



Neven Point Wind Farm

Request for Scoping Opinion

Version 1

Report to Neven Point Wind Ltd

Issued by Aquatera Ltd

P877 – December 2019



www.aquatera.co.uk

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Issue record

The version number is indicated on the front cover.

Version	Date	Details
V0.1	12/12/2019	First draft issued to client.
V1	16/12/2019	Final draft completed.

Members of:



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1 INTRODUCTION

1.1 CONTEXT

This Scoping Report (the Report) has been prepared by Aquatera Ltd on behalf of Neven Point Wind Farm Ltd, ('the Developer'), who is proposing to submit a planning application to Orkney Island Council ('the Council') (OIC) under the Town and Country Planning (Scotland) Act 1997 (as amended) for permission to construct and operate Neven Point Wind Farm. The wind farm is comprised of eight wind turbines with a combined installed capacity of up to 40 megawatts (MW) (the 'Proposed development'). The Report is intended to allow the Council, statutory and non-statutory consultees to form a Scoping Opinion on the proposed development under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations').

An Environmental Impact Assessment (EIA) will be undertaken in accordance with Schedule 2 of the EIA Regulations, which advises that developments involving the installation of more than two turbines, or if the height of any turbine or height of any other infrastructure exceeds 15 metres, then that proposal may require an EIA. Given the scale of the proposed development and the potential for significant effects, an EIA has been progressed without seeking a formal Screening Opinion from the Council. The outcomes of the EIA will be described in an EIA Report, which will accompany a planning application to the Council.

The specific aims of the Scoping Report are to provide:

- A brief description of the location, nature and purpose of the proposed development;
- A brief description of its likely significant effects on the environment; and
- The proposed scope and level of detail of information to be provided in the EIA report.

1.2 THE DEVELOPER

Neven Point Wind Ltd, a locally owned company established by Orkney residents, is a major landowner on Eday together with a wind developer with 17 years experience in identifying sites for significant wind development in Orkney. Neven Point Wind Farm is 100% locally owned, with options being available for other local residents to buy in to the development through shares and benefiting from a proposed community fund.

1.3 PROJECT OVERVIEW

The Developer proposes to construct and operate a wind farm on an area approximately 1 km west of the Eday ferry terminal. The location of the proposed development is provided in Figure A1 and described in Chapter 2: Project Description. The proposed development is anticipated to consist of up to eight wind turbine generators of a maximum 180 m height to tip, each with a rated capacity of up to 5 MW resulting in a total site capacity of up to 40 MW (Figure A2). Ancillary infrastructure will comprise a substation, access tracks, laydown areas and temporary construction compound, as detailed in Figure A3.

1.3.1 Project rationale

The electricity network on Orkney is connected via two distribution subsea cables between Rackwick Bay on Hoy, and Murkle Bay near Thurso, and is currently at full capacity. Orkney has been unable to reach its full renewable energy production potential due to a lack of adequate transmission infrastructure to mainland Scotland. Proposals for an upgrade to this infrastructure by Scottish Hydro Electric Transmission's (SHE-T) need to demonstrate a 'needs case' (i.e.



in the form of consented projects that will utilise any new cable) to Ofgem. A new transmission link between mainland Scotland and Orkney with a capacity of 220 MW was conditionally approved in September 2019, to be delivered by 2023.

Approval is conditional on a total of at least 135 MW of new wind farm projects on Orkney either being awarded a Contract for Difference (CfD) or being judged likely to be developed by December 2021¹.

The proposed development will contribute towards the 135 MW of wind capacity required to approve the transmission connection.

1.3.2 Community Benefit

In line with Scottish Government policy 'Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments', the proposed development proposes to make a minimum contribution of £5,000 per installed megawatt per annum to the local community. A key organisation in this regard on Eday is Eday Partnership, which has its own community owned 900 kW turbine, and so has experience managing renewable energy generated funds. The details of this arrangement will be confirmed in the final application and potential options may include:

- Formation of a new, independent entity with external and community representation;
- Through existing organisations on the island (Eday Partnership, Eday Renewable Energy Ltd (ERE), Eday Community Council); or
- Via Orkney Islands Council.

Once the planning process has been completed, the developer will consult with the local community to better understand the needs and wishes of the community, and how the development may best serve the local people and local projects. The fund could be used to support local housing projects on Eday, reduce fuel poverty, support electric car owners through provision of charging points or provide support for infrastructure enhancements on the island.

1.4 PRE-SCOPING CONSULTATION

To date, pre-Scoping discussions with regard to the proposed development have been carried out with the consultees listed in Table 1.1.

¹ Ofgem (2019). Ofgem gives go-ahead to Orkney transmission link subject to conditions. Press Release: 16 September 2019. Available at: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-gives-go-ahead-orkney-transmission-link-subject-conditions> (accessed 01/11/2019)



Table 1.1 Pre-Scoping consultation activities undertaken

Consultee	Date	Topic
Eday community	February 2019	Introduce plans for the proposal, request community feedback, inform of benefits offered.
Scottish Natural Heritage (SNH)	August 2019	Comprehensive discussion regarding the ornithology constraints on the site including bird survey findings, flight lines, nest locations, successful fledglings and predicted impacts on ornithology and ecology from the proposed development. Layout revised in response to initial ornithology collision risk assessments.
Orkney Bat Group	31 October 2019	Request for local bat data on Eday to direct the requirement for assessment.
NATS	21 October 2019	Aviation and Radar - Technical and Operational Assessment (TOPA) cost obtained. Self-assessment secondary surveillance assets undertaken.
Atkins Global	1 November 2019	Consultation on telecoms - No objection to proposed development.
JRC	16 October 2019	Consultation on telecoms – Objection to some locations. Layout revised in response to consultation feedback.
BT	22 October 2019	Consultation on telecoms - Objection to some locations. Layout revised in response to consultation feedback.
Met Office	21 October 2019	Consultation on meteorological radar assets – No Objections, the wind farm is outside all Met Office consultation zones.
SSEN	26 November 2019	Utilities assets consultation. 33kV line running north to south adjacent to the proposed development boundary. No utilities within the proposed development site.

Consultation will continue throughout the EIA process. Public exhibitions will be held in relevant locations to ensure stakeholders have the opportunity to learn more about the proposed development, to provide feedback to the project team and to meet formal Pre-Application Consultation (PAC) requirements under The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 (see Section 1.5.3).

Consultation on specific technical issues will also be undertaken directly with relevant consultees, where appropriate, as part of the EIA process. The outcome of consultations will be considered within the assessment. A list of consultees is provided in Appendix B to this report.

1.5 CONSENTING STRATEGY

1.5.1 Planning consent

The installed capacity of the Neven Point Wind Farm is up to 40 MW. A planning application will be submitted to OIC under the Town and Country Planning (Scotland) Act 1997 (as amended) for permission to construct and operate the proposed development. The Application will be accompanied by an Environmental Impact Assessment (EIA) Report, in addition to other documentation including a Design and Access Statement, Habitats Regulations Appraisal (HRA), and a Pre-Application Consultation (PAC) Report.



1.5.2 Habitats Regulations Appraisal (HRA)

Under the Conservation (Natural Habitats, &c.) Regulations 1994 a Habitats Regulations Appraisal (HRA) may be required, should potential connectivity with Natura 2000 sites be identified; a Europe-wide network of protected sites developed under the European Commission Habitats Directive (Directive 92/43/EEC) and the Birds Directive (79/409/EEC). The planning authority must consider whether any plan or project will have a 'likely significant effect' on a Natura site, if so they must carry out an 'appropriate assessment'.

The EIA Regulations require that the planning authority must ensure where appropriate that the HRA and EIA are co-ordinated. A HRA Report will be produced to enable the planning authority (the Council) to undertake this process and will be provided as a separate document to accompany the EIA Report.

1.5.3 Pre-Application Consultation (PAC)

Developments fall under a hierarchy of 'national', 'major' and 'local' developments under the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009. Applications which fall under the category of 'major' and 'national' developments require Pre-application Consultation (PAC) with communities and submission of a Design and Access Statement under The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013. The installed capacity of the Neven Point Wind Farm is up to 40 MW, which exceeds the 20 MW criterion of a Major Application. A Proposal of Application Notice (PAN) will be submitted at least 12 weeks prior to the proposed planning application submission date and consultation with local communities will be carried out following the response of the Local Authority to the PAN.

1.5.4 European Protected Species Licence

Where European Protected Species (EPS) are present such as otters or bats, licences to permit works that will affect them will only be granted subject to specific tests being met. Any requirement for an EPS will be discussed with SNH and OIC. Following consent, the formal EPS licensing process will be followed to secure any authorisations required.



1.6 LAYOUT OF THIS DOCUMENT

The Scoping Report is set out with the following sections:

Section 2. Project Description: detailing the site selection and alternatives, site location, boundaries, relevant components and infrastructure.

Section 3. Policy and Legislative Framework: outlining the key planning and environmental regulations, policies and plans and licensing requirements.

Section 4. Identification of Likely Significant Effects: detailing the approach to the scoping of impacts upon which the EIA Report will focus.

Section 5. Human Environment: describing the baseline human environment, potential impacts and likely significant effects and approach to EIA for factors including socio-economics; land use and utilities; population and human health; access, traffic and transport; archaeology and cultural heritage; landscape and visual amenity; tourism and recreation; telecommunications; and aviation and radar.

Section 6. Ecological Environment: describing the baseline ecological environment, potential impacts and likely significant effects and approach to EIA for factors including ornithology; and terrestrial ecology (habitats and mammals).

Section 7. Physical Environment: describing the baseline physical environment, potential impacts and likely significant effects and approach to EIA for factors including hydrology, geology and soils; and air quality and climate.

Section 8. Approach to EIA: detailing the outline approach to EIA, how cumulative effects will be addressed, environmental management planning, and a proposed outline of the EIA Report.

Section 9. Summary of Likely Significant Effects: summary of the results of Scoping, listing factors and impacts which have been scoped out and those which have been scoped in for further consideration in the EIA process.

