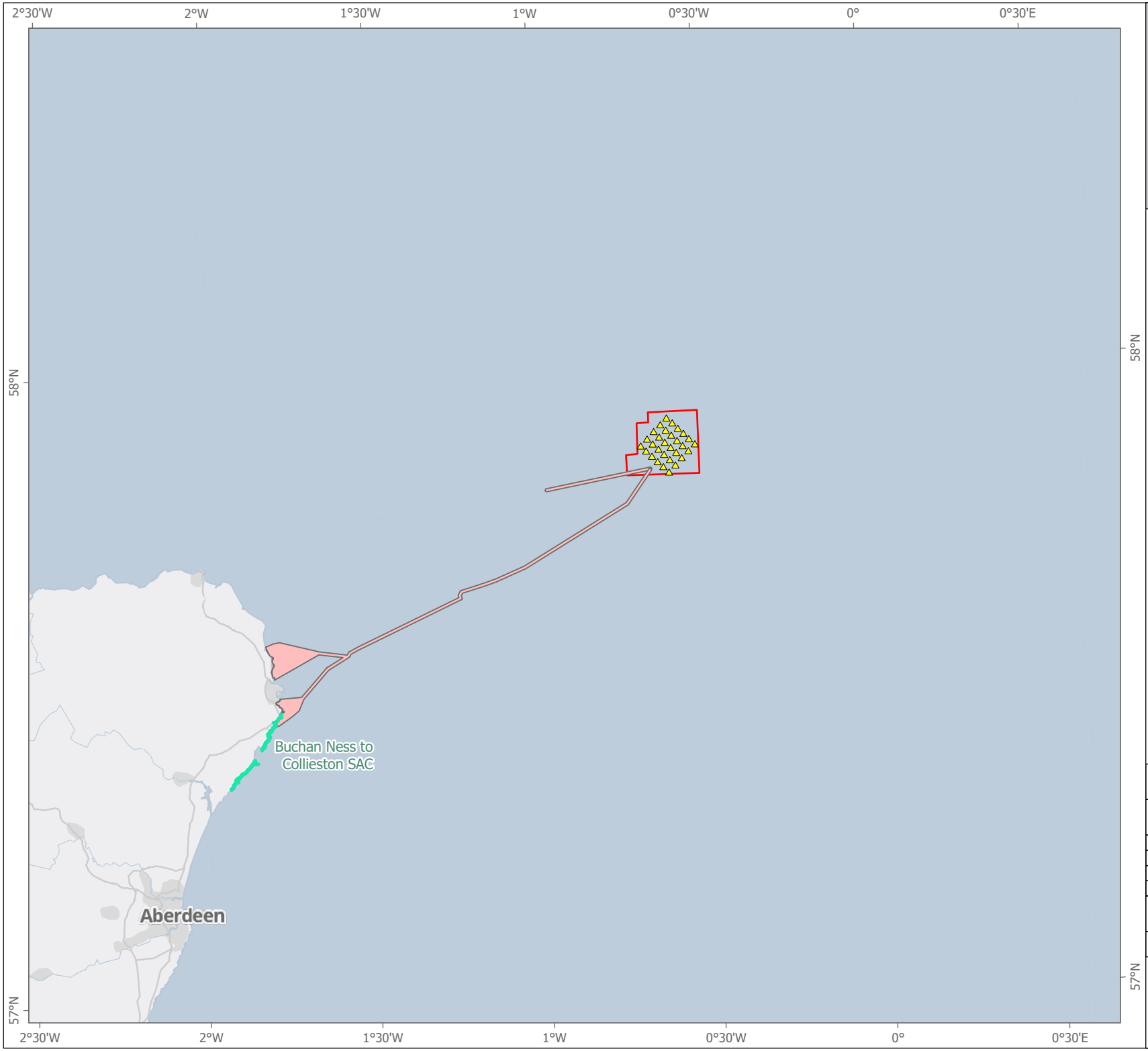
4.1.1 Identification of Sites

95. The ZOI for such indirect effects is typically defined from the outputs of the physical processes modelling to determine, for example, the fate of suspended sediments during the construction process. At this stage of the project, fully physical processes modelling has not yet been undertaken. Therefore, the ZOI has been defined as the extent of two mean tidal excursions, which applies a reasonable and suitable level of precaution. This equates to a maximum extent of 20 km in a north west to a south east direction. On the basis of this, a single site, Buchan Ness to Collieston SAC has been identified and taken through for consideration of LSE in Section 4.3. The SAC lies within the southern Export Cable Route option, and within 20 km of the northern option (Figure 4.1).

4.1.1.1 Site Overview

96. The cliffs and slopes at Bucchan Ness to Collieston SAC support a wide range of maritime habitats including grassland, crevice and ledge communities with characteristic species such as thrift *Armeria maritima*, Scots lovage *Ligusticum scoticum* and roseroot *Sedum rosea*. The cliff top has some of the best examples of heath and brackish flushes on the coast of north-east Scotland. The SAC designation does not provide information on the intertidal species of the cliffs. The SAC is designated for the following feature as a primary reason for site selection: *Vegetated sea cliffs of the Atlantic and Baltic Coasts*[5].

[5] *Full site citation can be found at https://sac.jncc.gov.uk/site/UK0030101*



LEGEND

- Proposed Green Volt development area
- Indicative turbine locations
- Possible export route options
- Special Areas of Conservation (SAC)

0 20

Kilometres

PROJECT: GREEN VOLT

TITLE: Figure 4.1 Location of Designated Sites Screened for LSE on Annex I Habitats

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FLOTATION ENERGY

4.2 Potential Effects Considered in Screening

97. Within the Green Volt Project Area, construction activities relating to the installation of the export cable and Landfall can cause direct or indirect effects on the habitat features of the Buchan Ness to Collieston SAC.

98. Operation and maintenance activities of the Project would create long term effects (i.e., for the lifespan of the Project) or permanent effects (i.e., where infrastructure is not removed during decommissioning), through the loss of existing habitat and possible introduction of new substrate, such as remedial rock protection or use of concrete mattresses as cable protection. Other temporary effects identified during operation would be caused by maintenance activities such as the repair of the export cables.

99. The potential effects on the SAC habitat (Vegetated sea cliffs of the Atlantic and Baltic Coasts) from the Export Cable Route have been identified as shown in Table 4.1; these effects are aligned with the Scoping Report. Potential effects arising from activities from the Windfarm Site have been screened out due to the distance of the Windfarm Site to the SAC.

Table 4.1:Summary of potential impacts to habitats as qualifying features (✓= screened in, x = screened out)

Potential Impacts	Construction	Operation	Decommissioning	Rationale
Physical disturbance and temporary habitat loss of seabed habitat	x	x	x	The habitats qualifying feature does not extend into the subtidal zone; therefore, there is no pathway of effect to the feature.
Physical disturbance and temporary habitat loss of intertidal habitat	✓	x	✓	The qualifying feature extends into the upper intertidal zone (i.e. Splash zone); therefore, LSE from this effect need to be considered.
Permanent habitat loss	x	x	x	There will be no permanent loss of the qualifying habitat feature from the export cable Landfall.
Increased suspended sediments and sediment re-deposition	x	x	x	The habitats qualifying feature does not extend into the subtidal zone; therefore, there is no pathway of effect to the feature.
Re-mobilisation of contaminated sediment during intrusive works	x	x	x	The habitats qualifying feature does not extend into the subtidal zone; therefore, there is no pathway of effect to the feature.
Accidental spills and pollution events	✓	✓	✓	Accidental spills and pollution events can occur from vessels and installation techniques required for the

Potential Impacts	Construction	Operation	Decommissioning	Rationale
				installation and maintenance of the export cable.
In combination effects	x	x	x	

4.3 Determination of LSE for Habitats

100. A single designated site, Bucchan Ness to Collieston SAC, was identified within the ZOI and taken forward for determination of LSE for Annex I habitats. Potential effects from the Project that have a pathway of effect to the SAC are provided in Table 4.1.

4.3.1.1 Physical disturbance and temporary habitat loss of intertidal habitat

101. If the southern Landfall option is chosen, HDD will be used to bring the export cable into Landfall. This method of installation drills under the SAC and, resulting in no direct disturbance or temporary habitat loss to the SAC. During decommissioning, the cable will be pulled out of the duct resulting in no direct or indirect interaction with the SAC.

102. If the northern Landfall option is chosen, the distance from the construction or decommissioning activities to the SAC are such that they do not fall within the ZOI of the SAC.

103. In conclusion, there is no LSE from the physical disturbance and temporary habitat loss of intertidal habitat resulting from construction and decommissioning activities of the Export Cable Route to Bucchan Ness to Collieston SAC.

4.3.1.2 Accidental Spills and Pollution Events

104. Accidental spills and pollution events can occur from vessels and installation techniques required for the installation and maintenance of the export cable. Green Volt will commit to undertaking construction works in adherence will all relevant best practice guidance and legislation and will prepare all necessary plans in advance of construction activities. On this basis, there is considered to be no LSE on Bucchan Ness to Collieston SAC from this impact.

4.4 In Combination Assessment

105. The LSE test requires consideration of the Project alone and/or in combination with other plans and projects. As no LSE has been identified for all effects in the alone assessment, there is either no pathway of effect, or the proposed Project would result in only negligible or inconsequential effects that would not contribute, in a material way, to in combination effects; therefore, no additional in combination issues are identified.

4.5 Summary of Habitats HRA Screening

106. One SAC, Bucchan Ness to Collieston SAC, was identified as having a pathway of effect from the Project to the site. The screening process identified that there was no LSE from the construction, P&M, and decommissioning activities from the Green Volt Offshore Windfarm to the SAC, either alone or in combination. Therefore, this site has been screened out.

5 Fish Ecology

5.1 Approach to Screening

107. Direct or indirect effects on Annex II migratory fish species may arise from the permanent or temporary physical presence or activities relating to the construction, operation and decommissioning of the windfarm and associated infrastructure. Potential effects include loss of habitat, disturbance and displacement.

108. This HRA screening exercise considers sites which meet the following criteria:

- the Project Area that directly overlaps a site whose qualifying features includes an Annex II migratory fish species;
- the distance between the Project Area and a site with fish as a qualifying feature that is within the range for which there could be an interaction, e.g., the distance of the site from the source of suspended sediment from the Project Area is within the range at which sediment deposition could occur, or effects from electromagnetic fields (EMF);
- the distance between the Project Area and resources on which the qualifying features depend on (e.g., an indirect effect acting on prey or access to supporting habitat) is within the range for which there could be an interaction; and
- the likelihood that a foraging area or a migratory route occurs within the Project Area.

5.1.1 Identification of Sites and Features (Receptor)

109. Based on a review of available information, the following Annex II species are known to either migrate through or spend part of their life cycle in the North Sea (Scoping Report):

- Atlantic salmon *Salmo salar*
- Sea lamprey Petromyzon marinus
- River lamprey Lampetra fluviatilis

110. There is the potential for these migratory fish to be present in the vicinity of the Project and they are, therefore, considered in this screening exercise.

111. The following Annex II species are migratory, but do not spend part of their life cycle in the marine environment and are not included within the screening exercise.

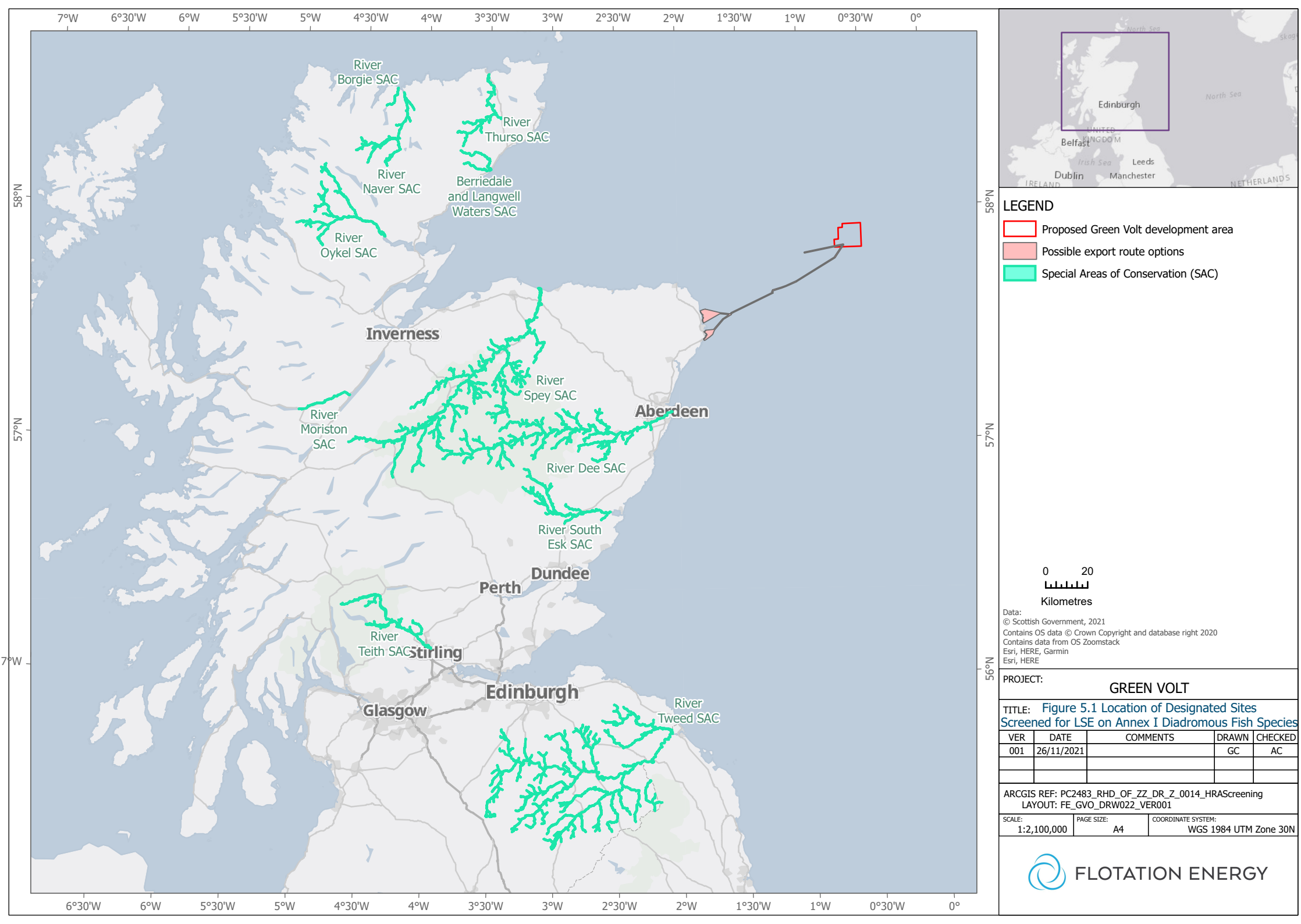
- Brook lamprey *Lampetra planeri*

112. Freshwater pearl mussel (FWPM) is a designated feature of a number of SACs. The long-term survival of the freshwater pearl mussel depends ultimately upon host availability (Skinner et al, 2003). Juvenile Atlantic salmon and sea trout are host fish of the larval stage (glochidia) of freshwater mussels, attaching themselves to the gill filaments in the fast-flowing sections of rivers over July - September. Therefore, healthy populations of juvenile salmonid (salmon and sea trout) fry and parr are required to ensure their survival over winter before they drop off in May and early June. The relative importance of salmon and sea trout to the FWPM population varies depending on location. Potential impacts to sea trout may be similar to those for salmon.

113. This exercise considers all designated sites within north and east coasts of Scotland and northern England which have migratory fish species and/or freshwater pearl mussel listed in Annex II of the Habitats Directive as a qualifying feature. Fish from these sites have potential to cross the footprint of the Project during construction or operation as part of their natural migratory routes. These sites are presented in Table 5.1 and Figure 5.1.

Table 5.1: Designated sites where fish are a qualifying feature (or feature of interest) screened into the HRA for further assessment

Designated site	Distance (km) and direction from Project boundary	Species
River Dee SAC	37 south	Atlantic salmon Freshwater pearl mussel
River Spey SAC	84 north	Atlantic salmon Sea lamprey Freshwater pearl mussel
South Esk SAC	93 south	Atlantic salmon Freshwater pearl mussel
Tweed SAC	186 south	Atlantic salmon Sea, brook and river lamprey
River Teith SAC	244 south	Atlantic salmon Sea, brook and river lamprey
River Borgie SAC	240 north	Atlantic salmon Freshwater pearl mussel
Berriedale and Langwell Waters SAC	140 north	Atlantic Salmon
River Naver SAC	224 north	Atlantic salmon Freshwater pearl mussel
River Thurso SAC	150 north	Atlantic salmon
River Oykel SAC	167 north	Atlantic salmon Freshwater pearl mussel
River Moriston SAC	204 north	Atlantic salmon Freshwater pearl mussel



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PROJECT: GREEN VOLT

TITLE: Figure 5.1 Location of Designated Sites Screened for LSE on Annex I Diadromous Fish Species

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FLOTATION ENERGY

5.2 Potential Effects Considered in Screening

114. The key factors that will be considered during the HRA screening process are:

- potential effects (source); and
- proximity of source to feature (distance between the Project and designated sites and migration routes) (pathway and receptor).

115. The potential effects on migratory fish from the Project have been identified within the EIA Scoping for fish and shellfish in Section 6.2 of the Scoping Report. Table 5.2 below presents potential effects during construction, operation and maintenance (O&M) and decommissioning considered in the HRA process.

116. During construction of Green Volt Offshore Windfarm, activities which result in disturbance to the seabed and the generation of suspended sediment have the potential to disturb and displace fish from supporting habitats or migratory routes. Underwater noise generated by construction activities, such as piling, also has the potential to displace fish from supporting habitats or migratory routes by acting as a barrier.

117. During the operational period, the physical presence of turbine foundations and associated components (OSPs, export cables, array cables) will result in the loss or replacement of existing habitats. Maintenance activities during the operational phase may also result in localised disturbance or displacement.

118. Some migratory species, such as salmonids, are vulnerable to EMF produced by the subsea cables during operation. Salmonids are likely to utilise EMF for behaviours such as navigation during long distance migrations which occur at certain stages of their life cycles (Gill and Bartlett, 2010).

119. Decommissioning would require the removal of foundation structures and either the cutting or removal of subsea cables resulting in physical disturbance, potential disturbance and displacement of impacts associated with suspended sediment and underwater noise. Effects caused during decommissioning would be similar to those during the construction phase.

120. The potential effects on fish from the Green Volt Offshore Windfarm have been identified from the Scoping Report and are provided in Table 5.2. These are potential effects which could affect a receptor (site or feature) if there is a pathway and have been adopted in this HRA Screening process.

Table 5.2: Summary of potential effects on fish ecology considered in HRA Screening (screened in (✓) and screened out (x)

Potential Impact	Construction	Operation & Maintenance	Decommissioning
Physical disturbance and temporary habitat loss of seabed habitat, spawning or nursery grounds or migration routes during intrusive works	✓	✓	✓
Permanent habitat loss	x	✓	x
Increased suspended sediments and sediment re-deposition	✓	x	✓
Re-mobilisation of contaminated sediment during intrusive works	✓	x	✓
Potential impacts on Designated Sites	✓	x	✓
Underwater noise impacts to hearing sensitive species during pile driving and other activities (vessels, seabed preparation, cable installation etc)	✓	✓	✓

Potential Impact	Construction	Operation & Maintenance	Decommissioning
Introduction of anchors, foundations, scour protection and hard substrate and associated fish aggregation	x	✓	x
Electromagnetic fields	x	✓	x
Accidental spills and pollution events	x	x	x
Cumulative underwater noise	✓	✓	✓
Cumulative permanent habitat loss	x	✓	✓
Cumulative changes to seabed habitat	✓	✓	✓
Cumulative impacts to designated sites	✓	✓	✓

5.3 Determination of LSE for Fish

121. Atlantic salmon and sea and river lamprey are diadromous fish, defined as those which spend portions of their life cycles both in freshwater and at sea.

122. There is limited knowledge of the migration behaviour of Atlantic salmon and sea and river lamprey once they reach the sea as post-smolts and during the return of adults to spawn within their native rivers. However, from available data it may be assumed that the fish species are more likely to be present in the Export Cable rather than the Windfarm Site (Ellis et al., 2012) as information suggests that most of the adult migration time is spent swimming in shallow coastal and near shore waters (0-40 m) (Malcom *et al*., 2015, Malcom *et al*., 2010). The extent of how long they are present in these areas prior to migration into deeper waters to their feeding areas near Greenland, as well as the routes they migrate along through the open sea remain little understood (Gill and Bartlett, 2010; Malcolm *et al*., 2015). Malcom *et al*. (2013) summarised the movement of Atlantic salmon around the Scottish coast to the be generally northwards from north east England to Aberdeenshire, and both northerly and southerly from the Black Isle and Sutherland. The National Research and Monitoring Strategy for Diadromous Fish (NRMSD) has been set up by Marine Scotland in order to prioritise the collection of information to fill this gap in knowledge, this research is ongoing.

5.3.1.1 Physical Disturbance, Displacement, Temporary and Permanent Habitat Loss During Construction

123. Due to the distance of the Project from the nearest SAC designated for diadromous fish (River Dee SAC is 37 km from nearest point on the Export Cable Route), there will not be any direct physical disturbance, displacement, temporary or permanent habitat loss during construction and no LSE is anticipated on all SACs in Table 5.1 and all sites are screened out.

124. Temporary disturbance will occur during construction activities across a narrow section of migratory routes but this habitat is not important for spawning activity. Although a narrow trench will be dug to lay the Export Cable across habitat which may support benthic prey species and provide a foraging resource for migratory fish, these works will be short term, temporary will not cause a barrier to the movement of fish. The seabed habitat is anticipated to recover quicker (Scoping Report; Ref: PC2483-RHD-ZZ-XX-RP-Z-0001) and as migratory fish are highly mobile, they will be able to move to unaffected areas with ease.

5.3.1.2 Increased Suspended Sediments and Sediment Re-Deposition and Re-Mobilisation of Contaminated Sediments During Construction

125. Migratory fish have the ability to avoid the localised areas disturbed by increased SSCs and sediment re-deposition during construction. If displaced, fish are able to move to adjacent, undisturbed areas within their normal habitat range. They will not be using the coast / open seas for spawning activities. The scale and nature of any impacts will be small (Scoping Report Scoping Report; Ref: PC2483-RHD-ZZ-XX-RP-Z-0001) when compared to the area of coastal / open sea habitat available along the migratory routes and any sediment plumes will be temporary and short term within a small footprint during the construction of the linear Export Cable Route.

126. Migratory species such as Atlantic salmon, sea trout and river lamprey will experience marine, brackish and freshwater environments during their life-cycle and are able to tolerate a wide range of changing parameters including salinity, dissolved oxygen and suspended sediments. The estuary environment through which they pass through include fine mud habitat and the fish have potential to experience periods of suspended sediments in the water column stirred up through natural events. Mortality of migratory fish species as a result of turbid water conditions has seldom been observed in nature and in salmonids (including Atlantic salmon and sea trout). On this basis, it is considered that there is not a pathway of effect from suspended sediments, sediment redeposition and remobilisation of suspended sediments to cause a LSE on the population levels of migratory fish qualifying interest features of any SACs in Table 5.1 if the fish pass through the area of impact (sediment plumes, etc) and all sites are screened out.