Section 10. Scoping Questions: lists questions to the Council and statutory consultees.

Section 11. References

This Scoping Report is supported by:

Appendix A: Figure Pack (Figure A1 to A14)

Appendix B: EIA Stakeholder List

Questions for stakeholders

Q1	Have all the relevant consenting requirements been identified?
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2 PROJECT DESCRIPTION

2.1 SITE SELECTION AND ALTERNATIVES

An iterative approach has been adopted by the development engineers and environmental team to progress the design of the proposals and this will continue throughout the EIA process, with the objective that the overall development could be shaped by minimising environmental effects. Following current best practice, in addition to engineering and economic factors, the design development process also involves extensive consultation, with both the relevant statutory bodies and non-statutory organisations to ensure environmental implications are taken into account.

The selection of the Neven Point site for development is primarily driven by the restrictions of the Site of Special Scientific Interest (SSSI) to the north of the proposed development site, ornithological constraints and residential areas to the east, along with the outputs of wind resource modelling, to identify the most productive areas of Eday with the least ecological impacts.

A high-level screening of suitability for supporting infrastructure, particularly focussing on substation options for the Neven Point site was undertaken and the proposed location is presented in Figure A3. This takes account of ornithology concerns, proximity to other infrastructure, heritage features and understanding of on-site conditions.

The background to the development process, the options considered and reasons for selecting the chosen option will be described in more detail in a 'consideration of alternatives' chapter of the EIA Report. It is important to consider technical, economic and environmental considerations early in the process and evaluate these to determine the possible environmental advantages of alternatives to the proposed development design. This may include consideration of options for siting, access routes and construction techniques or measures for avoiding, mitigating and managing environmental effects.

The current scoping layout has been revised from an initial ten-turbine layout with towers of 83 m and 150 m height to blade tip to eight turbines with 110 m towers and height to blade tip of 180 m. The revisions have been adopted to reduce the pressures on protected bird species such as Great Skuas and Artic Skuas. The increase in tower height to 110 m will significantly reduce collision risk on Skua populations, with the reduction in number of turbines improving visual impact, noise and ornithological pressure on breeding birds and collision risk overall. During the revision process, wirelines were created and it was determined that the increase in height from a visual perspective was insignificant between a 150 m tip height and 180 m tip height, with the benefits to ornithology providing the confidence to proceed with this design.

2.2 SITE LOCATION

The Site is located approximately 1 km west of the Eday ferry terminal extending to approx. 441 ha (Figure A1). There are no significant residential settlements on Eday, with the population residing in individual houses and farmsteads distributed across the island, or in small groups. The terrain is comprised of agricultural land, grazing pastures, rough grassland, peat and heather moors. Eday has a gentle undulating topography, with the exception of the southern and eastern aspects, which are primarily flat, increasing to approximately 100 m AOD to the western aspects and towards the middle of the island. The proposed development sites the turbines approximately between 10 m and 85 m AOD.

The design of the wind farm has sited the turbines within areas of rough grazing and agricultural land, along with access tracks utilising existing tracks. Where possible, areas of peat and heather have been avoided, there may be a slight



incursion from access tracks into areas of shallow poor quality peat, these are existing farm tracks which are currently ungraded.

The surrounding area also includes a number of individual residential and public properties such as:

- Farms;
- Primary School; and
- Ferry Terminal.

2.3 THE PROJECT

The proposed development comprises a wind farm consisting of up to eight wind turbine generators rated up to 5 MW each and ancillary infrastructure. Turbines will be located within the agricultural lands of Greentoft farm (see Figure A2 and Figure A3). Given the iterative nature of the EIA process, the layout proposed may be modified as a result of survey outputs, on-going consultation and stakeholder input via the scoping report, and the final development design will be refined over the EIA process.

2.3.1 Wind turbine generators

The proposed development will comprise of up to eight wind turbine generators rated at up to 5 MW each, resulting in a site installed capacity of up to 40 MW. A summary of the range of candidate turbine specifications will be provided in the EIA Report. Currently the maximum tip height for a suitable turbine would be 176 m to tip (based on a Nordex E133 – 110 m tower and 133 m rotor), however, in order to ensure future technology is accounted for within the initial scope, a worst case scenario has been assessed. The maximum specifications of the turbines are as follows:

- Height to Blade Tip: up to 180 m;
- Height to Hub: up to 110 m;
- Rotor Diameter: 140 m;
- Rated Capacity Range: 4.8 MW – 5 MW; and
- Transformers: internal or external.

Each turbine installation will have associated access and a crane pad/hardstanding with approximate dimensions of 55 m by 25 m.

2.3.2 Access tracks

Access to the proposed development site is initially expected to be along the B9063 to Roadside leading westwards to turbine T8, then southwards to Springfield Cottage with turbine T6 and turbine T7 accessed via new track networks. Turbines T2 to T5 will be accessed along existing farm track layouts from Greentoft Farm through agricultural land. Turbine T1 will be accessed separately with existing road networks taking materials and components north along the B9063 towards London Airport, then west at the war memorial round to the coast at Mussetter, back southwards towards Newbigging. A new access track will be constructed to access turbine T1 from Newbigging (See Figure A3).

2.3.3 Route options for HGVs and Abnormal Loads

It is expected the main turbine components will be landed in Hatston pier and/or transported to Eday pier via dedicated vessels. Heavy Goods Vehicles (HGVs) are also likely to be transported to Eday by specialist contracted vessels. The



Developer will consult with Orkney Ferries and Orkney Harbour Authority to ensure there is no disruption to existing services and other marine users.

Upon landing at Eday pier, the construction traffic will head west along the B9063, crossing the unnamed road which runs north to south from the southern coast at Bay of Greentoft to the crossroads at Roadside. The traffic will continue west along an unnamed road providing access to Ward Hill where it will proceed south west along the access road to Greentoft farm. It is likely that the construction compound will be located within Greentoft farm. An indicative transport route is illustrated in Figure A3.

The Developer will consult with OIC Roads to confirm route suitability and any road widening or strengthening requirements to facilitate abnormal loads (further details in Section 5.4: Access, Traffic and Transport).

2.3.4 Temporary construction compound

A temporary construction compound will be required during the construction of the proposed development, forming an area of hardstanding which will provide space for temporary welfare, parking, laydown areas and potentially concrete batching. The proposed temporary construction compound footprint will require approximately 100 m by 50 m and is proposed to be located in an area that will avoid potential impacts on residents and peatland (Figure A3).

2.3.5 Electrical infrastructure

Underground cabling will be laid within the verges along access tracks where appropriate, to connect turbine transformers to a site substation. The substation is likely to be a single storey building with an associated car parking area. The entire footprint of the substation compound is anticipated to require approximately 50 m by 30 m. The proposed area for the substation is indicated in Figure A3. The electrical connection to the electricity network falls under a separate consenting process, a Section 37 application under the Electricity Act, 1989, and will be subject to a separate application process by the grid operator. Consequently, the grid connection to the site will not be considered as part of the EIA for the proposed development. Turbine T1 may be connected by either overhead lines to turbine T7 or by underground cable. The manner of connection will be determined following consultation with SHE-T, SNH and SEPA.

2.3.6 Borrow pits

There are several options for sourcing aggregates for the proposed development, including: borrow pits within the development site; utilisation of an existing quarry located within the landowners property boundary, east of Greentoft and adjacent to the proposed development boundary; and import of aggregates from quarries on Orkney mainland. The Developer will consult with OIC to confirm suitable options and relevant licensing requirements.

2.3.7 Anemometer

The Developer does not propose to install an anemometer as part of the proposed development. It is proposed to use LiDar and/or obtain wind resource data from the local community turbine/MET office.

2.3.8 Project schedule

It is expected that the construction phase of the proposed development will take up to 18 months. The duration of the construction period is highly weather dependent and can be impacted by prevailing weather conditions. A more informed timescale will be detailed within the EIA Report once the design phase has been completed following recommendations from the scoping process. An indicative construction programme is outlined below:

- Construction of site entrance and visibility splay;



- Construction of temporary construction compound, access tracks and hardstanding areas;
- Excavation and construction of turbine foundations;
- Construction of substation;
- Excavation of cable trenches and laying of cables;
- Installation and commissioning of turbines; and
- Reinstatement of land and removal of temporary construction compound.

2.3.9 Decommissioning and repowering

It is expected that the proposed development will be operational for a period of at least 25 years, following which time it is expected that the wind farm will be decommissioned or repowered. Should this wind farm be decommissioned, it would involve the removal of all above ground infrastructure, including the turbines, cables transformers and substation. All recyclable materials will be recycled as part of the decommissioning process where possible. A habitat restoration plan will be included as part of the CEMP, with an outline plan compiled as part of the EIA Report.

Questions for stakeholders

Q2	Has sufficient information been provided on the nature and purpose of the development for the planning authority to form a Scoping Opinion?
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3 POLICY AND LEGISLATIVE FRAMEWORK

3.1 INTRODUCTION

The key policy documents of relevance to the proposed development will be considered throughout the preparation of the EIA Report, including key local planning guidance, renewable energy policy and other material planning considerations. Policy documents identified within this Section will be considered in further detail during the preparation of the planning application for the proposed development in an accompanying Planning Statement.

3.2 LEGISLATIVE CONTEXT

3.2.1 Town and Country Planning (Scotland) Act 1997

The installed capacity of the proposed development is up to 50 MW. In Scotland, renewable energy developments that have capacity to generate up to 10 MW of electricity and turbine height that will exceed 15 m (each turbine will be up to 180 m) require consent from the planning authority under Section 57 of the Town and Country Planning (Scotland) Act 1997 (Scottish Government, 1997) as amended by the Planning etc. (Scotland) Act 2006 (the Planning Act) (Scottish Government, 2006). A planning application is therefore being submitted to OIC for permission to construct and operate the proposed development.

3.2.2 Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (The 2017 Regulations)

The 2017 Regulations transpose the requirements of the EIA Directive 85/337/EC (as amended) into the Scottish planning system. An Environmental Impact Assessment (EIA) will be undertaken in accordance with Schedule 2 of the EIA Regulations which advises that developments involving the installation of more than two turbines, or if the height of any turbine or height of any other infrastructure exceeds 15 metres, then that proposal may require an EIA. Given the scale of the proposed development and the potential for significant effects, an EIA has been progressed without seeking a formal Screening Opinion from the Council.

3.2.3 The Conservation of Habitats and Species Regulations

In relation to wildlife and nature conservation, two key Directives have been adopted by the European Community, namely Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (the Birds Directive; formerly 79/409/EEC).

The Habitats and the Birds Directive are transposed in Scotland by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended); commonly known as the Habitats Regulations. The Habitats Regulations require that an appropriate assessment (AA) is carried out by the competent authority (in this case, OIC) if any Natura 2000 interests are likely to be significantly affected by a proposed development, a process known as Habitats Regulations Appraisal (HRA).

The requirement for HRA and EIA are independent of each other in that each are subject to individual tests and therefore the requirement for one does not mean another automatically applies. However, the EIA Regulations require that where a development is EIA development and also requires a HRA the planning authority must ensure where appropriate that the HRA and the EIA are coordinated (regulation 54(1)).



3.2.4 European Protected Species Licence

Certain species listed under Annex IV of the Habitats Directive and the Habitats Regulations are given special protection as European Protected Species (EPS). Where EPS are present, such as otters or many bat species, licences issued by SNH to permit works that will affect them will only be granted subject to specific tests being met. Any requirement for an EPS Licence will be consulted upon with SNH. Following planning consent, the formal EPS licensing process will be followed to secure any authorisations required.

3.3 POLICY FRAMEWORK

3.3.1 Climate Change

The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (IPCC, 2014) was published in 2014 and provides an overview of the state of knowledge concerning the science of climate change. The IPCC report highlights the need for a rapid increase in low carbon electricity supply from current levels of 30% up to 80% by 2050. European, UK and Scottish Government have increasingly focussed on climate change issues with policies developed to help achieve specific targets.

The 2030 Climate and Energy Framework was adopted by EU leaders in 2014. The three key targets for the year 2030 include:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels);
- At least 27% share for renewable energy; and
- At least 27% improvement in energy efficiency.

This builds on the 2020 Climate and Energy Package which seeks reductions of greenhouse gas emissions by 20% and increasing the proportion of final energy consumption from renewable sources to 20%. It is also in line with the longer-term perspective set out in the Roadmap for moving to a competitive low carbon economy in 2050, the Energy Roadmap 2050 and the Transport White Paper. For the UK, the EU Effort Sharing Decision includes a 16% reduction in UK greenhouse gas emissions by 2020 and a requirement for 15% of all energy consumed in the UK to come from renewable sources by 2020.

The proposed development will facilitate a reduction in greenhouse gas emissions by displacing the generation of electricity from fossil fuels through the generation of electricity from renewable energy sources, as detailed in Chapter 2.

3.3.2 Renewable Policy

UK Policy

The following documents set out the UK Governments binding commitments to cut carbon emissions through the deployment of renewable energy:

- The Climate Change Act 2008;
- The UK Renewable Energy Strategy (2009); and
- The UK Renewable Energy Roadmap (2011) (updated in 2013).



In the Climate Change Act 2008, the UK Government set a binding commitment to cut the UK's carbon emissions by 80% by 2050. The Climate Change Act further requires that limits be set on the total amount of emissions in successive five-year periods (carbon budgets), with a minimum 34% reduction by 2020, against 1990 levels.

The UK Renewable Energy Strategy (2009) sets out the UK's strategy to meet legally-binding target to ensure 15% of energy comes from renewable sources by 2020, contributing towards measures to tackle climate change by reducing the UK's emissions of carbon dioxide by over 750 million tonnes by 2030. It also promotes the security of energy supply and opportunities for the UK economy with the potential to create up to half a million more jobs in the UK renewable energy sector. It describes a scenario where the government will establish mechanisms to provide financial support for renewable electricity and create opportunities for individuals, communities and business to harness renewable energy.

In 2011, the UK Renewable Energy Roadmap was published which confirms the UK Governments commitment to increasing the use of renewable energy and outlines the UK's potential to meet its 2020 target of 15% of UK energy consumption from renewable resources and deliver an operational capacity of 29 gigawatts (GW) of renewable energy by this same year.

In December 2012 and 2013, updates were issued to the UK Renewable Energy Roadmap which reiterated the commitment to achieve the renewable energy target for 2020 as set out within the 2009 EU Renewable Energy Directive. In relation to onshore wind development, the 2013 Update states that: "Onshore wind, as one of the most cost effective and proven renewable energy technologies, has an important part to play in a responsible and balanced UK energy policy...it remains committed to ensuring that projects are built in the right places". Wind energy is seen as the most significant renewable energy source for achieving these targets in the short and medium term. Wind power does not create carbon dioxide emissions during its operational life and displaces other fuel sources generating greenhouse gas emissions.

This proposed development will demonstrate the potential reduction in carbon emissions through a carbon balance assessment in the EIA Report, which will consider the carbon costs involved in each phase of the development and carbon savings associated with renewable energy generation.

Scottish Policy

The Scottish Governments key commitment to cut carbon emissions through the deployment of renewable energy are set out in the following legislation and policy documents:

- The Climate Change (Scotland) Act 2009;
- Scottish Energy Strategy: The Future of Energy in Scotland; and
- Onshore Wind Policy Statement.

The Climate Change (Scotland) Act 2009 creates a long-term basis to ensure a reduction in Scottish greenhouse gas emissions by 80% by 2050, with an interim milestone of 42% by 2020. The most recent energy statistics published in March 2018 indicate that Scotland generated 68.1% of its gross electricity consumption from renewable sources (Scottish Government, 2018). The Scottish Government has now set further targets which include producing 100% of the country's demand for electricity from renewable sources by 2020 (Scottish Government, 2011).

The Draft Scottish Energy Strategy: The Future of Energy in Scotland was published in December 2017 and sets out the Scottish Government's vision for the future energy system in Scotland, to 2050. It describes the priorities for an integrated approach that considers both the use and supply of energy for heat, power and transport. The Strategy continues the Scottish Governments commitments to renewable energy, highlighting how community and shared



ownership is expected to contribute targets of 1 GW of community and locally-owned energy by 2020 and 2 GW by 2030.

The final Onshore Wind Policy Statement was published alongside the draft Energy Strategy. The Statement continues the Scottish Government's existing onshore wind policy set out in previous publications, highlighting the benefits on onshore wind including low costs technology, opportunities associated with island projects, and supply chain.

This proposed development will demonstrate the benefits of onshore wind for the economy of the Orkney Isles in a socio-economic impact assessment in the EIA Report. This will include opportunities through increased employment and use of the supply chain; greatly increased benefits to the local community and Orkney economy through re-investment of profits and community ownership; and improvement of island electrical infrastructure, providing opportunities for renewable energy generation and export.

3.4 COMMUNITY OWNERSHIP CONTEXT

The Scottish Government has continually asserted its support for community ownership of renewables, notably in its Electricity Generation Policy Statement in 2012, which set a target for at least 500 MW installed capacity of community and locally owned renewable energy generation by 2020 (Scottish Government, 2013). The Scottish Energy Strategy (Scottish Government, 2017a) describes the ambitions of the Government to see community energy mainstreamed across all systems and increases the community and shared ownership target to 1 GW by 2020. Clear support for community projects was highlighted, acknowledging their importance in empowering communities to take control of their own local resources. Similarly, the Onshore Wind Policy Statement reiterates the role that locally owned and community schemes have in maintaining the long-term sustainability of many remote rural areas. Although this proposed development is not wholly a community project, there are options for members of the Eday and wider Orkney communities to buy into the development via a shares purchase, this does permit the consideration of community developments to apply to this proposed development.

The Supplementary Guidance states that '*The current recommended level of community benefit payment is £5,000 per Megawatt per year for wind energy developments.*'

3.5 PLANNING CONTEXT

3.5.1 Statutory Development Plan

The Orkney Local Development Plan 2017 (referred to as "the Plan") sets out a vision and spatial strategy for the development of land in Orkney over the next ten to twenty years. The Plan contains the land use planning policies which Orkney Islands Council will use for determining applications. It also contains development proposals for the towns, villages and rural settlements, and establishes settlement boundaries for each of these areas where the principle of development will be accepted. The Plan replaces the 2014 Orkney Local Development Plan, and will provide the planning framework for the whole of Orkney.

Policy 7 (Energy) of the Plan states:

- *Orkney Islands Council supports the use of renewable and low carbon technologies to heat and power our homes, work places and community facilities and seeks to facilitate appropriate developments associated with a variety of types of renewable energy generation.*
- *The Plan seeks to ensure that Orkney's full potential for electricity and heat from renewable sources is achieved, whilst ensuring that there are no unacceptable impacts on relevant environmental and community considerations, including individual properties and those settlements that are not included on the sustainable settlements hierarchy.*



Applications for any windfarms should take account of the Spatial Strategy Framework for windfarm development:

- Areas with potential capacity to accommodate wind farms have been identified as 'Areas with Potential for Wind Farm Development'; representing the areas of least constraint to wind energy development. Wind energy development is likely to be supported in principle within these areas, subject to proposals complying with the Development Criteria from Supplementary Guidance: Energy and any other material planning consideration.

The proposed development is located within the 'Areas with potential for Wind Farm Development' as identified in the Spatial Strategy Framework in the Plan.

3.5.2 Supplementary Planning Guidance

Supplementary Guidance Energy was published in 2017 and the purpose of supplementary guidance to provide further information, policy and advice on complex planning matters and seeks to expand upon the core policies or land allocations in the plan.