5.3.1.3 Disturbance and Displacement to Migratory Fish Due to Underwater Noise Impacts During Construction

127. Research by Harding et al. (2016) has demonstrated that the hearing threshold of salmonids is not as sensitive as other fish species as they lack secondary hearing modifications linking the swim bladder to the auditory system. Harding et al. (2016) reported that the noise produced from piling activities from offshore windfarm construction does not appear to have significant effects upon the movement behaviour or physiological behaviour of Atlantic salmon and individuals do not show a startle response or stress to this source of underwater noise. Lamprey also do not possess a swim bladder and are less sensitive to underwater noise than fish that do possess a swim bladder (Maes et al, 2004).

128. Therefore, even though the movements of Atlantic salmon and lamprey are not fully understood within a local or regional context, they are not considered to be sensitive to sources of underwater noise. Limited piling will be required during the construction phase of the Project (approximately 36 hours of work to install four piles for the substation, built approximately 75 km offshore in deep waters (110 m depth)), and all other activities for construction, operation or decommissioning (vessel movement, seabed preparation, cable installation, etc) will be lower in noise frequency. The vessels which will be used for construction will be (with the exception of the installation of the substation) local vessels which contribute to the background noise levels in the surrounding waters and migratory fish will be habituated to these background noise levels. ‘Soft start’ procedures will be incorporated into the method statements to ensure that underwater noise is slowly introduced to marine fauna. On this basis, it is considered that there is no pathway for underwater noise to cause a LSE on the population levels of migratory fish qualifying interest features of any of the SACs being assessed. This approach was taken for the Moray West Offshore windfarm, where a greater number of piling activities were proposed within 25 km of an SAC protected for Annex II migratory fish species (River Spey SAC).

129. Particle motion is increasingly recognised as a potentially important mechanism for effects relating to offshore developments such as wind energy, especially for those fish species more sensitive to particle motion than sound pressure (Farcas *et al.,* 2016), and to invertebrates (potential prey) which are only sensitive to particle motion (Miller *et al.,* 2016; Roberts & Breithaupt, 2016). There are very limited data relating to particle motion levels resulting from pile-driving during the installation of offshore windfarm foundations. Measurements were collected by Thomsen *et al.* (2015) during the construction of an offshore windfarm in the southern North Sea; particle motion was considered to be sufficiently elevated above ambient levels within 750 m of piling locations, across most of the frequency spectrum, to be detectable by most fish species. Thomsen *et al.* (2015) also measured the differing levels of particle motion around operational wind turbines. Levels were found to be measurably greater than background within 40 m of the turbine base, and emissions from steel monopile foundations were noted to be greater than those from jacket-based turbines. These results were not related to audibility to marine fauna. Measurements have not been taken for floating wind technology. Due to distance of the nearest SAC from the Project (37 km), and limited piling activities which take place in the Windfarm Site 75 km offshore in deep water, while a disturbance may occur to individuals, an impact is not anticipated to cause LSE on SAC population levels from SACs listed in Table 5.1 and all sites are screened out.

5.3.1.4 Introduction of Anchors, Foundations, Scour Protection and Hard Substrate and Associated Fish Aggregation

130. The Windfarm Site is located in deep waters 75 km offshore, and Atlantic salmon and sea lamprey are not anticipated to be within the Windfarm Site in large numbers during their migrations. River lamprey are rarely found in the open sea. Aggregation around devices, anchors and foundations are not anticipated to cause a LSE on SAC population levels.

131. Hard substrate used to bury the export cables at locations where is cannot be buried are not anticipated to cause a barrier to the movement of migratory fish or disrupt their passage and as such, are not anticipated to cause an LSE on SAC population levels from any SACs listed in Table 5.1 and all sites are screened out.

5.3.1.5 Disturbance and Displacement to Migratory Fish from EMF During Operation

132. The migratory nature of some species means they may be sensitive to effects such as EMF generated from subsea cables. Salmonids and lamprey are likely to use EMF for navigational purposes during their long migrations. There is limited knowledge on the effects of EMF on migratory species and, therefore, a level of uncertainty in their potential interaction with EMF.

133. Atlantic salmon response to EMF was tested empirically by MSS (Armstrong et al. 2015). Experiments were conducted where post-smolt and adult fish swam through coils emitting EMF. No unusual behaviours or evidence of alarm or other response were observed during coil activation. The authors concluded that the main finding was that there was no identifiable behavioural response of Atlantic salmon of EMF at 50 Hz (like those emitted from Alternating Current (AC) cables), and that AC cables, as proposed at the Green Volt Offshore Windfarm, do not emit EMF strong enough to influence salmonids and other species sensitive to EMF. Research (Godfrey et al., 2014; Malcom et al., 2010), demonstrates that Atlantic salmon are known to migrate using coastal routes and generally only congregate at the mouths of their natal rivers prior to ascending them, and as the export cable is 37 km from the closest SAC for Atlantic salmon congregation of SAC populations are unlikely to occur around the Export Cable Route.

134. Lampreys, like elasmobranchs, possess electroreceptors that are sensitive to weak, low-frequency electric fields (Bodznick and Preston 1983). Whilst response to electric fields have been reported in these species, information on the use that they make of the electric sense is limited. It is likely however, that they use it in a similar way as elasmobranchs to detect prey, predators or conspecifics and potentially for orientation or navigation (Normandeau et al., 2011). The cues used by sea lampreys during their homeward migrations are not known (Waterside Ecology, 2017). Relatively little is known about the precise habitats occupied by adult sea lampreys and although adults are sometimes caught at sea, the precise conditions in which they occur have not been described. Most adults are found in freshwater and spawning and larval stages occur in rivers (Maitland, 2003).

135. As part of the project design, the Export Cable Route will be buried to a DoL as agreed with the regulators, as recommended by the UK Department of Energy and Climate Change (DECC) (2011), which will protect the cables from unintentional damage from anchors and fishing activities. Where burying is not possible, Flotation Energy are committed to ensuring the equivalent depth will be achieved through other means, such as rock dumping. As the cables are buried at depth, there will be little or no EMF at the surface of the seabed. Species monitoring at the Robin Rigg windfarm observed no significant difference in the difference in distribution of electro sensitive species along the cable corridor after two years of monitoring (Malcom et al., 2013).

136. Due to the distances from the SACs, the limited known effects of EMF on migratory fish species and the commitment to bury subsea cables as per DECC requirements, it is, therefore, proposed that the potential effects from EMF are screened out from the HRA process and that EMF will not require further consideration in any future RIAA. This conclusion is also validated through the outcomes of the Moray East, Moray West, Beatrice, and Kincardine offshore windfarms HRAs for which no LSE from EMF was accepted.

137. Given the location of the Project Area relative to the habitat of freshwater pearl mussel, will not be any direct effects on freshwater mussel SAC populations. However, it is recognised that populations may be indirectly affected if there were impacts on their host species (salmonids). As no LSE has been determined on salmonid populations from the River Dee, South Esk and River Spey SACs, there will be no LSE on freshwater pearl mussels from SACs listed in Table 5.1 and all sites are screened out.

5.4 In Combination Assessment

138. The in-combination assessment will consider plans or projects where the predicted effects have the potential to interact with effects from the proposed construction, operation and maintenance or decommissioning of the Project. See Section 3.3.1 for the in combination methodology.

139. The nearest SAC to the north of the Project is the River Spey SAC (84 km) whilst the nearest to the south of the Project is the River Dee SAC (37 km). All designated sites are considered to be beyond the area where congregation might occur in nearshore environments near the river mouth as fish wait for environmental conditions to become conducive for river entry, however fish from these two SACs are most likely to encounter the project in greatest numbers during their migrations. In combination effects of underwater noise and EMF will be considered for SACs within 90 km of the proposed works and will consider both these SACs. Beyond 90 km, there is not anticipated be an LSE for sites designated for migratory fish and SAC populations will be spread out within the marine environment. Impacts are screened out for South Esk SAC, Tweed SAC, River Teith SAC, River Borgie SAC, Berriedale and Langwell Waters SAC, River Thurso SAC, River Oykel SAC and River Moriston SAC. Impacts associated with direct habitat loss, suspended sediments or

aggregation are not anticipated to cause an LSE for migratory fish, alone or in combination and all sites are screened out.

5.5 Summary of Fish HRA Screening

140. Of all the designated sites initially considered in the HRA screening for migratory fish qualifying interest features, three SACs have been screened in for further assessment to determine the potential for any adverse effects on the integrity of the sites in relation to the conservation objectives as result of the Project alone or in-combination with other projects and plans (Table 5.3).

Table 5.3: Designated sites where fish are a qualifying feature (or feature of interest) screened into the AA for further assessment

Designated site	Distance and direction from Project boundary (km)	Species	Reason for screening in / out
River Dee SAC	37 south	Atlantic salmon Freshwater pearl mussel	Potential for cumulative LSE. Screened in (in combination underwater noise and EMF).
River Spey SAC	84 north	Atlantic salmon Sea lamprey Freshwater pearl mussel	
South Esk SAC	93 south	Atlantic salmon Freshwater pearl mussel	
Tweed SAC	186 south	Atlantic salmon Sea, brook and river lamprey	No LSE anticipated: screened out
River Teith SAC	244 south	Atlantic salmon Sea, brook and river lamprey	
River Borgie SAC	240 north	Atlantic salmon Freshwater pearl mussel	
Berriedale and Langwell Waters SAC	140 north	Atlantic Salmon	
River Naver SAC	224 north	Atlantic salmon Freshwater pearl mussel	
River Thurso SAC	150 north	Atlantic salmon	
River Oykel SAC	167 north	Atlantic salmon Freshwater pearl mussel	
River Moriston SAC	204 north	Atlantic salmon Freshwater pearl mussel	

6 Marine Mammals

141. HRA screening is Stage 1 of the three stage HRA process (see Section 3.2). The aim of Screening is to determine whether or not a plan or project is likely to have a LSE on a designated site, either alone or in-combination with other plans and projects. Where it is considered that there is no potential for LSE, the site (or relevant interest feature) is 'screened out' from further consideration in the HRA process. Where the potential for LSE cannot be discounted, it remains screened in and further assessment will be undertaken.

142. Mitigation measures intended to avoid or reduce the harmful effects of a plan or project are not taken into account at the Screening stage, but will be considered during the AA stage, where this applies. Agreement on whether sites and features should or should not be screened-out will be sought through feedback on this Report and throughout the ongoing stakeholder consultation.

143. The screening assessment is based on the understanding of the baseline environment and the scope and nature of the proposed project activities at the time of writing. Further environmental survey and assessment work, changes to designated sites, consultee responses and refinements to the Project design may change this assessment. Any such changes will be reflected in the draft HRA.

6.1 Approach to Screening

144. For marine mammals, the approach to HRA screening primarily focuses on the potential for connectivity between individual marine mammals from designated populations and the offshore Project Area (i.e., demonstration of a clear source-pathway-receptor relationship). This is based on the distance of the offshore Project Area from the designated site, the range of each effect and the potential for marine mammals from a designated site to be within range of an effect.

145. The HRA screening exercise therefore considers designated sites which meet the following criteria:

- the distance between the potential effect of the Project and a designated site with marine mammals as a qualifying feature is within the range for which there could be an interaction (for example, the pathway is not too long for significant noise propagation and therefore the site is within the ZOI for underwater noise effects);
- the distance between the proposed project and resources on which the qualifying marine mammal feature depends (i.e., an indirect effect acting though prey or access to habitat) is within the potential ZOI (for example the pathway is not too long); and
- the likelihood that a foraging area or a migratory route occurs within the ZOI of the proposed project (applies to mobile interest features when outside the designated site).

6.2 Potential Effects Considered in Screening

146. The key factors that will be considered during the HRA screening process for marine mammals are:

- potential effects (source); and
- proximity of source to feature (distance between the Project and SACs, migration routes) (pathway and receptor).

147. The potential effects on marine mammals from the Project have been identified within the EIA Scoping for marine mammals. Table 6.1 presents potential effects during construction, O&M and decommissioning considered in the HRA process.

Table 6.1: Summary of potential effects to marine mammals screened into HRA

Potential Impacts	Construction	O&M	Decommissioning
Underwater noise including barrier effects (all potential sources during operation, O&M and decommissioning)	✓	✓	✓
Collision risk with vessels	✓	✓	✓
Entanglement	x	✓	x
Disturbance at seal haul-out sites	x	x	x
Barrier effects due to the physical presence of offshore infrastructure.	x	✓	x
Changes in water quality	x	x	x
Changes to prey availability	✓	✓	✓
In-combination effects from underwater noise	✓	✓	✓
In-combination effects from collision risk and entanglement	✓	✓	✓
In-combination effects from disturbance at seal haul-out sites	✓	✓	✓
In-combination effects to prey availability (including habitat loss)	✓	✓	✓
Transboundary effects	✓	✓	✓

6.3 Determination of LSE for Marine Mammals

148. The following sections describe the process used to define the list of sites for which there is possible connectivity and therefore potential for a source – pathway – receptor relationship for marine mammal qualifying SAC features, i.e., harbour porpoise *Phocoena phocoena*, bottlenose dolphin *Tursiops truncatus*, grey seal *Halichoerus grypus* and harbour seal *Phoca vitulina*.

6.3.1.1 Harbour porpoise

149. For harbour porpoise, connectivity is considered potentially possible between the Project and any designated sites within the North Sea Management Unit (MU) (IAMMWG, 2021) where harbour porpoise are listed as a qualifying feature. Therefore, all designated sites outwith the North Sea MU have been screened out from further consideration.

150. This HRA screening considers any designated sites within the harbour porpoise North Sea MU, where the species is considered as a grade A, B or C feature. Grade D indicates a non-significant population (JNCC, 2009) and have therefore not been considered further. Table 6.2 provides the list of designated sites for harbour porpoise considered in the HRA screening.

151. As harbour porpoise are wide-ranging within the North Sea MU, no discrete population can be assigned to an individual designated site. It is, therefore, assumed that at any one time, harbour porpoise within or in the vicinity of the Project Area are associated with the nearest SAC, the Southern North Sea SAC (as they cannot simultaneously be part of the population of multiple designated sites, although all are part of the larger MU population). Therefore, with regard to the potential effects of the Project, connectivity of harbour porpoise from other designated sites, other than the Southern North Sea SAC is screened out.

6.3.1.2 Bottlenose dolphin

152. For bottlenose dolphin, connectivity is considered potentially possible between the Project and any designated sites within the Greater North Sea and Coastal East Scotland MUs (IAMMWG, 2021) where bottlenose dolphins are listed as a qualifying feature. Therefore, all designated sites out with these MUs have been screened out from further consideration.

153. This HRA screening considers any designated sites where bottlenose dolphin is considered as a grade A, B or C feature. Grade D indicates a non-significant population (JNCC, 2009) and have therefore not been considered further. Table 6.2 provides the list of designated sites for bottlenose dolphin considered in the HRA screening.

154. As a precautionary approach, it is assumed that all bottlenose dolphins in the vicinity of the Project are from the Moray Firth SAC. Therefore, with regard to the potential effects of the Project, connectivity of bottlenose dolphin from other designated sites, other than the Moray Firth SAC is screened out.

6.3.1.3 Grey seal

155. Grey seals are wide ranging and can breed and forage in different areas (Russell *et al*., 2013). Grey seals generally travel between known foraging areas and back to the same haul-out site but will occasionally move to a new site. For example, movements have been recorded between haul-out sites on the east coast of England and the Outer Hebrides (SCOS, 2018), and tags deployed on grey seals at Donna Nook and Blakeney Point in May 2015 indicated that they used multiple haul-outs sites; with one hauling out in the Netherlands and one in Northern France (Russell, 2016).

156. Grey seals will typically forage in the open sea and return regularly to land to haul-out, although they may frequently travel up to 100 km between haul-out sites. Foraging trips generally occur within 100 km of their haul-out sites, although grey seal can travel up to several hundred kilometres offshore to forage (SCOS, 2020).

157. To take into account the wide range and movements of grey seal, all designated sites where grey seal are a qualifying feature in the North Sea area were considered. All designated sites out with this region were screened out from further consideration. For grey seal, the screening process includes any designated site where the species is a grade A, B or C feature.

158. Grey seals could come from any of the designated sites considered to have potential connectivity, due to their large foraging ranges and movements. As a result, it will be assumed within the assessments that any grey seal within the Project Area, or within the potential disturbance ranges of the Project, could be from a designated site. Therefore, any potential effects to grey seal will be assessed based on them being from the nearest designated site, and they have travelled away from the site in order to forage.

159. The Isle of May SAC and Faray and Holm of Faray SAC, both designated for grey seal, have been screened in for further assessment, taking into account the movements and forging ranges of grey seal (Table 6.2).

6.3.1.4 Harbour seal

160. The Sea Mammal Research Unit (SMRU), in collaboration with others, has deployed telemetry tags on harbour seals around the UK. The spatial distributions indicate harbour seals persist in discrete regional populations, display heterogeneous usage, and generally stay within 50 km of the coast (Russell and McConnell, 2014). Tagged harbour seals were observed to have a more coastal distribution than grey seals and do not travel as far from haul-outs (Russell and McConnell, 2014).

161. Harbour seals generally make smaller foraging trips than grey seal. The typical and average foraging range for harbour seal is 50-80 km (SCOS, 2017). Tracking studies have shown that harbour seals travel 50-100 km offshore and can travel 200 km between haul-out sites (Lowry *et al*., 2001; Sharples *et al*., 2012). The range of these trips varies depending on the location and surrounding marine habitat.

162. To take into account the wide range and movements of harbour seal, all designated sites where harbour seal are a qualifying feature in the North Sea area were considered. All designated sites out with this region were screened out from further consideration. For harbour seal, the screening process includes any designated site where the species is a grade A, B or C feature.

163. Harbour seals could come from any of the designated sites considered to have potential connectivity, due to their foraging ranges and movements. As a result, it will be assumed within the assessments that any harbour seal within the Project Area, or within the potential disturbance ranges of the Project, could be from a designated site. Therefore, any potential effects to harbour seal will be assessed based on them being from the nearest designated site, and they have travelled away from the site in order to forage.

164. The Firth of Tay and Eden Estuary SAC and Dornoch Firth and Morrich More SAC, both designated for harbour seal, have been screened in for further assessment, taking into account the movements and forging ranges of harbour seal (Table 6.2).

6.4 In Combination Assessment

165. The in-combination assessment will consider plans or projects where the predicted effects have the potential to interact with effects from the proposed construction, operation and maintenance or decommissioning of the Project. See Section 3.3.1 for the in combination methodology.

166. The plans and projects assessed for potential in-combination effects are located within (i) the relevant MU boundary for harbour porpoise, bottlenose dolphin, grey seal or harbour seal; and (ii) there is the potential for connectivity and clear pathway for the in-combination effect and marine mammals from the designated sites, e.g. the distance between the potential effect and a designated site with marine mammals as a qualifying feature is within the range for which there could be an interaction.

167. The projects identified for potential in-combination assessment will be agreed during meetings with relevant stakeholders.

6.5 Summary of Marine Mammal HRA Screening

168. Of all the designated sites initially considered in the HRA screening (Table 6.3) for marine mammals, six SACs have been screened in for further assessment to determine the potential for any adverse effects on the integrity of the sites in relation to the conservation objectives as result of the project alone or in-combination with other projects and activities (Table 6.2).

169. Table 6.3 provides the screening assessment for all designated sites in the North Sea area (including potential transboundary effects), with either harbour porpoise, grey seal or harbour seal listed as a qualifying feature with a population grade of A, B, or C, within the relevant screening areas. These are also displayed in Figure 6.1.

Table 6.2: Designated sites where marine mammals are a qualifying feature (or feature of interest) screened into the HRA for further assessment

Designated site	Species	Reason for screening in
Southern North Sea SAC	Harbour porpoise	Potential effects from: o underwater noise o vessel interactions o entanglement o barrier effects due to the physical presence of offshore infrastructure. o changes to prey resources o in-combination effects
Moray Firth SAC	Bottlenose dolphin	Potential effects from: o underwater noise o vessel interactions o entanglement o barrier effects due to the physical presence of offshore infrastructure. o changes to prey resources o in-combination effects
Isle of May SAC Faray and Holm of Faray SAC	Grey seal	Potential effects from: o underwater noise o vessel interactions o entanglement o barrier effects due to the physical presence of offshore infrastructure. o changes to prey resources o in-combination effects
Firth of Tay and Eden Estuary SAC Dornoch Firth and Morrich More SAC	Harbour seal	Potential effects from: o underwater noise o vessel interactions o entanglement o barrier effects due to the physical presence of offshore infrastructure. o changes to prey resources o in-combination effects

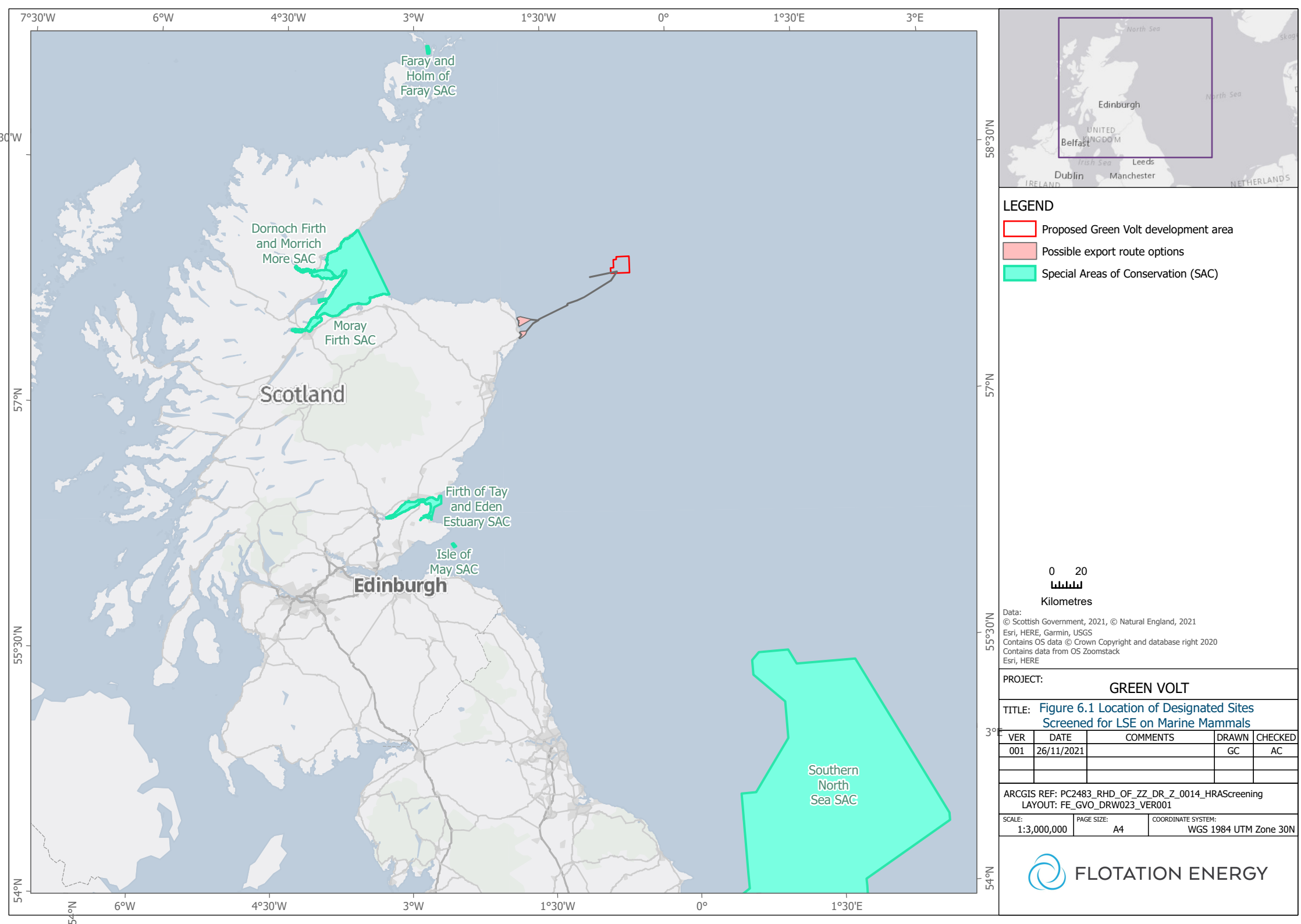

7°30'W
6°W
4°30'W
3°W
1°30'W
0°
1°30'E
3°E
58°30'N
57°N
55°30'N
54°N
Faray and Holm of Faray SAC
Dornoch Firth and Morrich More SAC
Moray Firth SAC
Scotland
Firth of Tay and Eden Estuary SAC
Isle of May SAC
Edinburgh
Southern North Sea SAC
North Sea
Edinburgh
UNITED KINGDOM
Belfast
Irish Sea
Leeds
Dublin
Manchester
IRELAND
NETHERLANDS
LEGEND
Proposed Green Volt development area
Possible export route options
Special Areas of Conservation (SAC)
0 20
Kilometres
Data:
© Scottish Government, 2021, © Natural England, 2021
Esri, HERE, Garmin, USGS
Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack
Esri, HERE
PROJECT:
GREEN VOLT
TITLE:
Figure 6.1 Location of Designated Sites Screened for LSE on Marine Mammals
VER | DATE | COMMENTS | DRAWN | CHECKED
001 | 26/11/2021 | | GC | AC
ARCGIS REF: PC2483_RHD_OF_ZZ_DR_Z_0014_HRAScreening
LAYOUT: FE_GVO_DRW023_VER001
SCALE: 1:3,000,000
PAGE SIZE: A4
COORDINATE SYSTEM: WGS 1984 UTM Zone 30N
FLOTATION ENERGY

Table 6.3 Screening of designated sites with harbour porpoise, grey seal or harbour seal as a qualifying feature in the North Sea area

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
BEMNZ0001	Belgium	Vlaamse Banken SAC	Harbour porpoise Harbour seal Grey seal	728	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
BEMNZ0002	Belgium	SBZ 1 / ZPS 1 SPA	Harbour seal	762	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
BEMNZ0005	Belgium	Vlakte van de Raan SCI	Harbour porpoise Grey seal Harbour seal	741	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00EY133	Denmark	Agger Tange, Nissum Bredning, Skibsted Fjord Og Agerø SAC	Harbour seal	540	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX122	Denmark	Ålborg Bugt, Randers Fjord Og Mariager Fjord SAC	Harbour seal	656	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00DX146	Denmark	Anholt Og Havet Nord For SAC	Harbour seal Grey seal	722	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
DK00EX026	Denmark	Dråby Vig SAC	Harbour seal	572	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00VA259	Denmark	Gule Rev SAC	Harbour porpoise	507	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX257	Denmark	Havet Omkring Nordre Rønner SAC	Harbour seal Grey seal	677	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK003X202	Denmark	Hesselø Med Omliggende Stenrev SAC	Harbour seal Grey seal	759	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX113	Denmark	Hirsholmene, Havet Vest Herfor Og Ellinge Å's Udløb SAC	Harbour seal Grey seal	654	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00EY124	Denmark	Løgstør Bredning, Vejlerne Og Bulbjerg SAC	Harbour seal	566	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00EY134	Denmark	Lovns Bredning, Hjarbæk Fjord Og Skals, Simested Og Nørre Ådal, Samt Skravad Bæk SAC	Harbour seal	598	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
DK00FX123	Denmark	Nibe Bredning, Halkær Ådal Og Sønderup Ådal SAC	Harbour seal	602	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX112	Denmark	Skagens Gren og Skagerrak SAC	Harbour porpoise	610	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX010	Denmark	Strandenge På Læsø Og Havet Syd Herfor SAC	Harbour seal Grey seal	676	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00VA258	Denmark	Store Rev SAC	Harbour porpoise	574	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00VA347	Denmark	Sydlige Nordsø SAC	Harbour porpoise Grey seal Harbour seal	512	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00AY176	Denmark	Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC	Harbour porpoise Grey seal Harbour seal	579	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00CY040	Denmark	Venø, Venø Sund SAC	Harbour seal	567	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
FR5300017	France	Abers - Côtes Des Legendes SAC	Grey seal	1046	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR3102005	France	Baie de Canche et couloir des trois estuaires SAC	Harbour porpoise Grey seal Harbour seal	817	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300015	France	Baie De Morlaix SAC	Grey seal	1025	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2502020	France	Baie de Seine occidentale SAC	Harbour porpoise Harbour seal	916	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2502021	France	Baie de Seine orientale SAC	Harbour porpoise Harbour seal	933	Out	The distance between the potential impact range of the proposed project and the site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2500077	France	Baie Du Mont Saint-Michel SAC	Harbour seal Grey seal	1003	Out	The distance between the potential impact range of the proposed project and the site is beyond that of potential for direct or indirect effects.
FR3102002	France	Bancs des Flandres SAC	Harbour porpoise Grey seal Harbour seal	744	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
FR5300020	France	Cap Sizun SAC	Grey seal	1108	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2500079	France	Chausey SAC	Grey seal	981	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5302007	France	Chaussée de Sein SAC	Grey seal	1117	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300009	France	Cote De Granit Rose-Sept-Iles SAC	Grey seal	992	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5302006	France	Cotes de Crozon SAC	Grey seal	1093	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR3100482	France	Dunes de l'Authie et Mollieres de Berck SAC	Harbour seal	838	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects.
FR3100474	France	Dunes De La Plaine Maritime Flamande SAC	Harbour seal	773	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
FR3100480	France	Estuaire De La Canche, Dunes Picardes Plaquees Sur L'ancienne Falaise, Foret D'hardelot Et Falaise D'equihen SAC	Harbour seal	805	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2300121	France	Estuaire de la Seine SAC	Harbour seal	929	Out	The distance between the potential impact range of the proposed project and the site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2200346	France	Estuaires et littoral picards (baies de Somme et d'Authie) SAC	Grey seal Harbour seal	839	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR3100478	France	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC	Harbour porpoise Grey seal Harbour seal	784	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300018	France	Ouessant-Molene SAC	Grey seal	1071	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2500088	France	Marais du Cotentin et du Bessin - Baie Des Veys SAC	Grey seal Harbour seal	922	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300019	France	Presqu'ile De Crozon SAC	Grey seal	1085	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
FR2500085	France	Récifs et Marais Arrière-Littoraux du Cap Lévi À la Pointe de Saire SAC	Grey seal Harbour seal	900	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR3102003	France	Recifs Gris-Nez Blanc-Nez SAC	Harbour porpoise Grey seal Harbour seal	773	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR3102004	France	Ridens et dunes hydrauliques du detroit du Pas-de-Calais SAC	Harbour porpoise Harbour seal Grey seal	775	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300010	France	Tregor Goëlo SAC	Grey seal	992	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2104301	Germany	Borkum-Riffgrund SCI	Harbour porpoise Grey seal Harbour seal	592	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1003301	Germany	Doggerbank SCI	Harbour porpoise Harbour seal	352	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1115391	Germany	Dünenlandschaft Süd-Sylt SAC	Grey seal	635	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
DE2016301	Germany	Hamburgisches Wattenmeer SAC	Harbour porpoise Grey seal Harbour seal	694	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1813391	Germany	Helgoland mit Helgolander Felssockel SAC	Harbour porpoise Grey seal Harbour seal	655	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2507301	Germany	Hund und Paapsand SCI	Harbour seal	676	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1315391	Germany	Küsten- und Dünenlandschaften Amrums SAC	Grey seal	648	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2424302	Germany	Muhlenberger Loch / Nesssand SAC	Harbour seal	799	Out	The distance between the potential impact range of the proposed project and the site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2306301	Germany	Nationalpark Niedersachsisches Wattenmeer SAC	Harbour porpoise Grey seal Harbour seal	635	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE0916391	Germany	NTP S-H Wattenmeer und angrenzende Kustengebiete SAC	Harbour porpoise Grey seal Harbour seal	608	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
DE2323392	Germany	Schleswig-Holsteinisches Elbastuar und angrenzende Flachen SAC	Harbour seal	720	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1011401	Germany	SPA Ostliche Deutsche Bucht SPA	Harbour porpoise Grey seal Harbour seal	556	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1714391	Germany	Steingrund SAC	Harbour porpoise Grey seal Harbour seal	661	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1209301	Germany	Sylter Außenriff SCI	Harbour porpoise Grey seal Harbour seal	530	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2018331	Germany	Unterelbe SAC	Harbour porpoise Harbour seal	723	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2507331	Germany	Unterems und Aussenems SAC	Harbour seal	675	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2008001	Netherlands	Doggersbank SAC	Harbour porpoise Grey seal Harbour seal	352	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
NL3009005	Netherlands	Duinen Ameland SAC	Grey seal	621	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2003060	Netherlands	Duinen en Lage Land Texel SAC	Grey seal	618	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL9801079	Netherlands	Duinen Goeree & Kwade Hoek SAC	Grey seal Harbour seal	725	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2003059	Netherlands	Duinen Terschelling SAC	Grey seal	611	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2003061	Netherlands	Duinen Vlieland SAC	Grey seal	614	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL4000021	Netherlands	Grevelingen SAC	Grey seal Harbour seal	729	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2008002	Netherlands	Klaverbank SAC	Harbour porpoise Grey seal Harbour seal	444	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL9802001	Netherlands	Noordzeekustzone SAC	Harbour porpoise	605	Out	

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
			Grey seal Harbour seal			The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL3009016	Netherlands	Oosterschelde SPA and SAC	Harbour porpoise Grey seal Harbour seal	737	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2008003	Netherlands	Vlakte van de Raan SAC	Harbour porpoise Grey seal Harbour seal	738	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL4000017	Netherlands	Voordelta SAC and SPA	Harbour porpoise Grey seal Harbour seal	709	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL1000001	Netherlands	Waddenzee SAC	Harbour porpoise Grey seal Harbour seal	616	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL9803061	Netherlands	Westerschelde & Saeftinghe SAC	Harbour porpoise Grey seal Harbour seal	746	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0510050	Sweden	Balgö SAC	Harbour seal	754	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
SE0520171	Sweden	Gullmarsfjorden SAC	Harbour seal	698	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0420002	Sweden	Hallands Vadero SAC	Harbour seal	803	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520170	Sweden	Kosterfjorden-Väderöfjorden SAC	Harbour porpoise	672	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
SE0510058	Sweden	Kungsbackafjorden 2011	Harbour seal	743	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0510084	Sweden	Nidingen 2011	Harbour seal	742	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520057	Sweden	Malmöfjord SAC	Harbour seal	695	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520058	Sweden	Måseskär SAC	Harbour seal	698	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
SE0520043	Sweden	Nordre Älvs Estuarium SAC	Harbour seal	720	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0420360	Sweden	Nordvästra Skånes havsområde SCI	Harbour seal Grey seal	778	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520176	Sweden	Pater Noster-Skärgården SAC	Harbour seal	707	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520036	Sweden	Sälöfjorden SAC	Harbour seal	712	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520188	Sweden	Soteskär SAC	Harbour seal	688	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520001	Sweden	Vrångöskärgården SAC	Harbour seal	726	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0017072	UK	Berwickshire and North Northumberland Coast SAC	Grey seal	227	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
UK0019808	UK	Moray Firth SAC	Bottlenose dolphin	151	In	Nearest UK designated site for bottlenose dolphin. It is assumed that all bottlenose dolphin in the Project Area, or areas of potential effect, are from this designated site.
UK0019806	UK	Dornoch Firth and Morrich More SAC	Harbour seal	188	In	Potential connectivity. It is assumed that harbour seal in the Project Area, or areas of potential effect, could be from this designated site.
UK0017096	UK	Faray and Holm of Faray SAC	Grey seal	188	In	Potential connectivity. It is assumed that grey seal in the Project Area, or areas of potential effect, could be from this designated site.
UK0030311	UK	Firth of Tay & Eden Estuary SAC	Harbour seal	156 (to cable route)	In	Potential connectivity. It is assumed that harbour seal in the Project Area, or areas of potential effect, could be from this designated site.
UK0030170	UK	Humber Estuary SAC	Grey seal	458	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0030172	UK	Isle of May SAC	Grey seal	213	In	Potential connectivity. It is assumed that grey seal in the Project Area, or areas of potential effect, are could be from this designated site.
UK9002361	UK	Mousa SAC	Harbour seal	230	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0030069	UK	Sanday SAC	Harbour seal	177	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screened in/out	Rationale
UK0012687	UK	Yell Sound Coast SAC	Harbour seal	275	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0030395	UK	Southern North Sea SAC	Harbour porpoise	273	In	Nearest designated site for harbour porpoise. It is assumed that all harbour porpoise in the Project Area, or areas of potential effect, are from this designated site.
UK0017075	UK	The Wash and North Norfolk Coast SAC	Harbour seal	530	Out	The distance between the potential effect range of the Project and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

7 Offshore Ornithology

7.1 Approach to Screening

170. Direct or indirect effects on ornithological features or assemblage component species of SPA and Ramsar sites may arise from activities relating to the construction, operation and decommissioning of the windfarm and associated infrastructure. Birds present in offshore waters, therefore potentially affected by the Project, will be predominantly seabirds, defined for this LSE screening report as auks, gulls, terns, gannets, skuas, shearwaters, petrels, cormorants and divers.

171. Other bird species that could potentially be affected by the offshore elements of the Project include those that may fly through the array area during spring and / or autumn passage (migration) periods.

172. In relation to offshore ornithology, this HRA screening exercise, therefore, considers SPAs and Ramsar sites which meet at least one of the following criteria:

- The site overlaps with the location of the Project (either the array site or the proposed cable corridor) or within the ZoI in which potential effects from the Project may extend (e.g. disturbance or displacement effects would extend beyond the footprint of the Project).
- The site includes seabird qualifying features that use waters in and around the Project in the breeding and / or non-breeding season.
- The site includes qualifying features, such as waterbirds, that may fly through the Project Area during periods of migration.

173. For the purpose of this LSE screening assessment, the SPAs and Ramsar sites that meet the above criteria are defined under the categories of:

- marine SPAs;
- breeding seabird colony SPAs;
- SPAs / Ramsar sites with migratory waterbird qualifying features (in this report these are termed ‘migratory waterbird SPAs’); and
- other SPAs / Ramsar sites located within the ZoI of the Project.

7.1.1 Identification of Sites and Potential Connectivity

7.1.1.1 Marine SPAs

174. All marine SPAs are considered to be located outwith the ZoI of the Project and would, therefore, lack potential connectivity. The closest marine SPA, Moray Firth, is 54.4 km from the proposed cable corridor, sufficiently distant that potential effects are unlikely to occur. This is particularly the case given that marine SPAs provide supporting habitat for qualifying features, as opposed to providing only roosting / nesting habitat from which features would commute outside of the SPA to forage.

7.1.1.2 Breeding seabird SPAs

175. The southernmost of the two proposed export cable corridor Landfall locations overlaps with the Buchan Ness to Collieston Coast SPA, a breeding seabird colony SPA which also incorporates adjacent foraging grounds. Consequently, all qualifying features of this SPA are taken forward for LSE screening.

176. The array area is located approximately 75 - 80 km from Buchan Ness and Collieston Coast SPA. Some seabird species from other this and other breeding seabird colony SPAs have large foraging ranges during the breeding season, as demonstrated in Table 7.1 (Woodward *et al.*, 2019), which may encompass the array area and / or proposed Export Cable Route. Aerial video transect surveys undertaken monthly from May to September 2020 (HiDef, unpublished data) provide an initial indication that usage of the Project Area during the breeding season may be relatively low (for example, kittiwake densities during that period were recorded at 0.4 to 1.4 birds per square kilometre, which, to put into context, is over ten times lower than that recorded at the consented Kincardine project). However, in the absence of two-year data at the time of writing, the potential for the Project to have effects on seabird qualifying features from any SPA breeding colonies within foraging range cannot be excluded. Additionally, breeding features of the seabird colony SPAs may also be present in the area occupied by the Project during the non-breeding season, when SPA populations are widely distributed and are not constrained by a need to return to an active nest.

7.1.1.2.1 Connectivity During the Breeding Season

177. To determine those breeding colony SPAs that may have connectivity with the Project during the breeding season, all colony SPAs on the east, north (including Orkney and Shetland) and north-west coast of Scotland are considered. Additionally, breeding seabird colony SPAs on the north-east and east coast of England that support features with large mean maximum foraging ranges (i.e., auks, fulmars, gannets) are also considered. On the west side of the UK, St. Kilda SPA, west of the Outer Hebrides, is the most southerly SPA considered. It is considered highly unlikely that qualifying species from more southerly sites would use waters in the vicinity of the Project during either the breeding or non-breeding season (Woodward *et al.*, 2019; Furness 2015; Dean *et al.*, 2013 and 2015; Shoji *et al.*, 2015).

Table 7.1 Mean maximum foraging ranges of breeding seabirds (from Woodward et al.*, 2019)*

Species	Mean maximum foraging range (km) ± 1 SD
Red-throated diver *Gavia stellata*	9.0*
Leach's storm-petrel *Oceanodroma leucorhoa*	657.0**
European storm-petrel *Hydrobates pelagicus*	336.0*
Fulmar *Fulmarus glacialis*	542.3 ± 657.9
Manx shearwater *Puffinus puffinus*	1,346.0 ± 1,018.7
Gannet *Morus bassanus*	315.2 ± 194.2
Shag *Phalacrocorax aristotelis*	13.2 ± 10.5
Cormorant *Phalacrocorax carbo*	25.6 ± 8.3
Kittiwake *Rissa tridactyla*	156.1 ± 144.5
Black-headed gull *Chroicocephalus ridibundus*	18.5*
Common gull *Larus canus*	50.0*
Great-black-backed gull *Larus marinus*	73.0*
Herring gull *Larus argentatus*	58.8 ± 26.8
Lesser black-backed gull *Larus fuscus*	127.0 ± 109.0
Sandwich tern *Thalasseus sandvicensis*	34.3 ± 23.2
Little tern *Sternula albifrons*	5.0*
Arctic tern *Sterna paradisaea*	25.7 ± 14.8
Common tern *Sterna hirundo*	17.6 ± 9.1

Species	Mean maximum foraging range (km) ± 1 SD
Roseate tern *Sterna dougallii*	12.6 ± 10.6
Great skua *Stercorarius skua*	443.3 ± 487.9
Arctic skua *Stercorarius parasiticus*	2 ± 0.7***
Razorbill *Alca torda*	88.7 ± 75.9
Guillemot *Uria aalge*	73.2 ± 80.5
Black guillemot *Cepphus grylle*	4.8 ± 4.3
Puffin *Fratercula arctica*	137.1 ±

Notes:

*No SD available for mean maximum value
**Mean value without SD – no mean maximum value available
***Mean value with SD – no mean maximum value available

178. The initial step in determining potential connectivity between a given seabird breeding colony SPA and the Project during the breeding season is an exercise to establish if the mean maximum foraging range (plus one standard deviation (SD)) of any feature of that SPA overlaps with the array area and / or proposed export cable corridor route. This step is presented in Table 7.2. For most of the SPAs presented in the table, the array area and / or proposed cable corridor of the Project overlaps with the mean maximum foraging range (plus one SD) of at least one feature. Exceptions are listed below; these are the SPAs for which there is no overlap between the Project and mean maximum foraging ranges (plus one SD) of any breeding seabird feature (and hence there is no potential for connectivity):

- Pentland Firth Islands
- Inner Moray Firth
- Cromarty Firth
- Papa Westray (North Hill and Holm)
- Imperial Dock Lock, Leith
- Firth of Tay and Eden Estuary
- Papa Stour

179. It should be noted that the distances set out in Table 7.2 represent the shortest straight-line distance ('as the crow flies') between the Project and the seabird breeding colony SPAs. The distances presented do not account for the fact that there would be additional distance involved in flying around (as opposed to over) larger land masses. So, for example, the 'real' flight distance from a colony on the northwest coast of Scotland would be greater than that presented in the table due to the additional distance from a bird navigating around the north coast and down to the Project location.

180. For this reason, there is considered to be no potential for connectivity with the following SPAs and features (given that the mean maximum foraging range (plus one SD) is significantly less than the 'real' flight distance):

- kittiwake from Shiant Isles; and
- kittiwake from North Rona and Sula Sgeir.

181. It is also considered highly unlikely that Manx shearwater *Puffinus puffinus* from the St Kilda SPA would have connectivity with the Project given the foraging areas used by birds from other shearwater colonies in western Britain and its known distribution in UK waters (Kober *et al.*, 2010; Dean *et al.*, 2013 and 2015; Shoji *et al.*, 2015).

182. Finally, based on the very low usage of the Project Area by Leach's storm-petrel (zero records) and great skua (one record) during breeding season aerial digital video transect surveys undertaken monthly by HiDef from May to September 2020, there is considered to be no potential connectivity with the following SPAs and features during the breeding season:

- Great skua at:
  - Hoy
  - Fair Isle
  - Noss
  - Foula
  - Handa
  - Ronas Hill – North Roe and Tingon
  - Fetlar
  - Hermaness, Saxa Vord and Valla Field
  - St Kilda
- Leach's storm-petrel:
  - Sule Skerry and Sule Stack
  - Foula
  - Ramna Stacks and Gruney
  - Flannan Isles
  - St Kilda

183. Further breeding season aerial surveys have been undertaken for the Project Area from March 2021 to September 2021, although at the time of writing these have not yet been analysed. Should analysis of data from the 2021 breeding season indicate notable presence of Leach's storm-petrel and / or great skua, the above sites would be considered further as part of the subsequent reporting / information to inform AA.

184. Due to potential connectivity in the breeding season, a total of 34 seabird breeding colony SPAs have been taken forward for LSE Screening (see Section 7.1.2 for a summary of sites and features taken forward).