Spatial Policy 1 (SP1) states that areas with potential for wind farms 'represent the areas of least constraint to wind energy development. Wind energy development is likely to be supported in principle within the areas subject to proposals complying with the Development Criteria and any other material planning consideration.'

The Proposed development is located in an 'Area with potential for wind farm development'. A comprehensive EIA process is proposed to follow this Scoping Process to ensure requirements for an appropriate level of assessment and public consultation are met.

A full assessment of the proposals against the policies, advice and guidance within the Supplementary Guidance will be provided in the EIA Report and an accompanying Planning Statement.

3.6 MATERIAL CONSIDERATIONS

The following documents are also considered material to the determination of the Application and will be referenced as appropriate in the EIA Report and accompanying Planning Statement:

- National Planning Framework 3 (2014);
- Scottish Planning Policy (2014);
- Planning Advice Notes (PANs) and Specific Advice Sheets;
- Draft Climate Change Plan (2017); and
- A Low Carbon Economic Strategy for Scotland (November 2010).

Questions for stakeholders

Q3	Have all of the relevant legislative requirements and policies been identified?
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4 IDENTIFICATION OF LIKELY SIGNIFICANT EFFECTS

4.1 APPROACH TO SCOPING

4.1.1 Consideration of potential impacts

The Scoping Report provides a description of the factors specified in regulation 4(3) of the EIA Regulations likely to be significantly affected by the proposed development and a description of those effects in an at an appropriate level of detail to enable the planning authority to adopt a Scoping Opinion for the basis of the EIA Report.

The Scoping process considers impacts arising during the construction, operation and decommissioning phases and indicates, where relevant, mitigation or monitoring measures.

To ensure the EIA Report is both proportionate and fit-for purpose, likely significant effects are identified on a receptor specific basis and a high level assessment undertaken on whether there is a potential pathway between **the impact** (the change which occurs as a result of the development) and the receptor. The assessment also defines whether **the effect** (the consequence of the change) is likely to be significant and as such should be considered further in the EIA process.

It is proposed that potential impacts of the proposed development on all relevant factors will be assessed under the criteria outlined in Table 4.1. This process is undertaken in line with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment².

Table 4.1 Consideration of potential impacts

Potential impact	Description of effects	Approach to EIA
Beneficial effect – unlikely to be significant	The proposed development may result in potential beneficial effects on the receptor, which are not likely to be significant.	Scoped out – no further assessment as it is not important enough to warrant further consideration/because the receptor will not be significantly affected.
Beneficial effect – likely to be significant	The proposed development may result in potential beneficial effects on the receptor, which are significant.	Scope in for further assessment.
Effect unlikely to be significant	Baseline information and knowledge of the potential impact are sufficient to determine that the proposed development is unlikely to have a significant effect on the receptor.	Scoped out - no further assessment as it is not important enough to warrant further consideration/because the receptor will not be significantly affected.
Likely significance of effect uncertain	There is uncertainty around the risk to the receptor and/or baseline data are currently insufficient.	Scoped in for further assessment.
Likely significant effect	The proposed development is likely to result in a significant detrimental effect on the receptor and further investigation is required to inform the EIA.	Scoped in for further assessment.

² CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.



4.1.2 Factors addressed in Scoping

The following factors are considered in this Scoping Report:

Section 5: Human Environment

- 5.1: Socio-Economics
- 5.2: Land Use and Utilities
- 5.3: Population and Human Health
- 5.4: Access, Traffic and Transport
- 5.5: Archaeology and Cultural Heritage
- 5.6: Landscape and Visual Amenity
- 5.7: Tourism and Recreation
- 5.8: Telecommunications
- 5.9: Aviation and Radar

Section 6: Ecological Environment

- 6.1: Ornithology
- 6.2: Terrestrial and Coastal Ecology

Section 7: Physical Environment

- 7.1: Hydrology, Geology and Soils
- 7.2: Air and Climate

4.1.3 Layout of Scoping assessments

The scoping assessment for each factor contains the following information:

- Scope of topic – what is included (and excluded);
- Overview of the baseline – what are key anticipated sensitivities and associated character/specifications related to the proposed development;
- Identification of potential impacts and likely significant effects – what will be investigated further in the EIA and what will not be taken forward for further assessment;
- Proposed approach to impact assessment - assessment methodology, any further data collection or survey requirements and consultation required; and
- Possible mitigation and monitoring measures.

The results of EIA Scoping are summarised in Section 9. Summary of Likely Significant Effects.

The overarching approach to the cumulative impact assessment for all EIA factors is outlined in Section 8.2 Cumulative and in-combination effects.

Questions for stakeholders	
Q4	Have all the relevant factors been identified for Scoping?
Q5	Have all of the likely significant effects been identified for further assessment?
Q6	Is the proposed approach to impact assessment acceptable for each factor?
Q7	Are the proposed mitigation and monitoring measures appropriate for each factor?



5 HUMAN ENVIRONMENT

5.1 SOCIO-ECONOMICS

5.1.1 Introduction

This chapter describes the socio-economic environment in the Orkney Islands, with a focus on the proposed development area including local economy, employment and contribution of economic activities including tourism and local farming. A high level description of potential impacts on socio-economic interests that may be affected by the proposed development is provided.

5.1.2 Baseline

The baseline for socio economics will be identified through assessment of Local (Eday), Regional (Orkney) and national (Scotland) trends directed towards population dynamics, current employment statistics, employment opportunities and sector skill availability. Other key metrics may include visitor numbers, visitor motivations, tourism with employment statistics, average earnings, spending culture and external generated income to the local community.

Financial statistics will include current average incomes, expenditures of residents both locally on Eday, where available, and in Orkney as a whole together with comparisons with Scottish averages to determine an overview of the financial culture. Income generated from tourism and visitation for business purposes will be included.

Local tourist guides, community groups and related businesses as well as OIC and national stakeholders such as Visit Scotland will be consulted to ensure an inclusive account of all recreational and tourist activities in the local community which may have an interest in the development.

Economics and employment

The Orkney Isles has developed an increasingly diverse economy over the past few decades but tourism, aquaculture and agriculture remain dominant.

There is scope to have significant revenue from the exporting of the significant renewable energy that is currently being generated in Orkney. There are 34 commercial scale wind developments consented or operational in Orkney which are capable of generating over 100% of Orkneys energy needs and potentially generating significant revenue for the local economy. However, renewable energy development in Orkney has been unable to reach its full potential for either supplying Orkney with sustainable energy, or exploiting the significant economic revenue due to a lack of adequate transmission infrastructure to mainland Scotland (further details in Section 1.3.1).

Gross Value Added (GVA) measures the increase in the value of the economy due to the production of goods and services within a particular region. This is used in the estimation of Gross Domestic Product (GDP), a key indicator of the state of the economy. GVA per head within the Orkney Isles is considerably lower than that of the UK and Scotland but emerges just above the Western Isles as the second lowest GVA (see Figure 5.1).



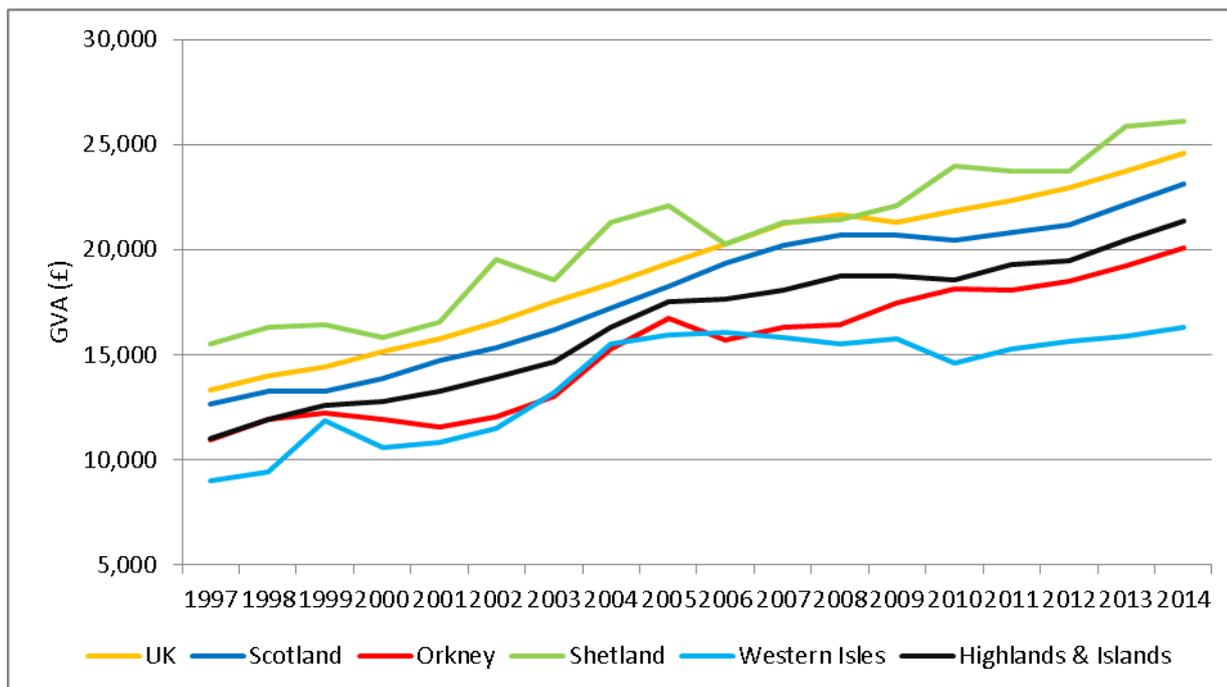


Figure 5.1 Gross value added per head in the UK, Scotland and the Scottish Island Groups (NOMIS, 2018)

Unemployment levels in Orkney fall consistently below the national average and follow levels in Shetland (Figure 5.2). Unemployment levels in Orkney have followed the national trend by seeing a marked decrease throughout this decade with unemployment dropping to below 3% in 2017 (Figure 5.2).