Table 7.2 Seabird breeding colony spas with potential connectivity to the project during the breeding season

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
Scottish seabird breeding colony SPAs (inc. Orkney and Shetland)								
Loch of Strathbeg	UK9002211	70.6	4.5	Sandwich tern	N	N	Y	Y
Buchan Ness to Collieston Coast	UK9002491	72.3	0.0	*Kittiwake* *Herring gull* *Guillemot* *Shag* *Fulmar*	*Y* *N* *Y* *N* *Y*	*Y* *Y* *Y* *N* *Y*	*Y* *Y* *Y* *Y* *Y*	*Y* *Y* *Y* *Y* *Y*
Ythan Estuary, Sands of Forvie and Meikle Loch	UK9002221	80.5	4.5	Common tern Little tern Sandwich tern	N N N	N N N	Y Y Y	Y Y Y
Troup, Pennan and Lion's Head	UK9002497	86.6	23.5	Kittiwake Guillemot *Herring gull* *Razorbill* *Fulmar*	Y N N Y Y	Y Y N Y Y	Y Y Y Y Y	Y Y Y Y Y
Fowlsheugh	UK9002271	131.1	60.3	*Kittiwake* *Herring gull* *Guillemot* *Razorbill* *Fulmar*	*Y* *N* *N* *N* *Y*	*Y* *N* *Y* *Y* *Y*	*Y* *N* *Y* *Y* *Y*	*Y* *Y* *Y* *Y* *Y*
East Caithness Cliffs	UK9001182	148.3	113.9	Kittiwake Herring gull Guillemot Razorbill Shag *Great black-backed gull* *Cormorant* *Fulmar*	Y N N N N N N Y	Y N Y Y N N/A N Y	Y N N N N N N Y	Y N Y Y N N/A N Y
North Caithness Cliffs	UK9001181	154.4	131.8	Guillemot *Kittiwake* *Razorbill* *Puffin*	N Y N N	N Y Y Y	N Y N Y	Y Y Y Y

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
				Fulmar	Y	Y	Y	Y
Copinsay	UK9002151	155.1	152.1	*Kittiwake* *Great black-backed gull* *Guillemot* *Fulmar*	Y N N Y	Y N/A N Y	Y N N Y	Y N/A Y Y
Pentland Firth Islands	UK9001131	155.7	139.6	Arctic tern	N	N	N	N
Auskerry	UK9002381	164.7	167.1	Storm-petrel Arctic tern	Y N	Y N	Y N	Y N
Hoy	UK9002141	176.6	156.5	Red-throated diver Great skua *Kittiwake* *Great black-backed gull* *Guillemot* *Puffin* *Arctic skua* *Fulmar*	N Y N N N N N Y	N/A Y Y N/A N Y N Y	N Y N N N N N Y	N/A Y Y N/A N Y N Y
Fair Isle	UK9002091	180.9	190.5	Arctic tern Guillemot *Kittiwake* *Razorbill* *Puffin* *Great skua* *Arctic skua* *Shag* *Gannet* *Fulmar*	N N N N N Y N N Y Y	N N Y N Y Y N N Y Y	N N N N N Y N N Y Y	N N Y N Y Y N N Y Y
Calf of Eday	UK9002431	185.1	189.1	*Kittiwake* *Great black-backed gull* *Guillemot* *Cormorant* *Fulmar*	N N N N Y	Y N/A N N Y	N N N N Y	Y N/A N N Y
Rousay	UK9002371	190.8	188.8	Arctic tern *Kittiwake*	N N	N Y	N N	N Y

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
				Guillemot *Arctic skua* *Fulmar*	N N Y	N N Y	N N Y	N N Y
Firth of Tay and Eden Estuary	UK9004121	191.6	120.4	Little tern	N	N	N	N
Inner Moray Firth	UK9001624	192.8	126.1	Common tern	N	N	N	N
Cromarty Firth	UK9001623	194.5	131.2	Common tern	N	N	N	N
West Westray	UK9002101	200.3	199.4	Arctic tern Guillemot *Kittiwake* *Razorbill* *Arctic skua* *Fulmar*	N N N N N Y	N N Y N N Y	N N N N N Y	N N Y N N Y
Marwick Head	UK9002121	202.3	191.1	Guillemot *Kittiwake*	N N	N Y	N N	N Y
Papa Westray (North Hill and Holm)	UK9002111	202.6	206.2	Arctic tern Arctic skua	N N	N N	N N	N N
Forth Islands	UK9004171	210.2	144.3	Arctic tern Common tern Roseate tern Sandwich tern Gannet Shag Lesser black-backed gull Puffin *Kittiwake* *Herring gull* *Guillemot* *Razorbill* *Cormorant*	N N N N Y N N N N N N N N	N N N N Y N Y Y Y N N N N	N N N N Y N N N Y N N N N	N N N N Y N Y Y Y N Y Y N
Sumburgh Head	UK9002511	214.2	224.0	Arctic tern *Kittiwake* *Guillemot*	N N N	N Y N	N N N	N Y N

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
				Fulmar	Y	Y	Y	Y
St. Abb's Head to Fast Castle	UK9004271	228.3	169.5	*Kittiwake* *Herring gull* *Guillemot* *Razorbill* *Shag*	N N N N N	Y N N N N	N N N N N	Y N N N N
Mousa	UK9002361	230.9	240.8	Arctic tern Storm-petrel	N Y	N Y	N Y	N Y
Noss	UK9002081	243.5	253.4	Gannet Great skua Guillemot *Kittiwake* *Puffin* *Fulmar*	Y Y N N N Y	Y Y N Y Y Y	Y Y N N N Y	Y Y N Y Y Y
Sule Skerry and Sule Stack	UK9002181	249.0	222.4	Storm-petrel Leach's storm-petrel Gannet Puffin *Guillemot* *Shag*	Y Y Y N N N	N/A N/A Y Y N N	Y Y Y N N N	N/A N/A Y Y N N
Cape Wrath	UK9001231	251.3	208.3	*Kittiwake* *Guillemot* *Razorbill* *Puffin* *Fulmar*	N N N N Y	Y N N Y Y	N N N N Y	Y N N Y Y
Foula	UK9002061	252.4	261.9	Arctic tern Leach's storm-petrel Red-throated diver Great skua Guillemot Puffin Shag *Kittiwake* *Razorbill*	N Y N Y N N N N N	N N/A N/A Y N Y N Y N	N Y N Y N N N N N	N N/A N/A Y N Y N Y N

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
				Arctic skua *Fulmar*	N Y	N Y	N Y	N Y
Imperial Dock Lock, Leith	UK9004451	253.8	183.5	Common tern	N	N	N	N
Handa	UK9001241	266.0	215.3	Guillemot Razorbill *Kittiwake* *Great skua* *Fulmar*	N N N Y Y	N N Y Y Y	N N N Y Y	N N Y Y Y
Papa Stour	UK9002051	272.5	282.2	Arctic tern	N	N	N	N
Priest Island (Summer Isles)	UK9001261	282.3	222.5	Storm-petrel	Y	N/A	Y	N/A
Ronas Hill – North Roe and Tingon	UK9002041	290.4	300.2	Red-throated diver Great skua *Black guillemot* *Arctic skua*	N Y N N	N Y N N	N Y N N	N Y N N
Fetlar	UK9002031	290.9	300.8	Arctic tern Great skua *Arctic skua* *Fulmar*	N Y N Y	N Y N Y	N Y N Y	N Y N Y
Ramna Stacks and Gruney	UK9002021	304.9	314.8	Leach's storm-petrel	Y	N/A	Y	N/A
Hermaness, Saxa Vord and Valla Field	UK9002011	310.7	320.6	Red-throated diver Puffin Gannet Great skua *Kittiwake* *Guillemot* *Shag* *Fulmar*	N N Y Y N N N Y	N N Y Y N N N Y	N N N Y N N N Y	N N Y Y N N N Y
North Rona and Sula Sgeir	UK9001011	323.5	286.7	Gannet Fulmar *Kittiwake* *Great black-backed gull*	N Y N N	Y Y N N/A	Y Y N N	Y Y Y N/A

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
				Razorbill	N	N	N	N
				Puffin	N	N	N	N
Shiant Isles	UK9001041	329.2	267.8	Razorbill	N	N	N	N
				Puffin	N	N	N	N
				Shag	N	N	N	N
				Kittiwake	N	N	N	Y
				Guillemot	N	N	N	N
				Fulmar	Y	Y	Y	Y
Flannan Isles	UK9001021	402.9	346.0	Leach's storm-petrel	Y	N/A	Y	N/A
				Kittiwake	N	N	N	N
				Guillemot	N	N	N	N
				Razorbill	N	N	N	N
				Puffin	N	N	N	N
				Fulmar	Y	Y	Y	Y
St. Kilda	UK9001031	456.2	394.5	Storm-petrel	N	N/A	N	N/A
				Leach's storm-petrel	Y	N/A	Y	N/A
				Puffin	N	N	N	N
				Gannet	N	Y	N	Y
				Great skua	N	Y	Y	Y
				Kittiwake	N	N	N	N
				Guillemot	N	N	N	N
				Razorbill	N	N	N	N
				Manx shearwater	Y	Y	Y	Y
				Fulmar	Y	Y	Y	Y
Non-Scottish seabird breeding colony SPAs								
Farne Islands		248.7	200.3	Arctic tern	N	N	N	N
				Common tern	N	N	N	N
				Roseate tern	N	N	N	N
				Guillemot	N	N	N	N
				Kittiwake	N	Y	N	Y
				Puffin	N	Y	N	Y
				Shag	N	N	N	N
				Cormorant	N	N	N	N
Coquet Island		281.9	235.1	Arctic tern	N	N	N	N

Seabird breeding colony SPA	Site code	Distance to array area (km)[1]	Distance to export cable (km)[1]	Relevant qualifying feature[2]	Is array site within mean-max foraging range?[3]	Is array site within mean-max foraging range (+1 SD)?[3,4]	Is export cable within mean-max foraging range?[3]	Is export cable within mean-max foraging range (+1 SD)?[3,4]
				Common tern	N	N	N	N
				Roseate tern	N	N	N	N
				Sandwich tern	N	N	N	N
				Kittiwake	N	Y	N	Y
				Black-headed gull	N	N/A	N	N/A
				Lesser black-backed gull	N	N	N	Y
				Herring gull	N	N	N	N
				Puffin	N	N	N	Y
				Fulmar	Y	Y	Y	Y
Flamborough & Filey Coast		397.7	366.2	Kittiwake	N	N	N	N
				Guillemot	N	N	N	N
				Razorbill	N	N	N	N
				Gannet	N	Y	N	Y
				Herring gull	N	N	N	N
				Puffin	N	N	N	N
				Shag	N	N	N	N
				Cormorant	N	N	N	N
				Fulmar	Y	Y	Y	Y

[1] Distance is calculated as the shortest 'straight-line' distance between the Project and the SPA.

[2]This includes all breeding seabird features, including features that qualify in their own right plus named component species of the breeding assemblage (the latter are those in *italics*).

[3]Foraging ranges are from Woodward *et al.* (2019). Where mean maximum foraging ranges are not available, the mean foraging range is instead used, as per Table 7.1).

[4]Where SD of foraging ranges are not published, this is marked in the table as N/A.

7.1.1.2.2 Connectivity During the Non-Breeding Season

185. It is typical in the LSE screening process to consider not only the effect of a project on breeding colony SPA features during the breeding season, but also on those features during the non-breeding season when they are unattached to a nesting site, and in the case of most seabird species, are distributed more widely. In theory, this means that there is potentially a greater range of features from the breeding colony SPAs that may be impacted by the Project during the non-breeding season than during the breeding season. Conversely, the fact that breeding adult seabirds from many SPAs mix together at sea with all other age classes during the non-breeding season, in addition to birds from overseas in the case of many species, means that any impacts will be shared among a large number of SPAs and / or Ramsar sites and will therefore be diluted.

186. For SPA populations for which breeding season connectivity has been established (in Table 7.2), it is assumed that there is also potential connectivity during the non-breeding season. On this basis, those sites have already been taken forward for consideration in LSE screening. This section therefore focuses on identifying additional sites and / or populations that need to be considered based solely on their potential connectivity during the non-breeding season.

187. For other, similar, LSE screening exercises, MS-LOT and NatureScot have advised that consideration of the potential for non-breeding season effects should be based upon the Biologically Defined Minimum Population Scales (BDMPS) approach (Furness, 2015). A similar approach is used herein.

188. For most seabird species, there are two general BDMPS regions defined within UK waters, the main division being between the North Sea and western waters. For some species, however, there are up to five BDMPS regions (Furness, 2015). In most instances, the BDMPS region of relevance to the Project is either the 'UK North Sea' or the 'UK North Sea and Channel'. Exceptions to this are red-throated diver (winter months only), shag and cormorant ('North West North Sea' BDMPS region) and roseate tern ('East Coast and Channel' BDMPS region). Within these large expanses of offshore waters, it is generally assumed that there is even mixing of birds from the different 'source' populations (from the UK and elsewhere) during passage and other non-breeding periods (Furness, 2015).

189. For some species, connectivity between breeding SPA populations and the Project during the non-breeding season can be excluded on the basis of the small (or negligible) contribution of these populations to the relevant BDMPS region total. For example, Furness (2015) indicates that none of the UK Manx shearwater SPA populations are considered to contribute to the UK North Sea BDMPS total for this species. As such, connectivity between the Project and SPA populations of Manx shearwater during the non-breeding season can be excluded.

190. For herring gull, great black-backed gull, common tern and Arctic tern, over 85% of BDMPS adult populations are comprised of a combination of non-UK populations and birds from non-SPA UK colonies (Furness, 2015). The maximum contribution of any individual SPA population to the BDMPS population of adult birds for these species is as follows:

- Herring gull: 1.8% (Calf of Eday);
- Great black-backed gull: 1.8% (Calf of Eday);
- Common tern: 1.7% (Coquet Island); and
- Arctic tern: 3.3% (Farne Islands).

191. Given the large spatial extent of the BDMPS regions for the above species, together with the assumption of even mixing of birds from different populations (and age classes) across the region, only a very small number of SPA birds would be estimated to occur within the vicinity of the Project, and the number of adult birds smaller still. As such, connectivity with SPA populations of these species during the non-breeding season can also be excluded.

192. On the east coast of the UK, Loch of Strathbeg SPA (Sandwich tern) and Ythan Estuary, Sands of Forvie and Meikle Loch SPA (Sandwich tern and little tern) are the northernmost SPA breeding colonies for these species (Parsons *et al.*, 2015; Wilson *et al.*, 2014). While potential connectivity with these populations is assumed on account of breeding season connectivity (see Table 7.2), it is highly unlikely that there could be potential connectivity with any other SPA populations in the non-breeding season given that all SPA tern species primarily migrate south from UK breeding colonies (e.g., Wernham *et al.*, 2002). Similarly, the northernmost SPA breeding colony for roseate tern is Forth Islands SPA, so again it is considered highly unlikely that SPA populations would have connectivity during the non-breeding season given that migrants are unlikely to be found substantially north of this colony at any time of the year.

193. For SPA populations of other species, connectivity during the non-breeding season is determined on the basis of the contribution of those populations to the relevant BDMPS region total. This is presented in Table 7.3. Furness (2015) indicates that no SPA gannet populations contribute to the North Sea BDMPS adult total aside from those for which breeding season connectivity has already been established, therefore this species has been excluded from the table.

194. As a conservative approach, potential connectivity is assumed for any SPA population which contributes to 5.0% or more of the BDMPS region total. Note that BDMPS region totals for some species differ seasonally (e.g., some species have different totals for autumn and spring passage periods and winter periods); therefore, where the contribution of a given SPA population towards the BDMPS total varies by season, the highest value is reported in the table.

Table 7.3 SPA population contributions to the BDMPS region total (%). Highlighted cells indicate where the SPA population exceeds 5% of the relevant BDMPS total.

Breeding colony SPA	Red-throated diver[1]	Fulmar[1]	Cormorant	Shag	Arctic skua[1]	Great skua[1]	Lesser black-backed gull[1]	Kittiwake[1]	Razorbill[1]	Puffin	Guillemot
Hermaness, Saxa Vord and Valla Field	1.5	-		0.5		10.3		0.1		3.5	0.7
Otterswick and Graveland	2.3										
Ronas Hill – North Roe and Tingon	4.6					2.0					
Foula	1.1	-		2.2	2.8	17.4		-	0.2	-	2.4
Orkney Mainland Moors	2.6										
Hoy	5.5	-			1.0	14.1		-		-	0.9
Caithness and Sutherland Peatlands	4.2										
Lewis Peatlands	0.7										
Mointeach Scadabhaigh	0.2										
Rum	0.1							0.01			0.02
Fetlar		-			6.7	6.1					
Noss		-				4.9		-		-	2.2
Sumburgh Head											0.7

Breeding colony SPA	Red-throated diver[1]	Fulmar[1]	Cormorant	Shag	Arctic skua[1]	Great skua[1]	Lesser black-backed gull[1]	Kittiwake[1]	Razorbill[1]	Puffin	Guillemot
Fair Isle		-		2.3	1.5	2.8		-	0.6	-	1.9
West Westray		-			2.2			-	0.3		4.9
Calf of Eday		-	13.3					-			0.9
Rousay		-			3.0			-			0.9
Marwick Head											1.6
Copinsay											0.8
East Caithness Cliffs		-	3.8	11.7				-	-	-	-
Forth Islands		-	3.5	9.4				-	1.7	-	-
Flamborough & Filey Coast		-						12.0	6.6	0.5	7.5
Cape Wrath		-						-	0.4	-	0.3
Handa		-				0.0		-	0.9		0.05
Flannan Isles		-						0.01	0.01	0.02	0.1
Sule Skerry and Sule Stack											0.08
North Rona and Sula Sgeir		-						0.01	0.2	0.01	0.05
Shiant Isles		-		0.0				0.01	0.8	0.07	0.05
St Kilda		-				0.0		0.01	0.3	0.1	0.2
Mingulay and Berneray		0.09		0.0				0.01	1.9	0.01	0.1
Rathlin Island		0.01					0.08	0.04	1.4	0.01	0.0
Farne Islands			0.6	1.9				-		-	6.3
St. Abb's Head to Fast Castle				1.8				-	0.7		4.2
Papa Westray					1.8						
Alde-Ore Estuary							1.7				
Ailsa Craig							0.1	0.01			0.0
Lough Neagh and Lough Beg							0.4				
Bowland Fells							3.4				
Morecambe Bay and Duddon Estuary							3.7				
Ribble and Alt Estuaries							6.1				
Skomer, Skokholm and the Seas off Pembrokeshire							5.2	0.01	0.6	0.02	0.2
Canna and Sanday								0.01		0.01	0.04
North Colonsay and Western Cliffs								0.03			0.0

[1]Species with more than one seasonal BDMPS region total. Where the contribution of a given SPA population towards the BDMPS total varies by season, the highest value is reported.

'-' Indicates that the SPA population has breeding season connectivity with the Project (therefore, non-breeding season connectivity is assumed).

195. Based on the data in Table 7.3, most SPA populations contribute only a small part of the relevant BDMPS regional total (generally below 5% and often below 1%). Therefore, when the large spatial extent of the relevant region is taken into account, plus the assumed even mixing of birds from different populations (and age classes) across the entirety of the region, it is apparent that whilst there is connectivity, there is unlikely to be sufficient numbers of birds from a given SPA present in the vicinity of the Project for an LSE to be considered feasible.

196. However, in some instances the contribution of SPA populations exceeded 5% of the relevant BDMPS region total, and on this basis a number of breeding SPA populations which have no potential connectivity during the breeding season are judged to have potential connectivity during the non-breeding season:

- red-throated diver populations at:
  - Hoy (5.5% of the NW North Sea total).
- shag populations at:
  - East Caithness Cliffs (11.7% of the UK NW North Sea total); and
  - Forth Islands (9.4% of the UK NW North Sea total).
- Arctic skua populations at:
  - Fetlar (6.7% of the UK North Sea & Channel total).
- great skua populations at:
  - Foula (17.4% of the UK North Sea & Channel total);
  - Hoy (14.1% of the UK North Sea & Channel total);
  - Hermaness, Saxa Vord and Valla Field (10.3% of the UK North Sea & Channel total); and
  - Fetlar (6.1% of the UK North Sea & Channel total).
- lesser black-backed gull populations at:
  - Ribble and Alt Estuaries (6.1% of the UK North Sea & Channel total); and
  - Skomer, Skokholm and the Seas off Pembrokeshire (5.2% of the UK North Sea & Channel total).
- kittiwake populations at:
  - Flamborough and Filey Coast (12.0% of the UK North Sea total).
- razorbill populations at:
  - Flamborough and Filey Coast (6.6% of the UK North Sea & Channel total).
- guillemot populations at:
  - Flamborough and Filey Coast (7.5% of the UK North Sea & Channel total); and
  - Farne Islands (6.3% of the UK North Sea & Channel total).

7.1.1.3 Migratory Waterbird SPAs / Ramsar Sites

197. To identify potential connectivity with sites designated for migratory waterbird species, consideration has been given to likely migratory pathways and distribution of coastal estuarine / inland waterbody SPAs / Ramsar sites on the north and east coast of Scotland. There is potential for the Project to have connectivity with a number of sites. As such, sites with migratory waterbird features that are located within the following coastal Natural Heritage Zones (NHZs) are taken forward for LSE screening:

- North Caithness and Orkney
- The Peatlands of Caithness and Sutherland
- Moray Firth
- North East Coastal Plain
- Eastern Lowlands

198. In total, 22 migratory waterbird SPAs have been taken forward for LSE screening (see Section 7.1.2 for a summary of sites and features taken forward).

7.1.1.4 Other SPAs / Ramsar Sites Within the ZoI

199. The potential ZoI of impacts associated with the Project, such as habitat loss, visual / noise disturbance and collision risk, are – to be conservative – considered to extend no more than 2 km from the Project boundary for most species. As an exception, red-throated diver is considered to be more sensitive to anthropogenic disturbance and for this species the ZoI may be considerably further. However, the nearest site for red-throated diver is Moray Firth SPA, 54.4 km from the Project and considered sufficiently distant to avoid disturbance. Regardless, this site has been taken forward for LSE screening as a migratory waterbird SPA.

200. Aside from Buchan Ness and Collieston Coast SPA (which has been taken forward for LSE screening as a breeding seabird colony SPA), there are no other SPAs / Ramsar sites considered to be within the ZoI of the Project.

7.1.2 Summary of initial Identification of Sites

201. In total, the initial screening process has identified 56 SPAs / Ramsar sites to be taken forward for LSE screening. The sites and features for LSE screening are summarised in Table 7.4. Following the table, the locations of the SPAs / Ramsar sites in relation to the Project are presented in Figure 7.1. The outcome of LSE screening for each of these sites and features is presented in Section 7.3.

Table 7.4 Summary of SPAs / Ramsar sites and relevant features taken forward for LSE screening

Site taken forward for LSE screening	Distance to export cable (km)	Distance to array area (km)	Relevant feature(s)
Breeding seabird colony SPAs			
Buchan Ness to Collieston Coast	0.0	72.3	Kittiwake Herring gull Guillemot Shag Fulmar
Loch of Strathbeg	4.5	70.6	Sandwich tern
Ythan Estuary, Sands of Forvie and Meikle Loch	4.5	80.5	Common tern Little tern Sandwich tern
Troup, Pennan and Lion's Head	23.5	86.6	Kittiwake Guillemot Herring gull Razorbill Fulmar
Fowlsheugh	60.3	131.1	Kittiwake Herring gull Guillemot Razorbill Fulmar
East Caithness Cliffs	113.9	148.3	Kittiwake Guillemot Razorbill Fulmar Shag[1]
North Caithness Cliffs	131.8	154.4	Guillemot Kittiwake Razorbill Puffin Fulmar
Forth Islands	144.3	210.2	Gannet Lesser black-backed gull Puffin

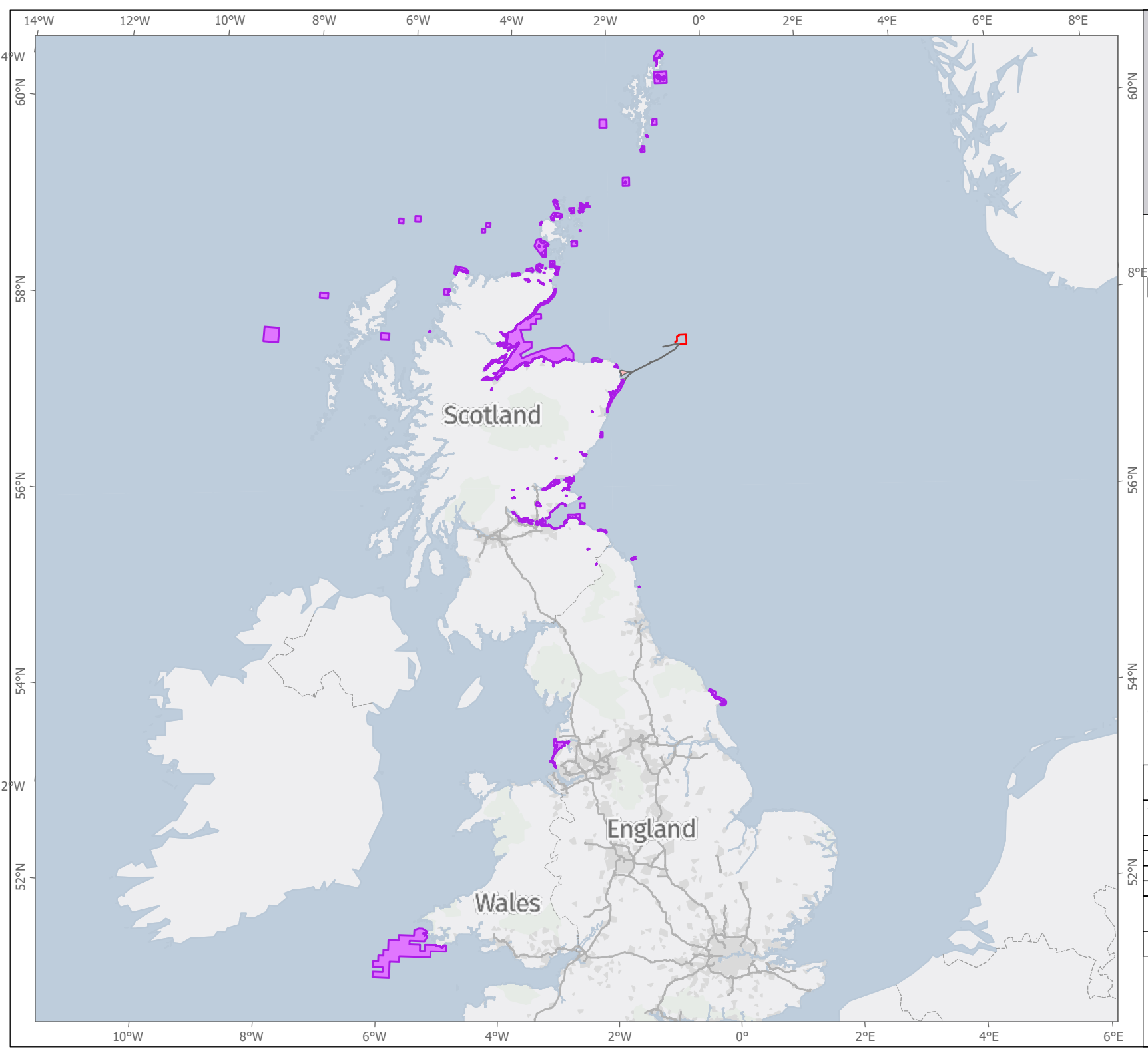
Site taken forward for LSE screening	Distance to export cable (km)	Distance to array area (km)	Relevant feature(s)
			Kittiwake Guillemot Razorbill Shag[1]
Copinsay	152.1	155.1	Kittiwake Guillemot Fulmar
Hoy	156.5	176.6	Kittiwake Puffin Fulmar Red-throated diver[1] Great skua[1]
Auskerry	167.1	164.7	Storm-petrel
St. Abb's Head to Fast Castle	169.5	228.3	Kittiwake
Fair Isle	190.5	180.9	Kittiwake Puffin Gannet Fulmar
Calf of Eday	189.1	185.1	Kittiwake Fulmar
Rousay	188.8	190.8	Kittiwake Fulmar
Marwick Head	191.1	202.3	Kittiwake
West Westray	199.4	200.3	Kittiwake Fulmar
Farne Islands	200.3	248.7	Kittiwake Puffin Guillemot[1]
Cape Wrath	208.3	251.3	Kittiwake Puffin Fulmar
Sumburgh Head	224.0	214.2	Kittiwake Fulmar
Handa	215.3	266.0	Kittiwake Fulmar
Sule Skerry and Sule Stack	222.4	249.0	Storm-petrel Gannet Puffin
Priest Island (Summer Isles)	222.5	282.3	Storm-petrel
Mousa	240.8	230.9	Storm-petrel
Coquet Island	235.1	281.9	Kittiwake Lesser black-backed gull Puffin Fulmar
Noss	253.4	243.5	Gannet Kittiwake Puffin Fulmar
Foula	261.9	252.4	Puffin Kittiwake Fulmar Great skua[1]
Shiant Isles	267.8	329.2	Fulmar
North Rona and Sula Sgeir	286.7	323.5	Gannet Fulmar
Fetlar	300.8	290.9	Fulmar Arctic skua[1] Great skua[1]
Hermaness, Saxa Vord and Valla Field	320.6	310.7	Gannet

Site taken forward for LSE screening	Distance to export cable (km)	Distance to array area (km)	Relevant feature(s)
			Fulmar Great skua[1]
Flannan Isles	346.0	402.9	Fulmar
Flamborough & Filey Coast	366.2	397.7	Gannet Fulmar Kittiwake[1] Razorbill[1] Guillemot[1]
St. Kilda	394.5	456.2	Gannet Fulmar
Ribble and Alt Estuaries	c.415	c.475	Lesser black-backed gull[1]
Skomer, Skokholm and Seas off Pembrokeshire	c.670	c.730	Lesser black-backed gull[1]
Migratory waterbird SPAs / Ramsar sites			
Loch of Strathbeg	4.5	70.6	Svalbard barnacle goose Pink-footed goose Greylag goose Whooper swan Goldeneye Teal
Ythan Estuary, Sands of Forvie and Meikle Loch	4.5	80.5	Pink-footed goose Eider Redshank Lapwing Waterbird assemblage
Moray Firth	54.4	117.8	Great northern diver Red-throated diver Slavonian grebe Scaup Eider Long-tailed duck Common scoter Velvet scoter Goldeneye Red-breasted merganser Shag
Loch of Skene	46.3	122.4	Greylag goose Goldeneye Goosander
Moray and Nairn Coast	75.9	141.4	Bar-tailed godwit Pink-footed goose Greylag goose Redshank Red-breasted merganser Dunlin Oystercatcher Wigeon Waterbird assemblage
Loch Spynie	87.1	151.8	Greylag goose
Montrose Basin	90.7	162.3	Pink-footed goose Greylag goose Redshank Oystercatcher Eider Wigeon Knot

Site taken forward for LSE screening	Distance to export cable (km)	Distance to array area (km)	Relevant feature(s)
			Dunlin Shelduck Waterbird assemblage
Loch of Kinnordy	113.8	189.0	Greylag goose Pink-footed goose
Dornoch Firth and Loch Fleet	120.4	180.1	Bar-tailed godwit Greylag goose Wigeon Curlew Teal Scaup Redshank Dunlin Oystercatcher Waterbird assemblage
Firth of Tay and Eden Estuary	120.4	191.6	Bar-tailed godwit Redshank Greylag goose Pink-footed goose Velvet scoter Shelduck Eider Common scoter Black-tailed godwit Goldeneye Red-breasted merganser Goosander Oystercatcher Grey plover Sanderling Dunlin Long-tailed duck Waterbird assemblage
Inner Moray Firth	126.1	192.8	Bar-tailed godwit Greylag goose Red-breasted merganser Redshank Scaup Curlew Goosander Goldeneye Teal Wigeon Cormorant Oystercatcher Waterbird assemblage
Loch Eye	128.6	190.6	Whooper swan Greylag goose
Caithness Lochs	130.5	158.4	Whooper swan Greenland white-fronted goose Greylag goose
Cromarty Firth	131.2	194.5	Whooper swan Bar-tailed godwit Greylag goose Redshank Curlew Red-breasted merganser

Site taken forward for LSE screening	Distance to export cable (km)	Distance to array area (km)	Relevant feature(s)
			Scaup Pintail Wigeon Dunlin Oystercatcher Waterbird assemblage
Firth of Forth	138.7	206.2	Red-throated diver Slavonian grebe Golden plover Bar-tailed godwit Pink-footed goose Shelduck Knot Redshank Turnstone Scaup Great crested grebe Cormorant Curlew Eider Long-tailed duck Common scoter Velvet scoter Goldeneye Red-breasted merganser Oystercatcher Ringed plover Grey plover Dunlin Mallard Lapwing Wigeon Waterbird assemblage
Cameron Reservoir	143.6	214.0	Pink-footed goose
Loch Ashie	147.6	216.7	Slavonian grebe
South Tayside Goose Roosts	161.4	236.6	Wigeon Pink-footed goose Greylag goose Waterbird assemblage
Loch Leven	167.1	240.5	Whooper swan Pink-footed goose Shoveler Cormorant Gadwall Teal Pochard Tufted duck Goldeneye Waterbird assemblage
East Sanday Coast	187.2	179.1	Bar-tailed godwit Purple sandpiper Turnstone
Greenlaw Moor	194.2	255.3	Pink-footed goose
Din Moss – Hoselaw Loch	209.9	268.3	Pink-footed goose Greylag goose

[1]Breeding seabirds which are included on the basis of potential connectivity during the non-breeding season only.



LEGEND

- Proposed Green Volt development area
- Possible export route options
- Special Protection Areas (SPA)

0 80

Kilometres

PROJECT: GREEN VOLT

TITLE: Figure 7.1 SPAs and Ramsar Sites taken forward for LSE Screening

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FLOTATION ENERGY

7.2 Potential Effects Considered in Screening

7.2.1 Pathways for Potential LSE on Marine Ornithological Features During the Construction Phase

7.2.1.1 Direct Habitat Loss

202. There is potential for direct habitat loss within the Project footprint during the construction phase, although generally this would be temporary and relatively short-term. In the proposed Export Cable Route, this effect pathway would consist of the loss of habitat during ploughing / dredging for cable installation and Landfall. Following burial, seabed habitats would be allowed to re-establish. Notably, there would be potential for effects to occur in relation to the southernmost offshore export cable Landfall option, which intersects the Buchan Ness to Collieston Coast SPA. As such, there is potential for LSE to result from this effect pathway in relation to the qualifying features of this SPA.

203. Given the foraging range of seabird features from other breeding colony SPAs (the next nearest are tern colonies at the Loch of Strathbeg and Ythan Estuary, Sands of Forvie and Meikle Loch, each c.4.5 km from the Project, with all others more than 20 km away) that may be present in the cable corridor during the breeding and / or non-breeding season, and the availability of marine habitats for other functions (e.g. roosting), temporary loss of habitat (restricted to the footprint of the selected cable route option) is considered unlikely to result in LSE.

204. Habitat loss would be incurred in the array area at locations where WTG securing points and ancillary structure foundations (including possible scour protection) are installed. Given that these would remain in position throughout the O&M phase (and are, therefore, permanent or long-term in nature), this effect pathway is instead discussed in Section 7.2.2)

205. There is not considered to be an effect pathway with migratory waterbird SPA features, given that such species are highly unlikely to use marine areas within the Project footprint for foraging and / or roosting and would be unaffected by habitat loss when migrating through the site.

7.2.1.2 Disturbance and Displacement

206. During the construction phase, the presence of vessels and construction works within and en-route to / from the footprint of the Project may cause temporary disturbance to seabirds at foraging, roosting and (in the case of works at or near the southernmost Landfall option) breeding areas. For most species, the affected area is considered to be no more than 2 km from the source of disturbance, although larger for red-throated diver, which is more sensitive to anthropogenic disturbance (e.g. Mendel *et al.* 2019; Heinänen *et al.* 2020). Disturbance effects may range from minor behavioural changes to complete displacement from the affected area. It should be noted that the proposed export cable route landfall options are located near to Peterhead, where the general marine area is characterised by the presence and activity of various types of large vessels, including cable lay vessels and oil / gas supply vessels). It is, therefore, considered plausible that there may be a level of habituation of offshore ornithology receptors to such disturbance in this area and responses may tend towards the milder end of the scale. Regardless, temporary disturbance and / or displacement may lead to a reduction in foraging opportunity and increased energy expenditure, and potential consequent decrease in survival rate and productivity.

207. It is anticipated that disturbance and displacement would only affect seabirds that physically use the area affected (whether for foraging, roosting or nesting). Migratory waterbird SPA features that fly through (or over) affected areas during migration would be unlikely to be affected as they would generally not be expected to forage or roost in the marine environment around the Project.

208. Given the above, it is considered that there is potential for LSE to result from this effect pathway in relation to breeding populations of kittiwake, herring gull, guillemot, shag and fulmar from Buchan Ness and Collieston Coast SPA, plus any other breeding SPA populations within mean maximum (plus one SD) foraging range of the proposed cable corridor and / or array site. Exceptions to this include fulmar, great skua and gull species (except kittiwake). Fulmar and great skua have particularly large foraging ranges (see Section 7.1.1) and extensive alternative marine areas for foraging and other functions (e.g., roosting / loafing) are available within range of these two species. Gull species generally have a high level of insensitivity to offshore windfarm-related disturbances (e.g. Dierschke *et al.*, 2016; Garthe and Hüppop, 2004); therefore, they are unlikely to be significantly affected by the presence of construction vessels and activity.

209. There is not considered to be any potential for LSE in relation to migratory populations of waterbird, given that the nearest migratory SPAs / Ramsar sites (Ythan Estuary, Sands of Forvie and Meikle Loch and Loch of Strathbeg) are each 4.5 km from the proposed cable corridor options (at the nearest point).

7.2.1.3 Changes to Prey Availability

210. This effect pathway may arise as a consequence of adverse impacts on prey species leading to changes in prey distribution, availability or abundance. Reduction or disruption to prey availability within the ZoI of the Project may lead to short-term displacement of foraging activity or reduced energy uptake, potentially leading to decreased survival rates and / or productivity.

211. It is considered that there is potential for LSE to result from this effect pathway in relation to breeding colony SPA populations within mean maximum (plus one SD) foraging range of the proposed cable corridor and / or array site. Exceptions to this are fulmar and great skua, given the particularly large foraging ranges of these species (see Section 7.1.1). Extensive alternative marine areas are available within foraging range of these species, hence there is not considered to be potential for LSE.

212. There is not considered to be any potential for LSE in relation to migratory waterbird populations, given that waterbirds on migration are unlikely to use the marine environment around the Project for foraging.

7.2.1.4 Accidental Pollution

213. Accidental pollution associated with construction activities is not considered as an effect pathway as it will be subject to other regulatory control through legislation and the requirements for contingency plans.

7.2.2 Pathways for Potential LSE on Marine Ornithological Features During the Operation and Maintenance Phase

7.2.2.1 Direct habitat loss

214. During the O&M phase of the Project, habitat loss / change in the array area may become permanent or long-term in nature, as structures such as WTG securing's and foundations for ancillary structures will remain in place throughout the lifetime of the Project. However, the actual footprint of habitat loss during the O&M phase (defined as the area in which structures are in direct contact with the seabed) would be negligible in the context of the foraging ranges of breeding colony seabird features that may be present in and around the array site (which is located 70-80 km from the nearest breeding colony SPA). On this basis, it is considered that the potential for LSE on breeding seabird populations can be excluded.

215. Migratory waterbird SPA features that commute through marine areas within the Project footprint are unlikely to use such areas for foraging and / or roosting, so it is considered that there would be no potential LSE to these features.

7.2.2.2 Disturbance and Displacement

216. As per construction-phase disturbance and displacement (see Section 7.2.1), the two effect pathways are categorised together for the purpose of LSE screening but will be separated when undertaking an assessment of effects on site integrity.

217. During the O&M phase, the presence of WTGs and ancillary structures, plus the presence of maintenance activity (e.g., vessels) within the array area, may result in potential disturbance / displacement of breeding colony SPA features that use affected marine areas. Affected areas would constitute the array area plus adjacent waters (the extent to which adjacent waters are affected is dependent on the sensitivity of each feature).

218. Consequences of operational phase disturbance / displacement – which would be long term in nature – may include a reduction in foraging ability and potential decreases in survival rate and productivity of those species affected. Different species have different sensitivities to operational windfarm disturbance, with some (such as gannet and red-throated diver) displaying marked displacement tendencies (see e.g., Dierschke *et al.*, 2016; Heinänen *et al*, 2020). The effects of displacement are likely to be small in the context of the foraging range that seabirds present in the array area have; however, with the increasing number of OWFs the potential for LSE cannot be excluded. As per the construction phase (see Section 7.2.1.2), the exception in this regard is for fulmar and great skua given the particularly large breeding season foraging ranges of these two species, and gull species (excluding kittiwake) given their high level of insensitivity to OWF-related disturbances.

219. Within the offshore cable corridor, cables would be present as immobile structures at (or buried beneath) the seabed with minimal maintenance activity required. As such, there is considered to be no pathway for potential LSE for SPA seabird features that are within foraging range of the export cable corridor but not the array area, or seabirds from SPAs present in the vicinity of the cable during the non-breeding season.

220. In terms of migratory waterbird SPA features, the same principle applies as for construction-phase disturbance – such species would not use the array area for foraging and / or roosting and birds commuting through the area on migration are unlikely to be affected by disturbances. As such, there is not considered to be a potential effect pathway.

7.2.2.3 Collision

221. Collisions with the rotating blades of wind turbine structures may result in mortality. Mortality incidences as a result of collisions could cause population declines or, in some situations, prevent population recovery. Seabird species which forage within, or commute through, the array area may be vulnerable to such effects, as may migratory waterbirds passing through the area on migration.

222. For seabirds, collision risk may vary between species dependent on a range of factors associated with flight behaviour, and whether the species in question routinely enters operational OWFs (i.e. undertakes macro-avoidance). Of fundamental importance in predicting vulnerability to collision risk is flight height (Johnston *et al.*, 2014a and 2014b). Species which predominantly fly at low heights (and therefore below the rotor swept area), such as fulmar and auk species, are far less vulnerable to this effect pathway. As per Johnston *et al.* (2014b), the proportion of fulmar, guillemot, razorbill and puffin flights at 'at risk' heights (defined in Johnston *et al.* (2014a) as between 20 m and 120 m above sea level) are 0.010 (95% C.I. 0.000 – 0.092), 0.004 (C.I. 0.000 – 0.102), 0.027 (0.000 – 0.137) and 0.000 (0.000 – 0.053), respectively. Species which, by contrast, tend to fly at greater heights, such as kittiwake, large gulls and gannet, are at greater risk of collision.

223. Given the location of the array area 70-80 km offshore, it is extremely unlikely that any of the waterbird species associated with migratory SPAs / Ramsar sites would make frequent movements in the area (e.g. when commuting between foraging and roosting sites). As such, it is considered that collision risk for these species is limited to migratory movements.

7.2.2.4 Barrier to Movement

224. While the presence of turbines may not necessarily lead to injury or mortality, there is the risk that the presence of several structures in a large OWF may act as a barrier to the movements of foraging seabirds or migrating waterbirds, leading to increased flight distance as individuals divert around or over the array area.

225. The increased energy expenditure from such diversions is unlikely to have any significant effect on survival and / or productivity rates of migrating waterbirds, which would only likely make one-off movements through the Project Area, particularly when considering the relatively minor diversionary distances in the context of the overall migration distances (e.g., Masden *et al.*, 2009).

226. However, repeated effects on seabirds that frequently commute through the site when foraging could incur greater energetic costs and may have a greater effect on survival rates and productivity. This is particularly relevant during the breeding season due to the need for back-and-forth movements between foraging grounds and the breeding colony SPAs (e.g., Searle *et al.*, 2018), especially if cumulative effects from other OWFs are taken into account. Exceptions again apply for fulmar and great skua; these features have a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. For other species, the energetic costs of diversionary flights may vary depending on morphology and regularity of flights through the affected area (e.g. Masden *et al.*, 2010). For all species, energetic costs of diversionary flights are less than those imposed by natural occurrences such as low food abundance or adverse weather; however, such costs would be additive (Masden *et al.*, 2010).

227. Some seabird SPA populations have connectivity during the non-breeding season (on account of the fact that they contribute more than 5% of the relevant BDMPS region total) but not during the breeding season (i.e., the mean maximum foraging range from the nesting colony does not extend to the array area). For such species, LSE due to this impact pathway has been discounted on the basis that there is no requirement for regular back-and-forth movements to nesting colonies during the non-breeding season, therefore the impact of diversionary flight activity would be minimal.

7.2.2.5 Changes to Prey Availability

228. This effect pathway may arise as a consequence of adverse impacts on prey species leading to changes in prey distribution, availability or abundance in response to operational- / maintenance-phase impacts. Reduction or disruption to prey availability within the ZoI of the Project may lead to displacement of foraging activity or reduced energy uptake, potentially leading to decreased survival rates and / or productivity.

229. It is considered that there is potential for LSE to result from this effect pathway in relation to breeding colony SPA populations within foraging range of the proposed cable corridor and / or array site. As noted in Section 7.2.1, exceptions to this are fulmar and great skua, given the particularly large foraging ranges of these species

230. There is not considered to be any potential for LSE in relation to migratory waterbird populations, given that waterbirds on migration are unlikely to use marine areas around the Project for foraging.

7.2.2.6 Accidental Pollution

231. As per the construction phase (see Section 7.2.1), accidental pollution is not considered an effect pathway given that it will be subject to other regulatory control through legislation and the requirements for contingency plans.

7.2.3 Pathways for Potential LSE on Marine Ornithological Features During the Decommissioning Phase

232. Effect pathways during the decommissioning phase are considered to be similar to, or less than, those described for the construction phase (see Section 7.2.1), although effects from direct habitat loss are not applicable.

7.3 Determination of LSE for Marine Ornithology

233. The tables provided in this section present the conclusions of the LSE screening for the Project in relation to offshore ornithology. Separate LSE screening tables (Table 7.5 and Table 7.6) are provided for each of the sites carried forward from the initial identification of sites and potential connectivity presented in Section 7.1.

7.3.1 Buchan Ness and Collieston Coast SPA

Table 7.5 LSE Matrix for marine ornithological features of Buchan Ness and Collieston Coast SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	✓[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Herring gull (breeding)	✓[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	✓[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Shag (breeding)	✓[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	✓[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		x[e]	x[e]	x[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	✓[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

234. The southernmost export cable corridor Landfall option passes through the SPA therefore there is potential for temporary loss of habitat for all features of the SPA during the construction phase. LSE cannot be excluded for any feature for this impact pathway during this phase of the Project.