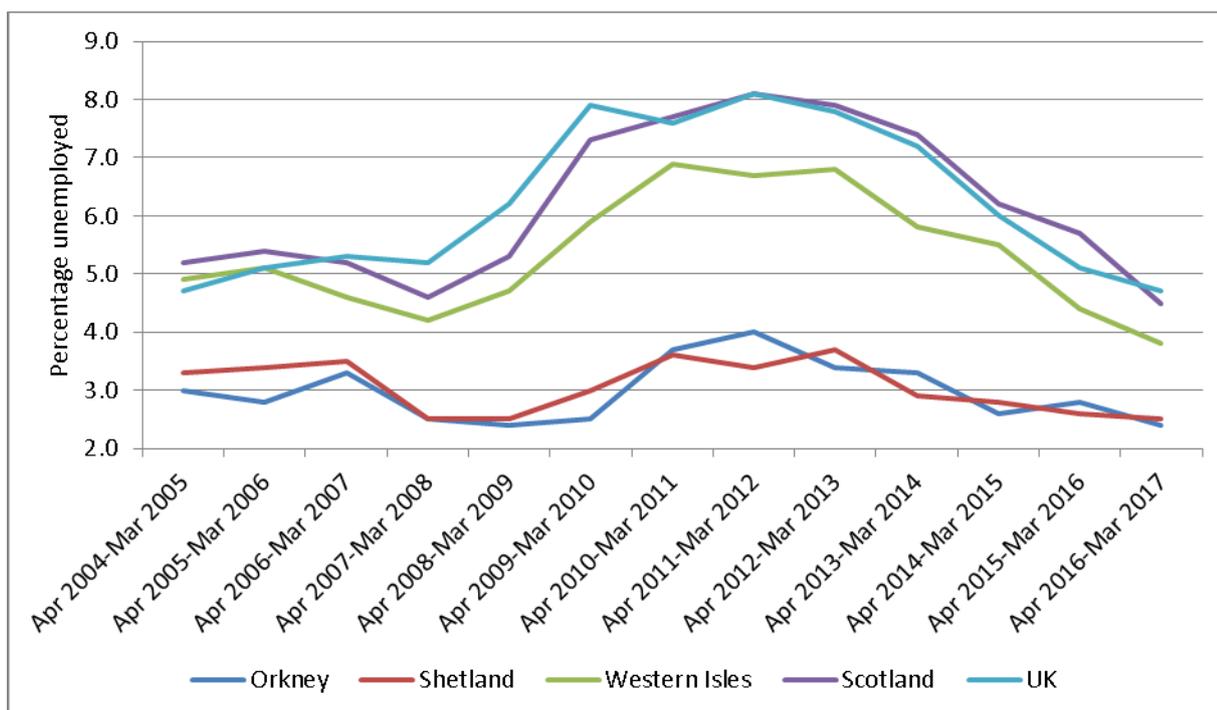


Figure 5.2 Unemployment by area (2004-2017) (NOMIS, 2018)



Population and demographics

In 2018, the population of Orkney was approximately 22,200 (National Records Scotland (NRS) 2019). This is a slight increase of 0.9% from 2017, while the national average increased by only 0.2% in the same year. Orkney's population is distributed across the multiple inhabited islands of the archipelago, however, the main concentration reside on the Orkney mainland.

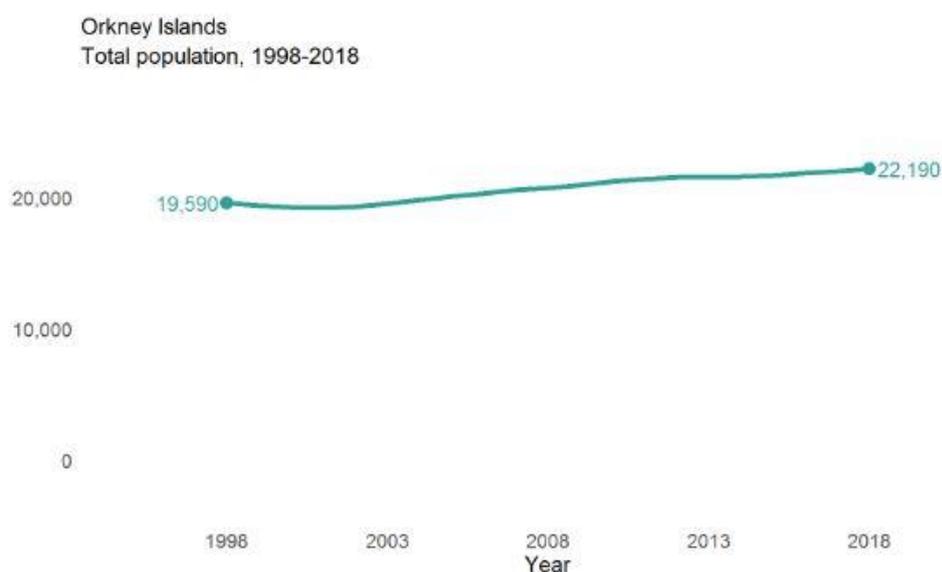


Figure 5.3 Orkney Population Statistics 1998 to 2018 (NRScotland.gov.uk)

Eday has a small population of approximately 160 people, with the majority in the 40-80 age class (Orkney.gov Economic review 2016). A decline in younger individuals is associated with limited employment opportunities on Eday. Restricted travel to and from Orkney mainland makes commuting to a job on the mainland difficult and therefore living on the island undesirable unless employment is found locally within farming or tourism sectors, which are primary sources of income on Eday.

5.1.3 Potential impacts

The potential socio-economic impacts (beneficial and adverse) that the proposed development may have during each phase include:

Construction and installation

- Development of improved electrical infrastructure providing opportunities for renewable energy generation and export;
- Financial benefit through increased employment and use of the supply chain;
- Financial benefit to the local community through increased use of local facilities and services;
- Pressure on local facilities and services (e.g. ferries) through an influx of workers during construction activities.

Operation and maintenance

- Financial benefit to the local community through re-investment of profits into the community;



- Financial benefit through increased employment and use of the supply chain;
- Financial benefit to the community through increased use of local facilities and services/ business tourism; and
- Added Social Value from partaking in the community shares scheme.

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.1. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.1 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Development of improved electrical infrastructure providing opportunities for renewable energy generation and export	All phases	The proposed development will contribute to the 135 MW of new projects required to satisfy Ofgem conditions for a new transmission connection to the Scottish Mainland. A new interconnector would provide greater energy security for Orkney, enable the Orkney to export electricity, stimulate further development in the marine renewables sector and provide opportunities for deployment of other renewable energy developments. This in turn, supports the expansion of a dynamic and growing economy in Orkney, whilst contributing to sustainable development and decarbonisation. Beneficial effect - likely to be significant	Scoped in for further assessment.
Financial benefit through increased employment and use of the supply chain	All phases	Construction and O&M activity associated with the proposed development may create employment both directly and through the supply chain at a national scale, regionally throughout Orkney and more locally on Eday. Beneficial effect - likely to be significant	Scoped in for further assessment.
Financial benefit to the local community through increased use of local facilities and services	All phases	The influx of workers that will be required to construct and maintain the proposed development will result in an increased use of local facilities and services providing income for these businesses that may otherwise have not been available. Beneficial effect - likely to be significant	Scoped in for further assessment.



Potential impact	Phase	Description of effect	Approach to EIA
Pressure on local facilities and services (e.g. ferries) through an influx of workers during construction activities	Construction and decommissioning	The influx of workers that will be required to construct the proposed development may result in pressure to local facilities and services on Orkney and Eday specifically. However, the proposed development will consist of eight turbines so will not require a major influx of workers. The MV Varagen can carry 144 passengers and 32 cars. It is therefore expected that this service has sufficient capacity to cope with any influx of workers for the proposed development. Any increase in pressure would be small scale and temporary and therefore unlikely to be significant. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Financial benefit to the local community through re-investment of profits into the community	Operation and maintenance	The proposed development is being taken forward by a local organisation who will re-invest a portion of the profits made from the energy produced by the wind farm through various initiatives, providing financial benefit to the community and its members. The proposed development may therefore result in potential beneficial effects on the receptor, which are likely to be significant. Beneficial effect - likely to be significant	Scoped in for further assessment.
Added Social Value from partaking in the community shares scheme	Operation and maintenance	There are indirect effects with regard to added social value of fostering business skills, entrepreneurial experience and sustainable self-development in Orkney and Eday specifically. Local ownership of the proposed development will also provide opportunities to develop new community uses for the wind farm development area. The access tracks to the wind turbines can be used to facilitate community access for a range of sustainable development purposes, such as mountain biking, recreational walking, easy access to the archaeological assets currently only accessible via rough ground walking and any other new community use that may emerge over the life of the wind farm. Beneficial effect – likely to be significant	Scoped in for further assessment.

5.1.4 Approach to EIA

A net benefit analysis of the socio-economic impacts associated with all phases of the proposed development will be undertaken in accordance with the Orkney Island Council Supplementary Guidance: Energy (2017). Data will be sourced from Orkney Islands Council: Orkney Economic review (2017, or latest available), and reference will be made to Scottish Government Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments (2013) and relevant case studies.



The proposed impact assessment strategy for socio-economics is outlined in Table 5.2 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 5.1.