235. Given the very small footprint of habitat loss during the O&M phase, the foraging range of breeding seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and other functions (e.g., loafing / roosting). As such, LSE can be excluded for all features during this phase of the Project.

[b] Disturbance / Displacement

236. The southernmost export cable corridor Landfall option passes through the SPA, therefore there is potential for disturbance / displacement of all features of the SPA during the construction and decommissioning phases. As such, LSE cannot be excluded for any feature during these phases of the Project.

237. During the O&M phase, kittiwake and guillemot foraging ranges may extend to the array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity with the Project. LSE cannot be excluded for these features at any time of the year during this phase of the Project.

238. While fulmar may forage within the array area, this species has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging, loafing and / or roosting in case of disturbance / displacement. Herring gull may also forage within the array area; however, this species is known to be insensitive to OWF-related disturbance impacts (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). Shag foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for these three features during the O&M phase at all times of the year.

[c] Collision

239. There is potential for collision with WTGs for kittiwake and herring gull during both the breeding and non-breeding seasons, given that these features may forage within the array area and are known to fly within the 'at risk' height range within the rotor swept area. LSE therefore cannot be excluded for these features at any time of the year. While guillemot and fulmar may also forage within the array area during the breeding and non-breeding seasons, these features generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

240. Shag foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature.

[D] Barrier to Movement

241. During the O&M phase there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake and guillemot, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2).

242. While fulmar may also forage within the array area during the breeding season, this qualifying feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. Herring gull may also forage within the array area; however, this species is known to be weakly attracted to OWFs (Dierschke *et al.*, 2016;) therefore is unlikely to undertake diversionary flights around the array area. LSE can be excluded for these features at all times of the year.

243. Shag foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of year.

[e] Changes to Prey Availability

244. The southernmost export cable corridor Landfall option passes through the SPA and adjacent marine areas. The possibility of indirect effects from changes in prey abundance, availability and / or distribution is present for all features, and LSE therefore cannot be excluded for kittiwake, herring gull, guillemot and shag. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE for this feature at any time of year during this phase of the Project.

[f] In-Combination Effects

245. Given that at least one effect pathway exists for all features of the SPA, the potential for in-combination effects with other plans and projects remains.

7.3.2 Loch of Strathbeg SPA / Ramsar site

Table 7.6 LSE Matrix for marine ornithological features of Loch of Strathbeg SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Sandwich tern (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Svalbard barnacle goose (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Greylag goose (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Whooper swan (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Goldeneye (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Teal (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]

[a] Direct Habitat Loss

246. During the construction phase, habitat loss is generally temporary and short-lived, and is unlikely to have effects on breeding Sandwich tern given the distance between the colony and the Project footprint. The foraging range of this feature is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / bathing) on a temporary basis. As such, in this phase of the Project LSE can be excluded for this feature during the breeding season.

247. During the O&M phase, Sandwich tern foraging range does not extend to the array area, so LSE during the breeding season can also be excluded during this phase of the Project. As the SPA population does not contribute significantly to the BDMPS region total, LSE for this impact pathway can be excluded during the non-breeding season for both construction and operation.

248. For migratory waterbird features, there is no pathway for effect as these features are unlikely to use the Project marine area for roosting and / or foraging. Birds flying through the Project Area on migration would be unaffected by habitat loss. LSE can therefore be excluded for these features for all phases of the Project.

[b] Disturbance / Displacement

249. During the construction and decommissioning phases, Sandwich tern foraging range may extend to the proposed offshore cable corridor, hence the population may be affected by disturbance / displacement. However, LSE can be excluded for this feature (at all times of the year) during these phases on the basis that Sandwich tern is considered to be relatively insensitive to the types of activity – e.g., presence of vessels – that would occur in the cable corridor during these phases of the Project (e.g. Fleissbach *et al.*, 2019).

250. Sandwich tern foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature in the O&M phase at all times of the year.

251. Migratory waterbirds are unlikely to be affected by disturbance / displacement effects during migration movements, as they do not interact with the marine environment around the Project. As such, LSE can be excluded for these features for all phases of the Project.

[c] Collision

252. Sandwich tern foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

253. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[d] Barrier to Movement

254. Sandwich tern foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of year.

255. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[e] Changes to Prey Availability

256. Sandwich tern foraging range during the breeding season may extend to the proposed offshore cable corridor. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for seabird features during the breeding season, provided they are within foraging range. As the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season, LSE can be excluded for this feature during the non-breeding season.

257. Migratory waterbird features are unlikely to use the marine environment around the Project for foraging; therefore, LSE can be excluded for these features for all phases of the Project.

[f] In-Combination Effects.

258. Given that at least one effect pathway exists for all features, the potential for in-combination effects with other plans and projects remains.

7.3.3 Ythan Estuary, Sands of Forvie and Meikle Loch SPA / Ythan Estuary and Meikle Loch Ramsar site

Table 7.7 LSE Matrix for marine ornithological features of Ythan Estuary, Sands of Forvie and Meikle Loch SPA / Ythan Estuary and Meikle Loch Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Common tern (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	x[f]	✓[f]
Little tern (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Sandwich tern (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Eider (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Redshank (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Lapwing (non- breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Waterbird assemblage (non-breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]

[a] Direct Habitat Loss

259. During the construction phase, habitat loss is generally temporary and short-lived, and is unlikely to have effects on breeding Sandwich tern, common tern and little tern given the distance between the SPA and the Project footprint. The foraging ranges of these features are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g., loafing / bathing) on a temporary basis. As such, LSE can be excluded for these features during the breeding season. During the O&M phase, foraging ranges do not extend to the array area, so LSE during breeding season can also be excluded during this phase of the Project. As the SPA populations do not contribute significantly to the BDMPS region total, LSE for this impact pathway can be excluded for these features during the non-breeding season for both construction and operation.

260. For migratory waterbird features, there is no pathway for effect in any phase as these features are unlikely to use the Project marine area for roosting and / or foraging. Birds flying through the Project Area on migration would be unaffected by habitat loss. LSE can therefore be excluded for these features for all phases of the Project.

[b] Disturbance / Displacement

261. During the construction and decommissioning phases, common tern, little tern and Sandwich tern foraging ranges may extend to the proposed offshore cable corridor, hence these populations may be affected by disturbance / displacement. However, LSE can be excluded for these features during these phases on the basis that tern species are considered to be relatively insensitive to the types of activity – e.g. presence of vessels – that would occur in the cable corridor during these phases of the Project (e.g. Fleissbach *et al.*, 2019).

262. For all three tern species, foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features during the O&M phase at all times of the year.

263. Migratory waterbirds are unlikely to be affected by disturbance / displacement effects during migration movements, as they do not interact with the marine environment around the Project. As such, LSE can be excluded for these features for all phases of the Project.

[c] Collision

264. Common tern, little tern and Sandwich tern foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features at all times of the year.

265. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[d] Barrier to Movement

266. Common tern, little tern and Sandwich tern foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features at all times of the year.

267. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[e] Changes to Prey Availability

268. Common tern, little tern and Sandwich tern foraging ranges during the breeding season may extend to the proposed offshore cable corridor. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE cannot be excluded for breeding seabird features within foraging range. However, as the SPA populations do not contribute significantly to the BDMPS region total during the non-breeding season, LSE can be excluded for these features during the non-breeding season.

269. Migratory waterbird features are unlikely to use the marine environment around the Project for foraging; therefore, LSE can be excluded for these features for all phases of the Project.

f In-Combination Effects.

270. Given that at least one effect pathway to LSE exists for all features of the SPA, the potential for in-combination effects with other plans and projects remains.

7.3.4 Troup, Pennan and Lion's Head SPA

Table 7.8 LSE Matrix for marine ornithological features of Troup, Pennan and Lion's Head SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Herring gull (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Razorbill (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

271. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

272. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

273. In the construction and decommissioning phases, kittiwake, guillemot and razorbill foraging ranges may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the Project Area, this qualifying feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. Herring gull may also forage within the Project Area; however, this species is known to be insensitive to OWF-related disturbance impacts (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). LSE can be excluded for these two features at all times of the year.

274. In the O&M phase, kittiwake, guillemot and razorbill foraging ranges may extend to the array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the array area, LSE can be excluded for this feature at all times of the year based on the reasons set out above. Herring gull foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[c] Collision

275. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While guillemot, razorbill and fulmar may also forage within the array area during the breeding and non-breeding seasons, these species generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

276. Herring gull foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature.

[d] Barrier to Movement

277. In the O&M phase there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, guillemot and razorbill, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

278. Herring gull foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. Furthermore, this species is known to be weakly attracted to OWFs (Dierschke *et al.*, 2016) therefore is unlikely to undertake diversionary flights around the array area. As such, LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

279. Foraging ranges of all seabird features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most SPA seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year.

[f] In-Combination Effects.

280. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and, therefore, there is no potential for contribution to in-combination effects.

7.3.5 Fowlsheugh SPA

Table 7.9 LSE Matrix for marine ornithological features of Fowlsheugh SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Herring gull (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Razorbill (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

281. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

282. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

283. In the construction and decommissioning phases, kittiwake, guillemot and razorbill foraging ranges may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. Herring gull may also forage within the Project Area; however, this species is known to be insensitive to OWF-related disturbance impacts (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). LSE can be excluded for these two features at all times of the year.

284. In the O&M phase, kittiwake, guillemot and razorbill foraging ranges may extend to the array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the array area, LSE can be excluded for this feature at all times of the year based on the reasons set out above. Herring gull foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[c] Collision

285. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While guillemot, razorbill and fulmar may also forage within the array area during the breeding and non-breeding seasons, these species generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

286. Herring gull foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

287. During the O&M Phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, guillemot and razorbill, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

288. Herring gull foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. Furthermore, this species is known to be weakly attracted to OWFs (Dierschke *et al.*, 2016) therefore is unlikely to undertake diversionary flights around the array area. As such, LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

289. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most SPA seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year.

[f] In-Combination Effects.

290. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and, therefore, there is no potential for contribution to in-combination effects.

7.3.6 East Caithness Cliffs SPA

Table 7.10 LSE Matrix for marine ornithological features of East Caithness Cliffs SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Razorbill (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Shag (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

291. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

292. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

293. In the construction and decommissioning phases, kittiwake, guillemot and razorbill foraging ranges may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding season, as may the non-breeding distribution of shag, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for shag during the non-breeding season and for kittiwake, guillemot and razorbill at any time of the year in this phase of the Project. While fulmar may also forage within the Project Area, this qualifying feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

294. In the O&M phase, kittiwake, guillemot and razorbill foraging ranges may extend to the array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the array area, LSE can be excluded for this feature at all times of the year based on the reasons set out above. During the non-breeding season, when shag from the SPA may have dispersed widely, it is unlikely that a significant number of birds would be present in the array area, as they have partially wettable plumage and require regular access to land for drying (Grémillet *et al.*, 1998) and therefore are rarely found away from coastal areas (Furness, 2015). On this basis, LSE can be excluded for this feature at all times of the year.

[c] Collision

295. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While guillemot, razorbill and fulmar may also forage within the array area during the breeding and non-breeding seasons, these features generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year. LSE can be excluded for shag on the basis of the information set out for disturbance / displacement.

[d] Barrier to Movement

296. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, guillemot and razorbill, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year. LSE can be excluded for shag on the basis of the information set out for disturbance / displacement.

[e] Changes to Prey Availability

297. Foraging ranges of all seabird features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most breeding SPA features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year.

f In-combination effects.

298. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.7 North Caithness Cliffs SPA

Table 7.11 LSE Matrix for marine ornithological features of North Caithness Cliffs SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Guillemot (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Razorbill (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

299. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

300. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

301. In the construction and decommissioning phases, kittiwake, guillemot, razorbill and puffin foraging ranges may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

302. In the O&M phase, kittiwake, razorbill and puffin foraging ranges may extend to the array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the array area, LSE can be excluded for this feature at all times of the year based on the reasons set out above. Guillemot foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[c] Collision

303. There is potential for collision with WTG for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding season. LSE therefore cannot be excluded for this qualifying feature at any time of the year. While razorbill, puffin and fulmar may also forage within the array area during the breeding and non-breeding season, these species generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

304. Guillemot foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season (regardless, guillemot flight altitude is generally below the rotor swept area). LSE can be excluded for this feature.

[d] Barrier to Movement

305. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, razorbill and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

306. Guillemot foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

307. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year.

[f] In-Combination Effects.

308. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.8 Forth Islands SPA

Table 7.12 LSE Matrix for marine ornithological features of Forth Islands SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Lesser black-backed gull (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Razorbill (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Shag (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

309. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

310. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

311. In the construction and decommissioning phases, foraging ranges of all seabird features may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for most of these features at any time of the year in this phase of the Project. The exception in this regard is for lesser black-backed gull, as this species is known to be insensitive to OWF-related disturbance impacts (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). LSE can be excluded for this feature at all times of the year.

312. In the O&M phase, gannet, kittiwake and puffin foraging ranges may extend to the array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While lesser black-backed gull may be present in the array area, LSE can be excluded for this feature at all times of the year based on the reasons set out above. Guillemot and razorbill foraging range during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features at all times of the year. During the non-breeding season, when shag from the SPA may have dispersed widely, it is unlikely that a significant number of birds would be present in the array area, as they have partially wettable plumage and require regular access to land for drying (Grémillet *et al.*, 1998) and therefore are rarely found away from coastal areas (Furness, 2015). On this basis, LSE can be excluded for this feature.

[c] Collision

313. There is potential for collision with WTGs for gannet, lesser black-backed gull and kittiwake, given that these features may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding season. LSE cannot be excluded for these features at any time of the year. While puffin may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

314. Guillemot and razorbill foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season (regardless, auk flight altitude is generally below the rotor swept area). LSE can be excluded for these features. LSE can be excluded for shag on the basis of the information set out for disturbance / displacement.

[d] Barrier to Movement

315. In the O&M phase there is potential for WTGs and ancillary structures to form a barrier to movement for gannet, puffin and kittiwake, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While lesser black-backed gull may also forage within the array, this species is known to be weakly attracted to OWFs (Dierschke *et al.*, 2016) therefore is unlikely to undertake diversionary flights around the array area. LSE can be excluded for this feature at all times of the year.

316. Guillemot and razorbill foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features at all times of the year. LSE can be excluded for shag at all times of the year on the basis of the information set out for disturbance / displacement.

[e] Changes to Prey Availability

317. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-combination effects.

318. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains.

7.3.9 Copinsay SPA

Table 7.13 LSE Matrix for marine ornithological features of Copinsay SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

320. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, therefore, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

321. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

322. In the construction and decommissioning phases, kittiwake and guillemot foraging ranges may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for these features at any time of the year in this phase of the Project. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year in this phase of the Project.

323. In the O&M phase, kittiwake foraging range may extend to the array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year in this phase of the Project. While fulmar may also forage within the array area, LSE in this phase of the Project can be excluded for this feature at all times of the year based on the reasons set out above. Guillemot foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[c] Collision

324. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding season, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

325. Guillemot foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season (regardless, flight altitude is generally below the rotor swept area). LSE can be excluded for this feature.

[d] Barrier to Movement

326. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

327. Guillemot foraging range during the breeding season does not extend to the array area and the SPA population does not contribute significantly to the BDMPS region total during the non-breeding season. As such, LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

328. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year.

[f] In-Combination Effects.

329. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.10 Hoy SPA

Table 7.14 LSE Matrix for marine ornithological features of Hoy SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Red-throated diver (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Great skua (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

330. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

331. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

332. In all phases of the Project, kittiwake and puffin foraging ranges may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, as may the distribution of red-throated diver during the non-breeding season, hence populations may be affected by disturbance / displacement from construction / decommissioning activities and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for red-throated diver during the non-breeding season and for kittiwake and puffin at any time of the year. While fulmar and great skua (the latter with potential connectivity only during the non-breeding season) may also forage within the Project Area, these features have particularly large foraging ranges (see Section 7.1.1) and therefore have extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for these features at all times of the year.

[c] Collision

333. There is potential for collision with WTGs for kittiwake, great skua and red-throated diver (the latter two features with potential connectivity only during the non-breeding season), given that these features may be present within the array area and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded for these features. While puffin and fulmar may also forage within the array area, these features generally fly at a low height (below the rotor swept area) and therefore are unlikely to be affected. LSE can be excluded for these features.

[d] Barrier to Movement

334. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

335. For great skua and red-throated diver, potential connectivity exists only during the non-breeding season, and, given that there would not be regular movements to and from the SPA, barrier effects would be infrequent. LSE can be excluded for these features.

[e] Changes to Prey Availability

336. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features within during the breeding and non-breeding season, provided they are foraging range. The exceptions in this regard are fulmar and great skua. While fulmar and great skua may also forage within the Project Area (the latter with potential connectivity only during the non-breeding season), the particularly large foraging ranges of these features means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE for these features at any time of the year.

337. [f] **In-Combination Effects.** Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.11 Auskerry SPA

Table 7.15 LSE Matrix for marine ornithological features of Auskerry SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Storm-petrel (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

[a] Direct Habitat Loss

338. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the storm-petrel population. LSE can be excluded for this feature in both the breeding and non-breeding seasons.

339. Given the very small footprint of habitat loss during the O&M phase, the foraging range of storm-petrel is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for this feature in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

340. In all phases of the Project, storm-petrel foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year.

[c] Collision

341. There is potential for collision with WTGs for storm-petrel, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE cannot be excluded for this feature at any time of the year.

[d] Barrier to Movement

342. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for storm-petrel, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2).

[e] Changes to Prey Availability

343. Foraging ranges of storm-petrel may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-Combination Effects.

344. Given that at least one effect pathway to LSE exists for storm-petrel, the potential for in-combination effects with other plans and projects remains.

7.3.12 St. Abb's Head to Fast Castle SPA

Table 7.16 LSE Matrix for marine ornithological features of St. Abb's Head to Fast Castle SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for kittiwake, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

345. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the kittiwake population. LSE can be excluded for this feature in both the breeding and non-breeding seasons.

346. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for this feature in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

347. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year.

[c] Collision

348. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year.

[d] Barrier to Movement

349. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2).

[e] Changes to Prey Availability

350. Foraging ranges of kittiwake may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-Combination Effects.

351. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains.

7.3.13 Fair Isle SPA

Table 7.17 LSE Matrix for marine ornithological features of Fair Isle SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

352. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

353. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

354. In all phases of the Project, kittiwake, puffin and gannet foraging ranges may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance activity. LSE cannot be excluded for these features at any time of the year. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] **Collision**

355. There is potential for collision with WTGs for kittiwake and gannet, given that these features may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for these features at any time of the year. While puffin and fulmar may also forage within the array area during the breeding and non-breeding seasons, these features generally fly below the rotor swept area and therefore are unlikely to be affected. LSE can be excluded for these features at all times of the year.

[d] **Barrier to Movement**

356. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, puffin and gannet, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] **Changes to Prey Availability**

357. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE.

[f] **In-Combination Effects.**

358. Given that at least one effect pathway to LSE exists for most features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.14 Calf of Eday SPA

Table 7.18 LSE Matrix for marine ornithological features of Calf of Eday SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

359. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on kittiwake and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

360. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake and fulmar are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

361. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for this feature at any time of the year. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

362. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding season, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

363. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

364. Kittiwake foraging range may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE cannot be excluded for most breeding seabird features within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE.

[f] In-Combination Effects.

365. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.15 Rousay SPA

Table 7.19 LSE Matrix for marine ornithological features of Rousay SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

366. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint such loss is unlikely to have effects on kittiwake and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

367. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake and fulmar are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

368. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for this feature at any time of the year. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

369. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

370. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

371. Kittiwake foraging range may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE.

[f] In-combination effects.

372. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.16 Marwick Head SPA

Table 7.20 LSE Matrix for marine ornithological features of Marwick Head SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for kittiwake, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

374. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the kittiwake population. LSE can be excluded in both the breeding and non-breeding seasons.

375. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for this feature in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

376. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for this feature at any time of the year.

[c] Collision

377. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding season. LSE therefore cannot be excluded for this feature at any time of the year.

[d] Barrier to Movement

378. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2).

[e] Changes to Prey Availability

379. Foraging ranges of kittiwake may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-Combination Effects.

380. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains.

7.3.17 West Westray SPA

Table 7.21 LSE Matrix for marine ornithological features of West Westray SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

381. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on kittiwake and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

382. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake and fulmar is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

383. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for this feature at any time of the year. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

384. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

385. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

386. Kittiwake foraging range may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-combination effects.

387. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.18 Farne Islands SPA

Table 7.22 LSE Matrix for marine ornithological features of Farne Islands SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

389. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

390. Given the very small footprint of habitat loss during the O&M phase, the foraging range of seabird features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

391. In all phases of the Project, kittiwake, puffin and guillemot foraging ranges (the latter with potential connectivity only during the non-breeding season) may extend to the proposed offshore cable corridor and / or array area, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for guillemot during the non-breeding seasons and for kittiwake and puffin at any time of the year.

[c] Collision

392. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While puffin and guillemot may also forage within the array area (the latter with potential connectivity during the non-breeding season only), these features generally fly below the rotor swept area and therefore are unlikely to be affected. LSE can be excluded for these features at all times of the year.

[d] Barrier to Movement

393. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). For guillemot, potential connectivity exists only during the non-breeding season, and, given that there would not be regular movements to and from the SPA, barrier effects would be infrequent. LSE can be excluded for this feature.

[e] Changes to Prey Availability

394. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-Combination Effects.

395. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains.

7.3.19 Cape Wrath SPA

Table 7.23 LSE Matrix for marine ornithological features of Cape Wrath SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

396. During the construction phase, habitat loss is generally temporary and short-lived. Given the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

397. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake, puffin and fulmar is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

398. In all phases of the Project, kittiwake and puffin foraging ranges may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for these features at any time of the year.

399. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] **Collision**

400. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While puffin and fulmar may also forage within the array area during the breeding and non-breeding seasons, these features generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

[d] **Barrier to Movement**

401. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] **Changes to Prey Availability**

402. Kittiwake and puffin foraging ranges may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] **In-Combination Effects.**

403. Given that at least one effect pathway to LSE exists for kittiwake and puffin, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.20 Sumburgh Head SPA

Table 7.24 LSE Matrix for marine ornithological features of Sumburgh Head SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

404. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on kittiwake and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

405. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake and fulmar is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

406. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for this feature at any time of the year.

407. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] **Collision**

408. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during both the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] **Barrier to Movement**

409. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] **Changes to Prey Availability**

410. Kittiwake foraging range may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] **In-Combination Effects.**

411. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.21 Handa SPA

Table 7.25 LSE Matrix for marine ornithological features of Handa SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

413. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on kittiwake and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

414. Given the very small footprint of habitat loss during the O&M phase, the foraging range of kittiwake and fulmar is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

415. In all phases of the Project, kittiwake foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for this feature at any time of the year.

416. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

417. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be affected. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

418. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

419. Kittiwake foraging range may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-Combination Effects.

420. Given that at least one effect pathway to LSE exists for kittiwake, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.22 Sule Skerry and Sule Stack SPA

Table 7.26 LSE Matrix for marine ornithological features of Sule Skerry and Sule Stack SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Storm-petrel (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

422. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

423. Given the very small footprint of habitat loss during the O&M phase, the foraging ranges of storm-petrel, gannet and puffin are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

424. In all phases of the Project, storm-petrel, gannet and puffin foraging ranges may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for these features at any time of the year.

[c] Collision

425. There is potential for collision with WTGs for storm-petrel and gannet, given that these features may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for these features at any time of the year. While puffin may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

426. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for storm-petrel, gannet and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2).

[e] Changes to Prey Availability

427. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-Combination Effects.

428. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains.

7.3.23 Priest Island (Summer Isles) SPA

Table 7.27 LSE Matrix for marine ornithological features of Priest Island (Summer Isles) SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Storm-petrel (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]

[a] Direct Habitat Loss

429. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the storm-petrel population. LSE can be excluded for this feature in both the breeding and non-breeding seasons.

430. Given the very small footprint of habitat loss during the O&M phase, the foraging range of storm-petrel is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

431. When the 'real' flight distance is taken into account (i.e. the distance travelled when moving around, rather than over, large land masses; see Section 7.1.1), the mean maximum foraging range for storm petrel from the SPA does not extend to the array area and barely extends to the proposed offshore cable corridor. On this basis, the risk of disruption to significant numbers of birds from the SPA due to disturbance / displacement effects is considered to be very low. LSE can be excluded for this feature at all times of the year.

[c] Collision

432. When the 'real' flight distance is taken into account, the mean maximum foraging range for storm petrel from the SPA does not extend to the array area, therefore there is no potential for collision with WTGs. LSE can be excluded for this feature.

[d] Barrier to Movement

433. When the 'real' flight distance is taken into account, the mean maximum foraging range for storm petrel from the SPA does not extend to the array area, therefore there is no potential for barrier effects from WTGs and ancillary structures. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

434. When the 'real' flight distance is taken into account, the mean maximum foraging range for storm petrel from the SPA does not extend to the array area and barely extends to the proposed offshore cable corridor. On this basis, the risk of disruption to significant numbers of birds from the SPA due to disturbance / displacement effects is considered to be very low. LSE can be excluded for this feature at all times of the year and in all phases of the Project.

[f] In-combination effects.

435. Given that no pathway to LSE exists for storm-petrel, there is no potential for in-combination effects with other plans and projects.

7.3.24 Mousa SPA

Table 7.28 LSE Matrix for marine ornithological features of Mousa SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Storm-petrel (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

[a] Direct Habitat Loss

436. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the storm-petrel population. LSE can be excluded for this feature in both the breeding and non-breeding seasons.

437. Given the very small footprint of habitat loss during the O&M phase, the foraging range of storm-petrel is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

438. In all phases of the Project, storm-petrel foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year.

[c] Collision

439. There is potential for collision with WTGs for storm-petrel, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year.

[d] Barrier to Movement

440. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for storm-petrel, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2).

[e] Changes to Prey Availability

441. Foraging ranges of storm-petrel may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range.

[f] In-Combination Effects.

442. Given that at least one effect pathway to LSE exists for storm-petrel, the potential for in-combination effects with other plans and projects remains.

7.3.25 Coquet Island SPA

Table 7.29 LSE Matrix for marine ornithological features of Coquet Island SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Lesser black-backed gull (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	x[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

443. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

444. Given the very small footprint of habitat loss during the O&M phase, the foraging range of features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

445. In the construction and decommissioning phases, foraging ranges of kittiwake and puffin may extend to the proposed offshore cable corridor and / or array area during the breeding and non-breeding season, hence populations may be affected by disturbance / displacement. LSE cannot be excluded for these features at any time of the year in these phases of the Project. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. Lesser black-backed gull may also forage within the Project Area; however, this species is known to be insensitive to OWF-related disturbance impacts (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). LSE can be excluded for these two features at all times of the year in these phases of the Project.

446. In the O&M phase, kittiwake foraging range may extend to the array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year in this phase of the Project. While fulmar may also forage within the array area, LSE in this phase of the Project can be excluded for this feature at all times of the year, based on the reasons set out above. Puffin and lesser black-backed gull foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features at all times of the year in this phase of the Project.

[c] Collision

447. There is potential for collision with WTGs for kittiwake, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

448. Puffin and lesser black-backed gull foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season (additionally, puffin flight altitude is generally below the rotor swept area). LSE can be excluded for these features.

[d] Barrier to Movement

449. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

450. Puffin and lesser black-backed gull foraging ranges during the breeding season do not extend to the array area and the SPA populations do not contribute significantly to the BDMPS region totals during the non-breeding season. As such, LSE can be excluded for these features at all times of the year.

[e] Changes to Prey Availability

451. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-combination effects.

452. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.26 Noss SPA

Table 7.30 LSE Matrix for marine ornithological features of Noss SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

454. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

455. Given the very small footprint of habitat loss during the O&M phase, the foraging range of features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

456. In all phases of the Project, gannet, kittiwake and puffin foraging ranges may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. LSE cannot be excluded for these features at any time of the year.

457. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

458. There is potential for collision with WTGs for kittiwake and gannet, given that these features may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for these features at any time of the year. While puffin and fulmar may also forage within the array area during the breeding and non-breeding seasons, these features generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

[d] Barrier to Movement

459. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake, gannet and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

460. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-Combination Effects.

461. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.27 Foula SPA

Table 7.31 LSE Matrix for marine ornithological features of Foula SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Puffin (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Great skua (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

463. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

464. Given the very small footprint of habitat loss during the O&M phase, the foraging range of features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

465. In all phases of the Project, puffin and kittiwake foraging ranges may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activities and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for these features at any time of the year.

466. While fulmar and great skua may also forage within the Project Area (the latter with potential connectivity only during the non-breeding season), these features have particularly large foraging ranges (see Section 7.1.1) and therefore have extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for these features at all times of the year.

[c] **Collision**

467. There is potential for collision with WTGs for kittiwake and great skua (the latter with potential connectivity only during the non-breeding season), given that these features may forage within the array area and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded during the non-breeding season for great skua and at any time of the year for kittiwake. While puffin and fulmar may also forage within the array area during the breeding and non-breeding seasons, these features generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

[d] **Barrier to Movement**

468. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for kittiwake and puffin, given that these features may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for these features (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

469. For great skua, potential connectivity exists only during the non-breeding season, and, given that there would not be regular movements to and from the SPA, barrier effects would be infrequent. LSE can be excluded for this feature.

[e] **Changes to Prey Availability**

470. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exceptions in this regard are fulmar and great skua. While fulmar and great skua may also forage within the Project Area, the particularly large foraging ranges of these features means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for these two features.

471. [f] **In-Combination Effects.** Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.28 Shiant Isles SPA

Table 7.32 LSE Matrix for marine ornithological features of Shiant Isles SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]

* Note that since no potential pathways to LSE exist for fulmar, by definition none exist for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

472. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the fulmar population. LSE can be excluded for this feature in both the breeding and non-breeding seasons.

473. Given the very small footprint of habitat loss during the O&M phase, the foraging range of fulmar is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

474. While fulmar may forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement from construction / decommissioning activities or from the presence of WTGs and maintenance activity. LSE can be excluded for this feature at all times of the year.

[c] Collision

475. While fulmar may forage within the array area during the breeding and non-breeding seasons, this feature generally flies at a low altitude (i.e. below the rotor swept area) and therefore is unlikely to be affected. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

476. While fulmar may forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

477. While fulmar may forage within the Project Area, the particularly large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year or in any phase of the Project.

[f] In-Combination Effects.

478. Given that no effect pathway to LSE exists for fulmar, there is no pathway for potential for in-combination effects with other plans and projects.

7.3.29 North Rona and Sula Sgeir SPA

Table 7.33 LSE Matrix for marine ornithological features of North Rona and Sula Sgeir SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

479. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on gannet and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

480. Given the very small footprint of habitat loss during the O&M phase, the foraging ranges of gannet and fulmar are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

481. In all phases of the Project, gannet foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding season, hence the population may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year.

482. While fulmar may also forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

483. There is potential for collision with WTGs for gannet, given that this feature may forage within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

484. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for gannet, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

485. Gannet foraging range may extend to the proposed cable corridor and array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging range means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-Combination Effects.

486. Given that at least one effect pathway to LSE exists for gannet, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways leading to LSE have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.30 Fetlar SPA

Table 7.34 LSE Matrix for marine ornithological features of Fetlar SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Arctic skua (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Great skua (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

487. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

488. Given the very small footprint of habitat loss during the O&M phase, the foraging range of features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

489. In all phases of the Project, Arctic skua may be present in the proposed offshore cable corridor and / or array area during the non-breeding season, hence the population may be affected by disturbance / displacement from construction / decommissioning activities and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature during the non-breeding season.

490. While fulmar and great skua may also be present within the Project Area (the latter with potential connectivity only during the non-breeding season), these features have particularly large foraging ranges (see Section 7.1.1) and therefore have extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for these features at all times of the year.

[c] **Collision**

491. There is potential for collision with WTGs for Arctic skua and great skua (both with potential connectivity only during the non-breeding season), given that these features may be present within the array area and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded for these features during the non-breeding season. While fulmar may also forage within the array area during both the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] **Barrier to Movement**

492. While fulmar may forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year. For Arctic skua and great skua, potential connectivity exists only during the non-breeding season, and, given that there would not be regular movements to and from the SPA, barrier effects would be infrequent. LSE can be excluded for these features.

[e] **Changes to Prey Availability**

493. Foraging ranges of Arctic skua may extend to the proposed cable corridor and / or array area during the non-breeding season. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within range. The exceptions in this regard are fulmar and great skua. While fulmar and great skua may also forage within the Project Area, the particularly large foraging ranges of these features means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for these two features.

[f] **In-Combination Effects.**

494. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.31 Hermaness, Saxa Vord and Valla Field SPA

Table 7.35 LSE Matrix for marine ornithological features of Hermaness, Saxa Vord and Valla Field SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Great skua (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

496. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

497. Given the very small footprint of habitat loss during the O&M phase, the foraging range of features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

498. In all phases of the Project, gannet may be present in the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activities and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year.

499. While fulmar and great skua may also be present within the Project Area (the latter with potential connectivity only during the non-breeding season), these features have particularly large foraging ranges (see Section 7.1.1) and therefore have extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for these features at all times of the year.

[c] Collision

500. There is potential for collision with WTGs for gannet and great skua (the latter with potential connectivity only during the non-breeding season), given that these features may be present within the array area and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded for great skua during the non-breeding season and for gannet at any time of the year. While fulmar may also forage within the array area during both the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

501. In the O&M phase, there is potential for structures to form a barrier to movement for gannet, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar and great skua may also be present within the array area (the latter with potential connectivity only during the non-breeding season), these features have particularly large foraging ranges and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for these features.

[e] Changes to Prey Availability

502. Foraging ranges of gannet may extend to the proposed cable corridor and / or array area during the non-breeding season. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exceptions in this regard are fulmar and great skua. While fulmar and great skua may also forage within the Project Area, the particularly large foraging ranges of these features means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for these two features.

[f] In-Combination Effects.

503. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.32 Flannan Isles SPA

Table 7.36 LSE Matrix for marine ornithological features of Flannan Isles SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]

* Note that since no potential pathways to LSE exist for fulmar, by definition none exist for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

504. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on the fulmar population. LSE can be excluded for this feature in both the breeding and non-breeding seasons.

505. Given the very small footprint of habitat loss during the O&M phase, the foraging range of fulmar is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

506. While fulmar may forage within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement from construction / decommissioning activities or from the presence of WTGs and maintenance activity. LSE can be excluded for this feature at all times of the year.

[c] Collision

507. While fulmar may forage within the array area during the breeding and non-breeding seasons, this feature generally flies at a low altitude (i.e. below the rotor swept area) and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

508. While fulmar may forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

509. While fulmar may forage within the Project Area, the particularly large foraging range of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year or in any phase of the Project.

[f] In-Combination Effects.

510. Given that no effect pathway to LSE exists for fulmar, there is no pathway for potential for in-combination effects with other plans and projects.

7.3.33 Flamborough & Filey Coast SPA

Table 7.37 LSE Matrix for marine ornithological features of Flamborough & Filey Coast SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Kittiwake (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Razorbill (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Guillemot (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		x[c]			x[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

512. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on SPA seabird populations. LSE can be excluded for all features in both the breeding and non-breeding seasons.

513. Given the very small footprint of habitat loss during the O&M phase, the foraging range of features that may be present in the array area are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded for these features in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

514. In all phases of the Project, gannet foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence populations may be affected by disturbance / displacement from construction / decommissioning activity and from the presence of WTG structures and regular maintenance. Similarly, during the non-breeding season the SPA populations of kittiwake, razorbill and guillemot contribute significantly to the BDMPS total, therefore there is potential for these features to be present in notable numbers within the Project Area. As such, LSE cannot be excluded for kittiwake, razorbill and guillemot during the non-breeding season and for gannet at any time of the year.

515. While fulmar may also be present within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

516. There is potential for collision with WTGs for gannet and kittiwake, given that these features may be present within the array area (the latter with potential connectivity only during the non-breeding season) and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded for kittiwake during the non-breeding season and for gannet at any time of the year. While fulmar, razorbill and guillemot may also forage within the array area (the latter two only during the non-breeding season), these features generally fly below the rotor swept area and therefore are unlikely to be impacted. LSE can be excluded for these features at all times of the year.

[d] Barrier to Movement

517. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for gannet, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also forage within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

518. For kittiwake, guillemot and razorbill, potential connectivity exists only during the non-breeding season, and, given that there would not be regular movements to and from the SPA, barrier effects would be infrequent. LSE can be excluded for these features.

[e] Changes to Prey Availability

519. Foraging ranges of all features may extend to the proposed cable corridor and / or array area. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. The exception in this regard is fulmar. While fulmar may also forage within the Project Area, the particularly large foraging ranges of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-Combination Effects.

520. Given that at least one effect pathway to LSE exists for features of the SPA, the potential for in-combination effects with other plans and projects remains. The exception in this regard is fulmar, for which effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.34 St. Kilda SPA

Table 7.38 LSE Matrix for marine ornithological features of St. Kilda SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Gannet (breeding)	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]
Fulmar (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		x[c]			x[d]		x[e]	x[e]	x[e]	x[f]	x[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		✓[b]	✓[b]	✓[b]		✓[c]			✓[d]		✓[e]	✓[e]	✓[e]	✓[f]	✓[f]	✓[f]

* Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

521. During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on gannet and fulmar populations. LSE can be excluded for both features in both the breeding and non-breeding seasons.

522. Given the very small footprint of habitat loss during the O&M phase, the foraging ranges of gannet and fulmar are such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in both the breeding and non-breeding seasons.

[b] Disturbance / Displacement

523. In all phases of the Project, gannet foraging range may extend to the proposed offshore cable corridor and array area during the breeding and non-breeding seasons, hence the population may be affected by disturbance / displacement from construction / decommissioning activities and from the presence of WTGs and regular maintenance activity. LSE cannot be excluded for this feature at any time of the year.

524. While fulmar may also be present within the Project Area, this feature has a particularly large foraging range (see Section 7.1.1) and therefore has extensive alternative marine habitats available for foraging / roosting in case of disturbance / displacement. LSE can be excluded for this feature at all times of the year.

[c] Collision

525. There is potential for collision with WTGs for gannet, given that this feature may be present within the array area and may fly within the 'at risk' height range within the rotor swept area during the breeding and non-breeding seasons. LSE therefore cannot be excluded for this feature at any time of the year. While fulmar may also forage within the array area during the breeding and non-breeding seasons, this feature generally flies below the rotor swept area and therefore is unlikely to be impacted. LSE can be excluded for this feature at all times of the year.

[d] Barrier to Movement

526. In the O&M phase, there is potential for WTGs and ancillary structures to form a barrier to movement for gannet, given that this feature may forage within the array area during the breeding season. Barrier effects may increase flight distance therefore LSE cannot be excluded for this feature (restricted to the breeding season, as per the rationale set out in Section 7.2.2). While fulmar may also be present within the array area during the breeding season, this feature has a particularly large foraging range and additional flight distance resulting from barrier effects would not be significant. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

527. Foraging ranges of gannet may extend to the proposed cable corridor and / or array area during the non-breeding season. As noted in Sections 7.2.1 and 7.2.2, the potential for LSE in all phases of the Project cannot be excluded for most seabird features during the breeding and non-breeding season, provided they are within foraging range. While fulmar may also forage within the Project Area, the particularly large foraging ranges of this feature means that there is extensive alternative marine foraging habitat available. As such, it is highly unlikely that changes to prey availability in the vicinity of the Project would result in LSE at any time of the year for this feature.

[f] In-Combination Effects.

528. Given that at least one effect pathway to LSE exists for gannet, the potential for in-combination effects with other plans and projects remains. For fulmar, effect pathways have not been identified and therefore there is no potential for contribution to in-combination effects.

7.3.35 Ribble and Alt Estuaries SPA

Table 7.39 LSE Matrix for marine ornithological features of Ribble and Alt Estuaries SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Lesser black-backed gull (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]

* Note that where one of the above potential pathways to LSE exist for lesser black-backed gull, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

529. Potential connectivity between the Project and lesser black-backed gull only exists during the non-breeding season (see Section 7.1.1). During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on lesser black-backed gull populations. LSE can be excluded in the non-breeding season.

530. Given the very small footprint of habitat loss during the O&M phase, the non-breeding range of lesser black-backed gull is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded in the non-breeding season.

[b] Disturbance / Displacement

531. There is no potential connectivity between the Project and the SPA population during the breeding season. During the non-breeding season, potential connectivity is based on the contribution of the population to the BDMPS total for the 'North Sea & Channel' region. Given the location of the SPA on the west coast of England and the sheer distance between the array area and the SPA (c. 475 km), as well as assumed even distribution of the SPA population throughout the BDMPS region, it is considered highly unlikely that significant numbers would be affected by disturbance / displacement during the non-breeding season. Furthermore, gull species generally have relatively high levels of insensitivity to OWF-related disturbance (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). On this basis, LSE can be excluded for this feature at all times of the year and for all phases of the Project.

[c] Collision

532. There is potential for collision with WTGs for lesser black-backed gull, given that this feature may be present within the array area during the non-breeding season and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded for this feature during the non-breeding season.

[d] Barrier to Movement

533. Potential connectivity with the lesser black-backed gull SPA population exists only during the non-breeding season, on the basis that the population contributes significantly to the BDMPS North Sea & Channel region total. Given that there would be no requirement for regular movement to and from the SPA, O&M phase barrier effects over the non-breeding season would be infrequent. Furthermore, this species is known to be weakly attracted to OWFs (Dierschke *et al.*, 2016) therefore is unlikely to undertake diversionary flights around the array area. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

534. Given the location of the SPA on the west coast of England and the sheer distance between the array area and the SPA (c. 475 km), as well as assumed even distribution of the SPA population throughout the BDMPS region, it is considered highly unlikely that significant numbers would be affected by changes to prey availability within the vicinity of the Project. On this basis, LSE can be excluded for this feature at all times of the year and for all phases of the Project.

[f] In-Combination Effects.

535. Given that at least one effect pathway to LSE exists for lesser black-backed gull, the potential for in-combination effects with other plans and projects remains.

7.3.36 Skomer, Skokholm and the Seas off Pembrokeshire SPA

Table 7.40 LSE Matrix for marine ornithological features of Skomer, Skokholm and the Seas off Pembrokeshire SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Lesser black-backed gull (breeding)	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]
Seabird assemblage (breeding)*	x[a]	x[a]		x[b]	x[b]	x[b]		✓[c]			x[d]		x[e]	x[e]	x[e]	x[f]	✓[f]	x[f]

* Note that where one of the above potential pathways to LSE exist for lesser black-backed gull, by definition it also exists for the wider qualifying breeding seabird assemblage.

[a] Direct Habitat Loss

536. Potential connectivity between the Project and lesser black-backed gull only exists during the non-breeding season (see Section 7.1.1). During the construction phase, habitat loss is generally temporary and short-lived. Given this, and the distance between the SPA and the Project footprint, such loss is unlikely to have effects on lesser black-backed gull populations. LSE can be excluded at all times of the year.

537. Given the very small footprint of habitat loss during the O&M phase, the non-breeding range of lesser black-backed gull is such that sufficient alternative marine habitat is available for foraging and for other functions (e.g. loafing / roosting). As such, LSE can be excluded at all times of the year.

[b] Disturbance / Displacement

538. There is no potential connectivity between the Project and the SPA population during the breeding season. During the non-breeding season, potential connectivity is based on the contribution of the population to the BDMPS total for the 'North Sea & Channel' region. Given the location of the SPA on the southwest coast of Wales and the sheer distance between the array area and the SPA (c. 730 km), as well as assumed even distribution of the SPA population throughout the BDMPS region, it is considered highly unlikely that significant numbers would be affected by disturbance / displacement during the non-breeding season. Furthermore, gull species generally have relatively high levels of insensitivity to OWF-related disturbance (Dierschke *et al.*, 2016; Garthe and Hüppop, 2004). On this basis, LSE can be excluded for this feature at all times of the year and for all phases of the Project.

[c] Collision

539. There is potential for collision with WTGs for lesser black-backed gull, given that this feature may be present within the array area during the non-breeding season and may fly within the 'at risk' height range within the rotor swept area. LSE cannot be excluded for this feature during the non-breeding season.

[d] Barrier to Movement

540. Potential connectivity with the lesser black-backed gull SPA population exists only during the non-breeding season, on the basis that the population contributes significantly to the BDMPS North Sea & Channel region total. Given that there would be no requirement for regular movement to and from the SPA, O&M phase barrier effects over the non-breeding season would be infrequent. Furthermore, this species is known to be weakly attracted to OWFs (Dierschke *et al.*, 2016) therefore is unlikely to undertake diversionary flights around the array area. LSE can be excluded for this feature at all times of the year.

[e] Changes to Prey Availability

541. Given the location of the SPA on the west coast of England and the sheer distance between the array area and the SPA (c. 475 km), as well as assumed even distribution of the SPA population throughout the BDMPS region, it is considered highly unlikely that significant numbers would be affected by changes to prey availability within the vicinity of the Project. On this basis, LSE can be excluded for this feature at all times of the year and for all phases of the Project.

[f] In-Combination Effects.

542. Given that at least one effect pathway to LSE exists for lesser black-backed gull, the potential for in-combination effects with other plans and projects remains.

7.3.37 Moray Firth SPA

Table 7.41 LSE Matrix for marine ornithological features of Moray FIrth SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Great northern diver (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-throated diver (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Slavonian grebe (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Scaup (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Eider (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Long-tailed duck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Common scoter (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Velvet scoter (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goldeneye (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-breasted merganser (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Shag (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

544. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

545. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

546. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

547. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.38 Loch of Skene SPA / Ramsar site

Table 7.42 LSE Matrix for marine ornithological features of Loch of Skene SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goldeneye (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goosander (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

549. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

550. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

551. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

552. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.39 Moray and Nairn Coast SPA / Ramsar site

Table 7.43 LSE Matrix for marine ornithological features of Moray and Nairn Coast SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-breasted merganser (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Dunlin (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

553. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

554. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

555. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

556. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.40 Loch Spynie SPA / Ramsar site

Table 7.44 LSE Matrix for marine ornithological features of Loch Spynie SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

557. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

558. There is potential for collision with WTGs for greylag goose during migration flights, given that this feature may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for this feature.