Table 5.2 Impact assessment strategy for socio-economics

Potential impact	Assessment approach	Data collection requirements	Consultation requirements
Development of improved electrical infrastructure providing opportunities for renewable energy generation and export	A detailed assessment of the potential benefit that a new connection between Orkney and the Scottish Mainland could provide will be undertaken and presented in the EIA Report.	None	Consultation with SHET and OIC
Financial benefit through increased employment and use of the local supply chain	An assessment of the potential financial benefit to Eday and Orkney through increased employment and use of the local supply chain will be undertaken and presented in the EIA Report with reference to up-to-date reports on the economic impacts of onshore wind energy.	None	Consultation with OIC and Eday community council.
Financial benefit to the community through increased use of local facilities and services/ business tourism	A detailed assessment of the potential financial benefit to Eday through increased use of local facilities and services will be undertaken and presented in the EIA Report with reference to up-to-date reports on the economic impacts of onshore wind energy.	None	Consultation with OIC and Eday community council.
Financial benefit to the local community through re-investment of profits into the community	A detailed assessment of the potential financial benefit to the local community through a re-investment of a portion of the profits into the community will be undertaken and presented in the EIA Report. A desk-based assessment of the likely profits that will be made from the proposed development and details of potential project-specific partnerships that could be set up to re-invest profits into the local community.	None	Consultation with OIC, Eday community councils and the local community.
Added Social Value from partaking in the community shares scheme	A detailed assessment of the potential benefits and added social value to the local community will be undertaken and presented in the EIA Report. Guidance and case studies including Social Enterprise UK's Social Value Hub ³ and the Cabinet Office Guidance. Social Value Act: information and resources (2016) ⁴ , while relevant to public services under the Public Services (Social Value) Act 2013, will provide useful resources to inform this assessment.	None	Consultation with OIC, Eday community council and the local community.

³ <http://www.socialvaluehub.org.uk/>

⁴ <https://www.gov.uk/government/publications/social-value-act-information-and-resources/social-value-act-information-and-resources>



5.1.5 Possible enhancement, mitigation and monitoring measures

Possible mitigation and enhancement measures that will be considered in the EIA process where there is the potential for likely significant effects on socio-economic receptors may include:

- An assessment of potential project-specific partnerships will be undertaken to ensure that the re-investment strategy maximises benefits for the Eday community.
- The Developer will maximise opportunities for the local workforce, the associated supply chain and use of local materials through appropriate procurement processes as far as practicable throughout all phases of the proposed development.
- Goods and services will be procured from the local economy wherever possible.
- The Developer will engage with the local community to ensure that there are no barriers placed in the way of participation, i.e. direct contact with the Developer's advisors, workshops, seminars and courses.



5.2 LAND USE AND UTILITIES

5.2.1 Introduction

This chapter will describe the land-uses and utility infrastructure within and in the vicinity of the proposed development area. A high level description of potential impacts on land-use and utility receptors that may be affected by the proposed development is provided. Reference should be made to section 5.3: Population and Human Health for the effects of disturbance to residential receptors in the vicinity of the proposed development boundary.

Impacts on recreational activities (e.g. walking and cycling) within the proposed development area are addressed in section 5.7 Tourism and Recreation.

The proposed development will require the installation of additional access tracks for construction traffic (see Chapter 2: Project Description for further details). The impact of increased traffic flows on existing road users is addressed in section 5.4: Access, Traffic and Transport.

5.2.2 Baseline

Land Use

Agriculture

The proposed development is located within privately owned farmland. The land is comprised of improved pasture and rough grazing. Agricultural practices currently undertaken on the land are livestock grazing with some hay, silage and haylage cutting seasonally. The Macaulay Institute's Land Capability for Agriculture (LCA) classification for the Site is predominantly '*Mixed Agriculture LCA Class 4.2: Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops*'; with some turbines located within or on the fringes of '*Rough Grazing LCA Class 6.3 'Land capable of use as rough grazing with low quality plants*'⁵. Neither of these classifications are indicated to be prime agricultural land.

Residential and commercial properties

There are approximately 12 residential properties, one school and the Eday pier within 2 km of the proposed development, to the east. The majority of the residential properties are detached houses and farms, many of which have micro scale wind turbines. There are no residential or commercial properties located to the north, south or west of the proposed development, with the exception of Greentoft Farm which is directly connected to the proposed development.

Access and recreation

The proposed development is within private land and there are no designated core paths within the site or surrounding area, however it is understood that there are coastal trails, which are a popular route for locals and visitors wishing to bird watch or see seals and cetaceans from the coastal viewpoints. The condition of these coastal trails is very poor and can be unsafe.

There are two scheduled monuments within the site boundary, a burnt mound and distinctive standing stone, currently there is no constructed path access to the burnt mound monument, which limits access to those able to walk across the fields and uneven terrain.

⁵ <https://soils.environment.gov.scot/maps/capability-maps/national-scale-land-capability-for-agriculture/>



Utilities

There are no utilities within the proposed development boundary, with the exception of 11kV overhead lines which run north to south along the eastern boundary of the site to service Greentoft Farm.

5.2.3 Potential impacts

The potential impacts that the proposed development may have upon land use and utilities during each phase include:

Construction and installation

- Loss of agricultural and grazing land during construction activities for turbine foundations, access tracks, crane pads and laydown areas
- Disruption to utility infrastructure and services within the development boundary area

Operational

- Loss of agricultural and grazing land due to installation of wind farm infrastructure (turbine foundations, crane pads and access)

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.3. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.3 Potential significance of effects on land use and utilities

Potential impact	Phase	Description of effect	Approach to EIA
Loss of agricultural and grazing land during construction activities for turbine foundations, access tracks, crane pads and laydown areas	All phases	In order to construct the proposed development, there will be a requirement for land take, some of which will be land which is currently used for agricultural purposes. As the proposed development is being taken forward by a local landowner, any detrimental impact as a result of a loss of land is likely to be outweighed by the financial benefits that would be realised by the wind farm being taken forward by local developers. The Site is not classified as prime agricultural land. Livestock grazing in the area will likely be restricted during construction however this will be temporary and will be able to continue once construction is completed. The full land take will be restored back to baseline on decommissioning. Effect unlikely to be significant.	Scoped out of assessment and will not be considered further



Potential impact	Phase	Description of effect	Approach to EIA
Disruption to utility infrastructure and services within the development boundary area	Construction and installation, decommissioning	There are no public water utilities within the development boundary site. There are 11kV overhead lines which run north to south along the eastern site boundary to service Greentoft farm which will not be impacted by the proposed development. The Developer will liaise with SSE throughout project development to ensure no impacts arise. Effect unlikely to be significant.	Scoped out of assessment and will not be considered further.

5.2.4 Approach to EIA

All potential impacts with regard to Land Use and Utilities are proposed to be scoped out and will therefore not be considered further in the EIA.

5.2.5 Possible enhancement, mitigation and monitoring measures

The developer would consult with relevant stakeholders to determine if it would be desirable to include a pathway to allow more easy access to this monument as part of the enhancements of the proposed development.



5.3 POPULATION AND HUMAN HEALTH

5.3.1 Introduction

This section describes communities local to the proposed development area and the public health status of Eday. Under the amendments to UK EIA Regulations in 2017, the assessment process must consider the potential effects of wind farm developments on population and human health. The amended EIA Directive does not define 'population and human health', however, guidance from the Institute of Environmental Management and Assessment (IEMA, 2017) indicates that 'public health' can be categorised into three EIA-relevant domains:

- Health protection (e.g. against infectious disease, toxicity, and environmental hazards);
- Health improvement (e.g. promoting physical, mental, and social wellbeing through lifestyles, education, housing, and employment); and
- Improving services (e.g. efficiency, clinical effectiveness, and equity).

A high level description of the potential impacts on local population and human health receptors (i.e. nearby residents and their properties) as a result of the proposed development activities is described. This section should be read in conjunction with section 5.1: Socio-Economics, which presents the demography of Orkney and considers the effects of economic impacts caused by the proposed development. Potential impacts of the proposed development on local amenities are addressed in section 5.2: Land Use and Utilities.

The potential impacts on air quality and hydrology that are relevant to health protection are respectively considered in sections 7.2: Air and Climate and 7.1 Hydrology, Geology and Soils. Reference should also be made to section 5.4: Access, Traffic and Transport for potential impacts of increased traffic flows throughout the proposed development lifecycle.

5.3.2 Baseline

Local community and residents

An assessment of the population dynamics on Eday has been detailed in section 5.1 Socio Economics. The community comprises mainly farmers, tour guides, nature rangers, holiday accommodation caretakers and retired individuals. A significant number of residents spend the majority of their time on the island with weekly or bi-weekly trips to the Orkney mainland to obtain supplies and materials.

Public health status

The trend, within Orkney as elsewhere in the Scotland, is currently towards an ageing population with an estimated 23.1% of the Orkney population over the age of 65 (18.7% Scotland), and 16.1% under 16 (16.9% Scotland) (Public Health Report 2017/18). The 2011 Orkney census data recorded 11,555 individuals stating they considered their health to be 'very good'

Health on the Eday is generally good, with the residents being fit and in good health due to their active lifestyle, 50% stated they believed their health was 'very good' with 23.9% stating they were in 'good' health, while 12.5% considered their health to be 'bad to very bad'.

Access to services is a perennial issue, particularly challenging in the outer isles, where it is difficult to maintain a sustainable health and care workforce (Public Health Report 2017/2018).



5.3.3 Potential impacts

The potential impacts that the proposed development may have upon population and human health receptors (i.e. nearby residents and their properties and temporary visitors) during each phase include:

Construction and installation

- Noise generated within the proposed development boundary as a result of civil engineering, turbine installation, and onsite transportation;
- Noise generated by increased traffic passing residential areas;
- Increased risk of road traffic accidents due to presence of heavy construction traffic and increased levels of traffic on the road networks;
- Vibration impacts at nearby dwellings arising from construction activities; and
- Air pollution from dust generated during construction works.

Operation and maintenance

- Noise from operation of turbines;
- Shadow flicker caused by rotating turbine blades;
- Ice throw from turbine blades in winter conditions; and
- Component failures resulting in blade throw.

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.4. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.4 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Noise generated within the proposed development boundary as a result of civil engineering, turbine installation, and onsite transportation	Construction and decommissioning	Temporary increases in onsite noise from civil engineering works and turbine installation has the potential to disturb residents at nearby dwellings. However, the nearest inhabited dwelling to the proposed site perimeter is approximately 0.4 km away, with no properties within 0.6 km of any of the planned turbine locations. The proposed aggregate extraction site is located 0.3 km from the nearest residence; noise may be a temporary disturbance if blasting is required. Likely significance of effect uncertain	Scoped in for further assessment.