[c] Barrier to movement

559. As described in Section 7.2.2, in the context of the substantial migration distances for greylag goose (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for this feature.

[d] In-Combination Effects.

560. Given that at least one effect pathway to LSE exists for greylag goose (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.41 Montrose Basin SPA / Ramsar site

Table 7.45 LSE Matrix for marine ornithological features of Montrose Basin SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Eider (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Knot (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Dunlin (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Shelduck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

561. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

562.

[b] Collision

563. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

564. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

565. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.42 Loch of Kinnordy SPA / Ramsar site

Table 7.46 LSE Matrix for marine ornithological features of Loch of Kinnordy SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

567. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

568. There is potential for collision with WTGs for pink-footed goose and greylag goose during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

569. As described in Section 7.2.2, in the context of the substantial migration distances for pink-footed goose and greylag goose (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

570. Given that at least one effect pathway to LSE exists for both pink-footed goose and greylag goose (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.43 Dornoch Firth and Loch Fleet SPA / Ramsar site

Table 7.47 LSE Matrix for marine ornithological features of Dornoch Firth and Loch Fleet SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Curlew (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Teal (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Scaup (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Dunlin (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

571. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

572. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

573. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

574. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.44 Firth of Tay and Eden Estuary SPA / Ramsar site

Table 7.48 LSE Matrix for marine ornithological features of Firth of Tay and Eden Estuary SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Velvet scoter (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Shelduck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Eider (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Common scoter (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Black-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goldeneye (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-breasted merganser (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goosander (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Grey plover (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Sanderling (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Dunlin (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Long-tailed duck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] **Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability**

575. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] **Collision**

576. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] **Barrier to Movement**

577. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] **In-Combination Effects.**

578. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.45 Inner Moray Firth SPA / Ramsar site

Table 7.49 LSE Matrix for marine ornithological features of Inner Moray Firth SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-breasted merganser (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Scaup (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Curlew (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goosander (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goldeneye (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Teal (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Cormorant (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

580. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

581. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

582. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

583. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.46 Loch Eye SPA / Ramsar site

Table 7.50 LSE Matrix for marine ornithological features of Loch Eye SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Whooper swan (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

584. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

585. There is potential for collision with WTGs for whooper swan and greylag goose during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

586. As described in Section 7.2.2, in the context of the substantial migration distances for whooper swan and greylag goose (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

587. Given that at least one effect pathway to LSE exists for both whooper swan and greylag goose (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.47 Caithness Lochs SPA / Ramsar site

Table 7.51 LSE Matrix for marine ornithological features of Caithness Lochs SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Whooper swan (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greenland white-fronted goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

588. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

589. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to movement

590. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

591. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.48 Cromarty Firth SPA / Ramsar site

Table 7.52 LSE Matrix for marine ornithological features of Cromarty Firth SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Whooper swan (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Curlew (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-breasted merganser (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Scaup (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pintail (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Dunlin (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

592. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

593. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

594. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

595. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.49 Firth of Forth SPA / Ramsar site

Table 7.53 LSE Matrix for marine ornithological features of Firth of Forth SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Red-throated diver (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Slavonian grebe (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Golden plover (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Shelduck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Knot (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Redshank (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Turnstone (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Scaup (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Great crested grebe (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Cormorant (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Curlew (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Eider (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Long-tailed duck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Common scoter (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Velvet scoter (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goldeneye (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Red-breasted merganser (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Oystercatcher (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Ringed plover (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Grey plover (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Dunlin (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Mallard (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Lapwing (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

597. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

598. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

599. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

600. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.50 Cameron Reservoir SPA / Ramsar site

Table 7.54 LSE Matrix for marine ornithological features of Cameron Reservoir SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct habitat loss, disturbance / displacement and changes to prey availability

601. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

602. There is potential for collision with WTGs for pink-footed goose during migration flights, given that this feature may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for this feature.

[c] Barrier to Movement

603. As described in Section 7.2.2, in the context of the substantial migration distances for pink-footed goose (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for this feature.

[d] In-Combination Effects.

604. Given that at least one effect pathway to LSE exists for pink-footed goose (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.51 Loch Ashie SPA

Table 7.55 LSE Matrix for marine ornithological features of Loch Ashie SPA

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Slavonian grebe	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct habitat loss, disturbance / displacement and changes to prey availability

605. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

606. There is potential for collision with WTGs for Slavonian grebe during migration flights, given that this feature may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for this feature.

[c] Barrier to Movement

607. As described in Section 7.2.2, in the context of the substantial migration distances for Slavonian grebe (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for this feature.

[d] In-Combination Effects.

608. Given that at least one effect pathway to LSE exists for Slavonian grebe (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.52 South Tayside Goose Roosts SPA / Ramsar site

Table 7.56 LSE Matrix for marine ornithological features of South Tayside Goose Roosts SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Wigeon (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

609. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

610. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

611. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

612. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.53 Loch Leven SPA / Ramsar site

Table 7.57 LSE Matrix for marine ornithological features of Loch Leven SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Whooper swan (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Shoveler (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Cormorant (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Gadwall (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Teal (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Pochard (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Tufted duck (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Goldeneye (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Waterbird assemblage (non-breeding)*	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

*Note that where one of the above potential pathways to LSE exist for a component feature, by definition it also exists for the wider qualifying non-breeding waterbird assemblage.

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

613. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

614. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] **Barrier To Movement**

615. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] **In-Combination Effects.**

616. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.54 East Sanday Coast SPA / Ramsar site

Table 7.58 LSE Matrix for marine ornithological features of East Sanday Coast SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Bar-tailed godwit (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Purple sandpiper (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Turnstone (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

617. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

618. There is potential for collision with WTGs for migratory waterbirds during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

619. As described in Section 7.2.2, in the context of the substantial migration distances for migratory waterbird features (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

620. Given that at least one effect pathway to LSE exists for all features (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.55 Greenlaw Moor SPA / Ramsar site

Table 7.59 LSE Matrix for marine ornithological features of Greenlaw Moor SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

621. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

622. There is potential for collision with WTGs for pink-footed goose during migration flights, given that this feature may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for this feature.

[c] Barrier to Movement

623. As described in Section 7.2.2, in the context of the substantial migration distances for pink-footed goose (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for this feature.

[d] In-Combination Effects.

624. Given that at least one effect pathway to LSE exists for pink-footed goose (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.3.56 Din Moss – Hoselaw Loch SPA / Ramsar site

Table 7.60 LSE Matrix for marine ornithological features of Din Moss – Hoselaw Loch SPA / Ramsar site

Feature	Direct habitat loss			Disturbance / displacement			Collision			Barrier to movement			Changes in prey availability			In-combination effects		
	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D	C	OM	D
Pink-footed goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]
Greylag goose (non-breeding)	x[a]	x[a]		x[a]	x[a]	x[a]		✓[b]			x[c]		x[a]	x[a]	x[a]	x[d]	✓[d]	x[d]

[a] Direct Habitat Loss, Disturbance / Displacement and Changes to Prey Availability

625. As described in Sections 7.2.1 and 7.2.2, the potential for LSE can be excluded for these affect pathways for all migratory waterbird SPAs taken forward for screening and for all phases of the Project. Migratory features are unlikely to interact with the marine environment around the Project if they commute through during migration flights, therefore would be unaffected by habitat loss, sources of disturbance / displacement and / or changes to prey availability.

[b] Collision

626. There is potential for collision with WTGs for pink-footed goose and greylag goose during migration flights, given that these features may commute through the array area within the 'at risk' height range (i.e. within the rotor swept area) whilst on passage. LSE cannot be excluded for these features.

[c] Barrier to Movement

627. As described in Section 7.2.2, in the context of the substantial migration distances for pink-footed goose and greylag goose (noting that migration flights would occur only periodically, as opposed to the regular and frequent nature of seabird foraging flights), it is unlikely that diversionary flight during the O&M phase would have a significant effect on survival or productivity rates. LSE can be excluded for these features.

[d] In-Combination Effects.

628. Given that at least one effect pathway to LSE exists for both pink-footed goose and greylag goose (associated with the risk of collision with WTGs), the potential for in-combination effects with other plans and projects remains.

7.4 In Combination Assessment

629. The in-combination assessment will consider plans or projects where the predicted effects have the potential to interact with effects from the proposed construction, operation and maintenance or decommissioning of the Project. See Section 3.3.1 for the in combination methodology.

7.5 Summary of Marine Ornithology HRA Screening

630. Of all the designated sites initially considered in the HRA screening for migratory fish qualifying interest features, 53 SPAs and Ramsar sites have been screened in for further assessment to determine the potential for any adverse effects on the integrity of the sites in relation to the conservation objectives as result of the Project alone or in-combination with other projects and plans (Table 8.2).

8 Summary

631. A summary of the designated sites, qualifying interest features and potential impacts for which a potential for LSE has been identified is shown in Table 8.1 for SACs and Table 8.2 for SPA/Ramsar sites. These sites will be taken forward for screening within the AA. The tables exclude all features which have been screened out as no potential for LSE has been identified.

632. In total, nine SACs are being taken forward for consideration in the AA. In relation to designated sites for Annex I habitats, the assessment of LSE in Section 4 considered one SAC for which LSE was not determined and, therefore, the site was screened out of further consideration in the AA.

633. On the basis that there is potential for indirect effects which could result in LSE on Annex II migratory fish species for the River Dee SAC, River Spey SAC and South Esk SAC in combination with other projects, these sites have been screened into the AA. All other SACs for fish species are screened out on the basis of no potential for LSE on the designated Annex II qualifying features. All sites are screened out for Project alone effects. For further information on the rationale, see Section 5.

634. Of all the designated sites initially considered in the HRA screening (Table 6.3) for marine mammals, six SACs have been screened in for further assessment to determine the potential for any adverse effects on the integrity of the sites in relation to the conservation objectives as result of the project alone or in-combination with other projects and activities. For further information on the rationale, see Section 6.

635. Table 8.2 provides a summary of the SPA and Ramsar sites and relevant features for which a potential for LSE has been identified (or cannot be excluded) as a result of the Project, alone and / or in-combination with other plans / projects. In total, 53 sites have been included in the table and will be taken forward for consideration in the AA. For further information on the rationale, see Section 7.

Table 8.1: Summary of SACs and relevant qualifying interest features for which LSE has been identified and screened in for further assessment.

Designated Site	Relevant Qualifying Interest Feature(s)	Project Phase	Effect
Dornoch Firth and Morrich More SAC	Harbour seal	Construction, decommissioning	Potential effects from: • underwater noise • vessel interactions • changes to prey resources • in-combination effects
		Operation & maintenance	Potential effects from: • underwater noise • vessel interactions • entanglement • barrier effects due to the physical presence of offshore infrastructure. • changes to prey resources • in-combination effects
Faray and Holm of Faray SAC	Grey seal	Construction, decommissioning	Potential effects from: • underwater noise

Designated Site	Relevant Qualifying Interest Feature(s)	Project Phase	Effect
			• vessel interactions • changes to prey resources • in-combination effects
		Operation & maintenance	Potential effects from: • underwater noise • vessel interactions • entanglement • barrier effects due to the physical presence of offshore infrastructure. • changes to prey resources • in-combination effects
Firth of Tay and Eden Estuary SAC	Harbour seal	Construction, decommissioning	Potential effects from: • underwater noise • vessel interactions • changes to prey resources • in-combination effects
		Operation & maintenance	Potential effects from: • underwater noise • vessel interactions • entanglement • barrier effects due to the physical presence of offshore infrastructure. • changes to prey resources • in-combination effects
Isle of May SAC	Grey seal	Construction, decommissioning	Potential effects from: • underwater noise • vessel interactions • changes to prey resources • in-combination effects
		Operation & maintenance	Potential effects from: • underwater noise • vessel interactions • entanglement • barrier effects due to the physical presence of offshore infrastructure. • changes to prey resources • in-combination effects
Moray Firth SAC	Bottlenose dolphin	Construction, decommissioning	Potential effects from: • underwater noise • vessel interactions • changes to prey resources • in-combination effects
		Operation & maintenance	Potential effects from:

Designated Site	Relevant Qualifying Interest Feature(s)	Project Phase	Effect
			• underwater noise • vessel interactions • entanglement • barrier effects due to the physical presence of offshore infrastructure. • changes to prey resources • in-combination effects
River Dee SAC	Atlantic salmon	All phases	In combination underwater noise and EMF.
	Freshwater pearl mussel		Indirect effects on FWPM from potential in combination effects on Atlantic salmon
River Spey SAC	Atlantic salmon	All phases	In combination underwater noise and EMF.
	Sea lamprey		
	Freshwater pearl mussel		Indirect effects on FWPM from potential in combination effects on Atlantic salmon
South Esk SAC	Atlantic salmon	All phases	In combination underwater noise and EMF.
	Freshwater pearl mussel		Indirect effects on FWPM from potential in combination effects on Atlantic salmon
Southern North Sea SAC	Harbour Porpoise	Construction, decommissioning	Potential effects from: • underwater noise • vessel interactions • changes to prey resources • in-combination effects
		Operation & maintenance	Potential effects from: • underwater noise • vessel interactions • entanglement • barrier effects due to the physical presence of offshore infrastructure. • changes to prey resources • in-combination effects

Table 8.2: Summary of SPAs and Ramsar sites and relevant qualifying interest features for which LSE has been identified and screened in for further assessment.

Site taken forward for Appropriate Assessment	Feature(s)
Seabird colony SPAs	
Buchan Ness to Collieston Coast	Kittiwake Herring gull Guillemot Shag Fulmar Breeding seabird assemblage
Loch of Strathbeg	Sandwich tern
Ythan Estuary, Sands of Forvie and Meikle Loch	Common tern Little tern Sandwich tern
Troup, Pennan and Lion's Head	Kittiwake Guillemot Herring gull Razorbill

Site taken forward for Appropriate Assessment	Feature(s)
	Breeding seabird assemblage
Fowlsheugh	Kittiwake Herring gull Guillemot Razorbill Breeding seabird assemblage
East Caithness Cliffs	Kittiwake Guillemot Razorbill Shag Breeding seabird assemblage
North Caithness Cliffs	Guillemot Kittiwake Razorbill Puffin Breeding seabird assemblage
Forth Islands	Gannet Lesser black-backed gull Puffin Kittiwake Guillemot Razorbill Shag Breeding seabird assemblage
Copinsay	Kittiwake Guillemot Breeding seabird assemblage
Hoy	Kittiwake Puffin Red-throated diver Great skua Breeding seabird assemblage
Auskerry	Storm-petrel
St. Abb's Head to Fast Castle	Kittiwake Breeding seabird assemblage
Fair Isle	Kittiwake Puffin Gannet Breeding seabird assemblage
Calf of Eday	Kittiwake Breeding seabird assemblage
Rousay	Kittiwake Breeding seabird assemblage
Marwick Head	Kittiwake Breeding seabird assemblage
West Westray	Kittiwake Breeding seabird assemblage
Farne Islands	Kittiwake Puffin Guillemot Breeding seabird assemblage
Cape Wrath	Kittiwake Puffin Breeding seabird assemblage
Sumburgh Head	Kittiwake Breeding seabird assemblage
Handa	Kittiwake Breeding seabird assemblage
Sule Skerry and Sule Stack	Storm-petrel Gannet Puffin Breeding seabird assemblage

Site taken forward for Appropriate Assessment	Feature(s)
Mousa	Storm-petrel
Coquet Island	Kittiwake Lesser black-backed gull Puffin Breeding seabird assemblage
Noss	Gannet Kittiwake Puffin Breeding seabird assemblage
Foula	Puffin Kittiwake Great skua Breeding seabird assemblage
North Rona and Sula Sgeir	Gannet Breeding seabird assemblage
Fetlar	Arctic skua Great skua Breeding seabird assemblage
Hermaness, Saxa Vord and Valla Field	Gannet Great skua Breeding seabird assemblage
Flamborough & Filey Coast	Gannet Kittiwake Razorbill Guillemot Breeding seabird assemblage
St. Kilda	Gannet Breeding seabird assemblage
Ribble and Alt Estuaries	Lesser black-backed gull[1]
Skomer, Skokholm and Seas off Pembrokeshire	Lesser black-backed gull[1]
Migratory waterbird SPAs / Ramsar sites	
Loch of Strathbeg	Svalbard barnacle goose Pink-footed goose Greylag goose Whooper swan Goldeneye Teal
Ythan Estuary, Sands of Forvie and Meikle Loch	Pink-footed goose Eider Redshank Lapwing Waterbird assemblage
Moray Firth	Great northern diver Red-throated diver Slavonian grebe Scaup Eider Long-tailed duck Common scoter Velvet scoter Goldeneye Red-breasted merganser Shag
Loch of Skene	Greylag goose Goldeneye Goosander
Moray and Nairn Coast	Bar-tailed godwit Pink-footed goose Greylag goose Redshank Red-breasted merganser

Site taken forward for Appropriate Assessment	Feature(s)
	Dunlin Oystercatcher Wigeon Waterbird assemblage
Loch Spynie	Greylag goose
Montrose Basin	Pink-footed goose Greylag goose Redshank Oystercatcher Eider Wigeon Knot Dunlin Shelduck Waterbird assemblage
Loch of Kinnordy	Greylag goose Pink-footed goose
Dornoch Firth and Loch Fleet	Bar-tailed godwit Greylag goose Wigeon Curlew Teal Scaup Redshank Dunlin Oystercatcher Waterbird assemblage
Firth of Tay and Eden Estuary	Bar-tailed godwit Redshank Greylag goose Pink-footed goose Velvet scoter Shelduck Eider Common scoter Black-tailed godwit Goldeneye Red-breasted merganser Goosander Oystercatcher Grey plover Sanderling Dunlin Long-tailed duck Waterbird assemblage
Inner Moray Firth	Bar-tailed godwit Greylag goose Red-breasted merganser Redshank Scaup Curlew Goosander Goldeneye Teal Wigeon Cormorant Oystercatcher Waterbird assemblage
Loch Eye	Whooper swan Greylag goose
Caithness Lochs	Whooper swan Greenland white-fronted goose

Site taken forward for Appropriate Assessment	Feature(s)
	Greylag goose
Cromarty Firth	Whooper swan Bar-tailed godwit Greylag goose Redshank Curlew Red-breasted merganser Scaup Pintail Wigeon Dunlin Oystercatcher Waterbird assemblage
Firth of Forth	Red-throated diver Slavonian grebe Golden plover Bar-tailed godwit Pink-footed goose Shelduck Knot Redshank Turnstone Scaup Great crested grebe Cormorant Curlew Eider Long-tailed duck Common scoter Velvet scoter Goldeneye Red-breasted merganser Oystercatcher Ringed plover Grey plover Dunlin Mallard Lapwing Wigeon Waterbird assemblage
Cameron Reservoir	Pink-footed goose
Loch Ashie	Slavonian grebe
South Tayside Goose Roosts	Wigeon Pink-footed goose Greylag goose Waterbird assemblage
Loch Leven	Whooper swan Pink-footed goose Shoveler Cormorant Gadwall Teal Pochard Tufted duck Goldeneye Waterbird assemblage
East Sanday Coast	Bar-tailed godwit Purple sandpiper Turnstone
Greenlaw Moor	Pink-footed goose
Din Moss – Hoselaw Loch	Pink-footed goose Greylag goose

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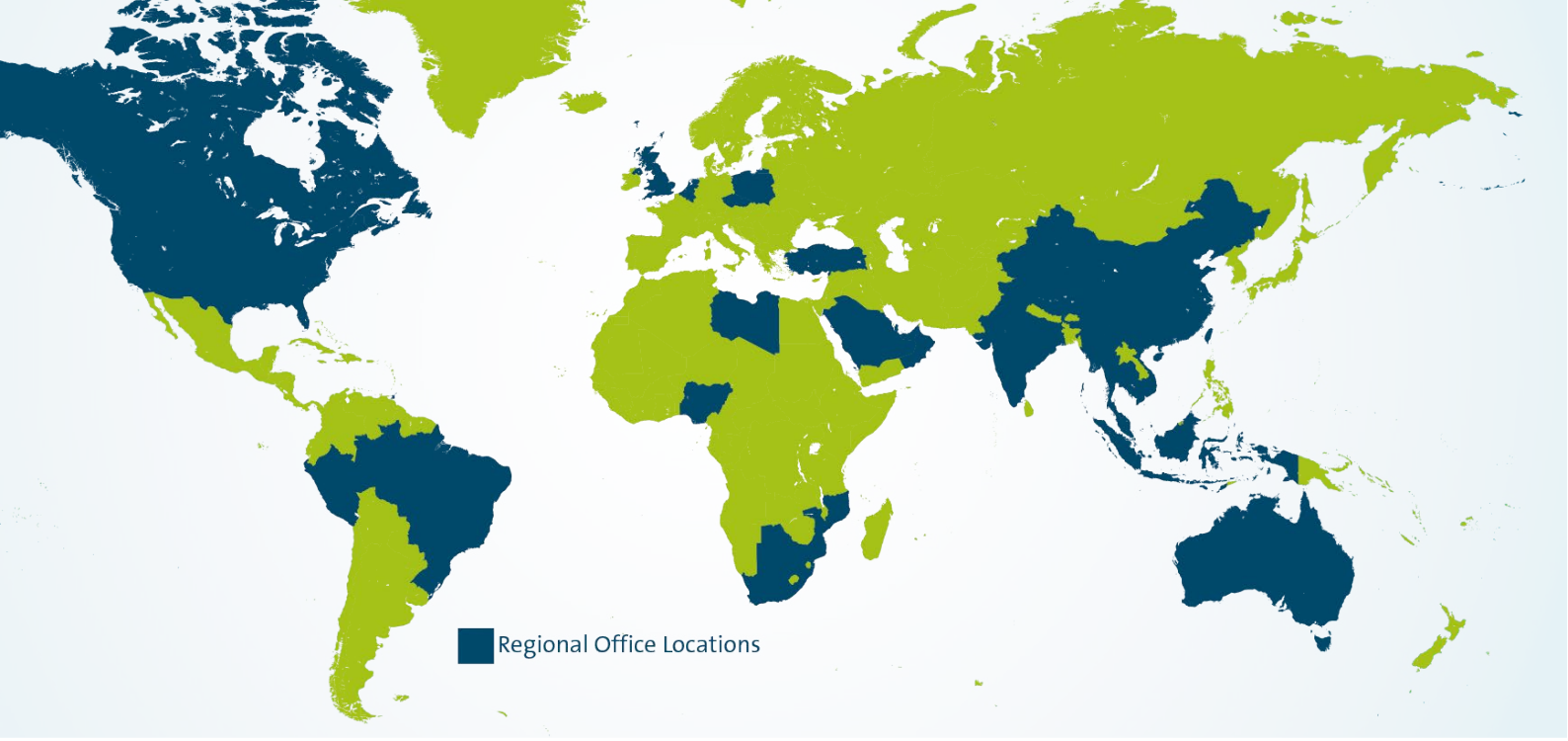

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