Potential impact	Phase	Description of effect	Approach to EIA
Noise generated by increased traffic passing residential areas	Construction and decommissioning	During construction and decommissioning of the wind farm there will be noise and vibration associated with the movement of HGVs involved in construction, including component and aggregate deliveries, which could be a source of nuisance to local residents. Deliveries of turbine components will arrive from the Eday Orkney Ferry Terminal which is a rural road situated close to residential receptors, increased vehicle access may disrupt nearby residents during daytime operations. Likely significance of effect uncertain	Scoped in for further assessment.
Increased risk of road traffic accidents due to presence of heavy construction traffic and increased levels of traffic on the road networks	Construction and decommissioning	Temporary increases in LGVs, HGVs, and abnormal load movements may increase the risk of collision with other road users accessing private residential or commercial properties. However, construction traffic will be slow moving and operate under a traffic management plan to prevent any increased risk of road traffic accidents. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Vibration impacts at nearby dwellings	Construction and decommissioning	The levels of vibration generated by mineral workings are well below those required to cause structural damage to properties from breaking or blasting (PAN 50). The nearest dwelling to the stone excavation site is approximately 0.3 km away, which is unlikely to be affected by vibration. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Air pollution from dust generated during construction works	Construction and decommissioning	Dust and particulates from general construction works, concrete batching, disturbed soils and stone processing can cause short term localised air pollution which could be a source of nuisance for local residents in close proximity to the construction site. Best practice construction measures will be implemented in line with relevant standards as part of the Construction Environmental Management Plan, including dust minimisation and control (as detailed in section 7.2.5). Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Noise from operational turbines	Operation and maintenance	Noise produced by the turbines during their operation has potential to cause disturbance to residents at nearby dwellings. Likely significance of effect uncertain	Scoped in for further assessment.



Potential impact	Phase	Description of effect	Approach to EIA
Shadow flicker causing disturbance at nearby dwellings	Operation and maintenance	<p>Under certain conditions, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off resulting in an effect known as shadow flicker. This effect only occurs inside buildings and under a limited set of circumstances, e.g. when meteorological conditions are clear, the sun is low in the sky and the moving shadow of a turbine is cast onto a narrow window. Due to the movement of the sun, these shadows pass any point quickly and the effect therefore only lasts a short period of time.</p> <p>Where recommended separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), 'shadow flicker' should not be an issue (Scottish Government, 2014). Figure A5 illustrates that no properties are likely to be affected⁶.</p> <p>Effect unlikely to be significant</p>	Scoped out of the assessment and will not be considered further.
Ice throw from turbine blades during winter conditions	Operation and maintenance	<p>Ice may accumulate on turbines under certain atmospheric conditions and may also cause ice to shed, leading to safety concerns. Ice throw is only considered a public health and safety concern when there is the possibility of human receptors within 350 m of a turbine (Joakim Renström 2015). The nearest residential property is 400 m. Modern turbine technology also has built in mitigation to reduce ice build up such as sensor activated heating mechanisms within the nacelle and de-icing blade coatings.</p> <p>Effect unlikely to be significant</p>	Scoped out of the assessment and will not be considered further.

⁶ Shadow flicker has been modelled using the shadow flicker module of WindFarm which calculates times throughout a year when a turbine rotor disc viewed from the window of a house is in line with the sun and therefore the potential for shadow flicker exists. The output presented in Figure A5 indicates areas of land where shadow could potentially occur and for how many hours a year.



Potential impact	Phase	Description of effect	Approach to EIA
Component failure resulting in blade throw	Operation and maintenance	The possibility of component failure such as rotor blade dropping or being thrown from the nacelle is a potential public safety concern. Blade throw is only considered to be a health and safety concern where there is the possibility of human receptors being in sufficiently close proximity to the turbines that injuries may occur, which there is not in this case. Modern technology has in-built mitigation to prevent serious structural malfunctions, such as sensors to warn of any joint strain and all turbines undergo regular visual inspection and maintenance as good operational practice. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.

5.3.4 Approach to EIA

The proposed impact assessment strategy for population and human health is outlined in Table 5.5 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for those impacts identified as having the potential to result in 'likely significant effects' or those where the 'likely significance of effect is uncertain' from Table 5.4.

Table 5.5 Impact assessment strategy for population and human health

Potential impact	Assessment approach	Data collection requirements	Consultation requirements
Noise generated within the proposed development boundary as a result of civil engineering, turbine installation, and onsite transportation	A qualified acoustician will undertake a noise assessment should activities such as blasting, or breaking be required during construction. Public notices will be displayed with expected times of any loud works and durations. Schedules will be adhered to, and only undertaken during set hours agreed with OIC and after consultation.	Background noise assessment to determine ambient levels.	OIC environmental health officer. Local consultation to identify any vulnerable residents who may be sensitive to blasting
Noise from increased construction traffic outwith site	An assessment of road traffic noise will be carried using "Guidelines for the Environmental Assessment of Road Traffic" from the Institute of Environmental Management and Assessment (IEMA, 1993), and presented in the EIA Report. Calculations of road traffic noise will be conducted using guidance from the Department of Transport (Welsh Office) (1988).	Any requirement for noise monitoring will be agreed with OIC.	Consultation with OIC Environmental Health. Identify any requirements for consultation with Transport Scotland.



Potential impact	Assessment approach	Data collection requirements	Consultation requirements
Noise from operational turbines	An assessment of the potential noise impacts resulting from the operation of the turbines will be carried out in line with ETSU-R-97 guidance using the ISO standard 9613-2:1996 calculations, supported by supplemental guidance as per the OIC Energy Supplementary Guidance (2017) document with the full assessment, findings and methodology presented in the EIA Report with any suitable mitigation detailed.	Sound power levels for the candidate wind turbine generator. Background noise assessment to determine ambient levels.	OIC Environmental Health.

5.3.5 Possible mitigation and monitoring measures

Possible mitigation measures that will be considered in the EIA process where there is the potential for likely significant effects on population and human health receptors may include:

General mitigation

- Construction hours, movement of HGVs and out of hours working would be agreed in advance with OIC to minimise any disruption to local residents;
- The contractor would be required to establish and maintain effective liaison with the local community throughout construction;
- The contractor would be required to ensure disturbance to the local community from construction activities is minimised to that required for safe implementation of the works;
- Temporary signage will be used to indicate the presence of works traffic in the area.

Impact specific mitigation

Noise from civil engineering and turbine installation and removal activities

- Particular attention would be paid to reducing construction noise levels through the use of 'best practical means' and restricted working hours in order to ensure that potential noise levels are minimised as far as possible;
- Residents, the Environmental Health Department and all other relevant parties would be informed well in advance of potential works and deliveries and various communication channels would be available to residents such that a relevant point of contact is available to resolve potential issues accordingly; and
- Where necessary, noise monitoring may be undertaken in order to ensure that specific construction noise limits are met during relevant times of the day.



5.4 ACCESS, TRAFFIC AND TRANSPORT

5.4.1 Introduction

This chapter characterises the existing road network, access routes, traffic levels and road conditions relevant to the proposed development and potential access routes required from the point of delivery and in relation to loads that will likely be transported via these routes. A high level description of the potential impacts arising from the proposed development is also provided.

Reference should also be made to section 5.3: Population and Human Health for the impacts of traffic noise, resulting in detrimental effects on air quality by construction traffic on local communities within the vicinity of the proposals.

5.4.2 Baseline

Eday is serviced by a daily ferry service, which is capable of transporting up to 32 cars. The road networks comprise single-track tarmac roads with frequent passing places to allow two-way traffic. There are access tracks to private properties.

Route options for HGVs and Abnormal Loads

As detailed in section 2.3.3, the routes proposed for component and materials delivery are along the main B9063 from the pier to the site boundary where newly constructed access tracks will connect to the turbine locations, compound and substation. An indicative transport route is illustrated in Figure A3

Traffic Flows

As the population on Eday is small, it is expected that traffic flows will be low. The highest volume of traffic will be expected to be along the access road to the pier, the B9063. The unnamed road leading south is primarily an access road for residents and therefore likely to have a low volume of traffic.

5.4.3 Potential impacts

The potential impacts that the proposed development may have upon access, traffic and transport during each phase include:

Construction and installation

- Increased traffic flows on local roads associated with HGVs and abnormal load movements resulting in severance and driver delay for local road users; and
- Road widening and strengthening works on local roads resulting in severance and driver delay for local road users.

Operation and maintenance

- Increased traffic flows on local roads associated with development maintenance traffic resulting in driver delay for local road users.

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.



A description of the effects of each potential impact and likely significance is presented in Table 5.6. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.6 Potential significance of effects on access, traffic and transport

Potential impact	Phase	Description of effect	Approach to EIA
Increased traffic flows on local roads associated with HGVs and abnormal load movements resulting in severance and driver delay for local road users	Construction and decommissioning	LGVs, HGVs and abnormal load movement may adversely impact on other road users due to a temporary increase in traffic volume and during the transport of turbine components due to the slow moving and large size of vehicles. Likely significance of effect uncertain	Scoped in for further assessment.
Road widening and strengthening works on local roads resulting in severance and driver delay for local road users	Construction and decommissioning	Works may be required to enable passage of abnormal loads on the local road network, which will potentially lead to temporary driver delay or severance along routes that require widening works. Likely significance of effect uncertain	Scoped in for further assessment.
Increased traffic flows on local roads associated with development maintenance traffic resulting in driver delay for local road users	Operation and maintenance	The volume of traffic that is likely to arise from the development once the wind farm is operational will be low. LGVs (or similar) are likely to be used for regular site visits and occasional deliveries using HGVs. The impact on traffic flows will be negligible. Effect unlikely to be significant.	Scoped out of assessment and will not be considered further.

5.4.4 Approach to EIA

The proposed impact assessment strategy for access, traffic and transport is outlined in Table 5.7 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 5.6.

A description assessment of the baseline conditions of the road network, as well as internal and external sea routes will be prepared for inclusion within the EIA Report chapter, including details of background traffic and shipping flows, historical incidents and accident data and an anticipated construction programme, where required. The following tasks will be undertaken:

- Site visit to observe baseline conditions on the road network and assess the suitability of access route(s) to accommodate the anticipated construction traffic.
- Locations which may be sensitive to heavy traffic will be identified.
- Stakeholder Consultation – engagement with OIC will be undertaken at an early stage to discuss the proposals and fully understand their precise requirements.
- Island access analysis – An assessment of island access arrangement will be undertaken to identify potential pinch points specifically around the Eday pier area.



- Component delivery – Orkney Ferries and Orkney Harbour Authority will be consulted to ensure any potential disruption to other marine users is avoided.

Table 5.7 Impact assessment strategy for access, traffic and transport

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Increased traffic flows on local roads associated with HGVs and abnormal load movements resulting in severance and driver delay for local road users	<p>An assessment of the conditions of the road network will be carried out to identify the predicted impacts that may arise during all phases of the development, their significance and propose a programme of mitigation where appropriate.</p> <p>The access routes to and from the site will be identified and an assessment undertaken of the current traffic flows on the local roads and predicted traffic flow generation profile during construction.</p> <p>The potential need for road closures or temporary diversions of roads and other public rights of way will also be identified.</p> <p>The approach will be undertaken by competent experts in accordance with the Institute of Environmental Management and Assessment (IEMA, 1993), Guidelines for the Environmental Assessment of Road Traffic (EART) and other latest available guidance.</p>	<p>Obtain up to date traffic count data sourced from the OIC if required.</p> <p>Proposed development details outlining construction programme, likely source of construction materials, details of identified abnormal loads, high level volumes of concrete, aggregate, steel, cabling etc.</p>	<p>Confirm baseline data requirements, assessment approach and agree routing strategy with OIC roads department. Identify any requirements for consultation with Transport Scotland</p>
Road widening and strengthening works on local roads resulting in severance and driver delay for local road users	<p>A full traffic management plan will be developed to assess the route identified. Any works required will be subject to a suitably qualified engineer and result in a comprehensive report issued to the OIC.</p>	<p>Road dimensions, traffic flow data, swept area analysis</p>	<p>Confirm baseline data requirements, assessment approach and agree routing strategy with OIC roads department Harbour Authority, and community council.</p>

5.4.5 Possible mitigation and monitoring measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on access, traffic and transport may include:

General mitigation

- A Traffic Management Plan (TMP) will be developed in consultation with OIC by the contractor as part of the outline Construction Environmental Management Plan (CEMP).
- Local residents will be kept informed of any potentially disruptive vehicle movement (such as delivery of abnormal loads) and the actions being taken to mitigate the impact of these vehicle movements.



- The contractor will be required as part of the TMP to monitor delays through and in proximity to the works and if any significant delays were identified to take account of this and programme activities to reduce the impacts on local traffic, including ferry traffic.
- Transport briefings and detailed logistic plans will be issued to all service and material suppliers to ensure that required driving standards are maintained and appropriate routings and timings are followed.
- A driver's induction will be undertaken to include: the traffic management plan for the development, a safety briefing; the need for appropriate care and speed control; identification of specific sensitive areas; identification of the specified access route(s); and the requirement not to deviate from the specified route(s).

Impact specific mitigation

Impacts from the development on traffic flows

- The movement of traffic, such as HGVs and in particular abnormal loads, will be restricted to particular times of the day to avoid the start and end of the school day and to reduce the risk of vehicles convoying when arriving/departing the site. Specific restrictions will be agreed with OIC Roads Service.

Impacts on the local roads associated with abnormal loads

- The proposed development team will work together with OIC to make an assessment of the capacity of roads, and any bridges and culverts to carry abnormal loads and general construction traffic and then to select appropriate routes and, if necessary, carry out necessary strengthening or improvement works with required consents.
- All necessary consents for the movement of abnormal loads will be obtained in advance by the contractor and where appropriate escort vehicles would be used.

Monitoring

- The contractor will be required to undertake road condition surveys throughout the development timescale and carry out any remedial road works resulting from the construction traffic as agreed with OIC.
- If required the Developer will liaise with OIC to reach agreement with regarding the requirement for pre-start conditions and surveys to be carried out during the construction phase on all those roads and bridges likely to be affected by the development.



5.5 ARCHAEOLOGY AND CULTURAL HERITAGE

5.5.1 Introduction

This chapter describes the archaeological and cultural heritage environment within the proposed development and wider area. The assessment considers direct effects on both designated and undesignated archaeology including the potential for currently unknown/undiscovered archaeological remains to exist within the proposed development boundary. Indirect and cumulative impacts on the setting of cultural heritage assets will also be assessed. Reference should also be made to the Landscape and Visual Amenity section in relation to indirect impacts on cultural heritage assets.

5.5.2 Baseline

Development Area

Scheduled Ancient Monuments

There is one scheduled ancient monument within the proposed development site; this is listed as Knoll Of Merrigartha Burnt Mound and is a prehistoric domestic and defensive: burnt mound. It has been determined to be from approximately 2800 BC and 1200 BC. It has been described on Pastmap/ Canmore as:

"visible as a crescent-shaped grass-covered mound, measuring approximately 30m NW-SE by 36m transversely and standing around 0.5m high. It is composed mainly of accumulated burnt stones and other burnt material. Two hollow areas in the interior indicate the likely position of activity areas or trough sites".

Undesignated Sites

There is an undesignated burnt mound approximately 130 m southeast from the Knoll of Merrigartha, the Greentoft burnt mound. This site has not been designated as it has suffered significant damage from ploughing activity prior to being discovered.

There are some unmarked graves for ship wreck victims also within the proposed development site, identified by slabs to the head and feet areas. Further dilapidated earthworks have been identified but not considered in condition relevant for designation, the majority of which are dykes and enclosures.

Setting of Archaeological and Cultural Heritage Features

Scheduled Ancient Monuments

Within a 5 km zone of theoretical visibility (ZTV), outwith the proposed development boundary, there are 11 scheduled ancient monuments to the north and one adjacent to the site boundary, with the majority being chambered cairns of varying conditions and burnt mounds (Figure A8).

The scheduled ancient monument to the east of the site, adjacent to the site boundary, is the single Southside standing stone, which is described as:

"An irregular monolith 5'3" high, and packed at base where it is 2'2" broad on the north and 18" thick on the east and heavily mutilated on the west"

Listed buildings

There are no Category A or B listed buildings within the 5 km ZTV. There is one category C listed building, Eday Kirk, circa 1860 single stony stone built church with a simple architecture and small graveyard enclosed by a dry stone wall.



World Heritage Sites

A large portion of the western mainland of Orkney is a designated world heritage site, specifically for the Ring of Brodgar, the recent archaeological find in Ness, Maeshow, Skara Brae and many more significant historical sites. Although outwith the 5 km survey area, there may be intervisibility between the site assets and the proposed development.

5.5.3 Potential impacts

The potential impacts that the proposed development may have upon archaeology and cultural heritage during each phase include:

Construction and installation

- Direct impacts on known and unknown (buried) archaeology within the proposed development boundary.

Operation and maintenance

- Indirect impacts on cultural heritage features outwith the development site through changes to the overall setting of these features (designated and undesignated).

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.8. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.8 Potential significance of effects on archaeology and cultural heritage

Potential impact	Phase	Description of effect	Approach to EIA
Direct impacts on known and unknown (buried) archaeology within the proposed development boundary.	Construction and decommissioning	Potential for damage to known and unknown remains through full range of construction and decommissioning activities. Likely significance of effect uncertain	Scoped in for further assessment.
Indirect impacts on cultural heritage features out with the proposed development boundary through changes to the overall setting of these features	Operation	The visual presence of wind turbines have the potential to materially change the setting of cultural heritage receptors. Likely significance of effect uncertain	Scoped in for further assessment.
Indirect impacts on the setting of undesignated archaeology	Operation	Any undesignated sites with visibility of the proposed wind turbines are anticipated to be of low sensitivity. Effect unlikely to be significant	Scoped out and will not be considered further.



5.5.4 Approach to EIA

The proposed impact assessment strategy for archaeology and cultural heritage is outlined in Table 5.9 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 5.8.

Table 5.9 Impact assessment strategy for Archaeology and Cultural Heritage

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Direct impacts on known and unknown (buried) archaeology	<p>Baseline data collection identify known and unknown features and development of strategies to mitigate, collect further data on or conserve features where appropriate.</p> <p>The assessment will make reference to relevant statutory and planning frameworks and local supplementary guidance for cultural heritage and will be undertaken in accordance with current best practice including the Chartered Institute for Archaeologists (CIfA) Standards and Guidance for historic environment Desk-based assessment (CIFA 2017) and Historic Environment Scotland Policy Statement (2016).</p>	<p>Desk based assessment drawing on national and local resources (NMRS, Orkney Isles Sites and Monuments Record, Estate records, historical records, journals and websites) to understand historical use of the site, a site walkover in accordance with best practice (Standard and guidance for archaeological field evaluation 2014 (CIFA 2014).), interrogation of aerial photographs to determine sites or features.</p>	<p>OIC Archaeology Service and Historic Environment Scotland.</p>
Indirect impacts on the setting of cultural heritage assets	<p>Sensitivity of features which fall within the ZTV of the wind farm will be determined by designations and sensitivity of the surrounding landscape. The impact will be assessed with reference to wireframes and photomontages, site walkovers (where necessary), HES guidance on managing change in the historic environment: Setting (HES, 2016); OIC Planning Policy Advice: Historic Environment (Topics and Themes) (March 2017); and OIC Supplementary Guidance: Historic Environment and Cultural Heritage (April 2017)</p>	<p>Generation of ZTV (Figure A8) for the development to identify sites which may be subject to impacts on setting.</p>	<p>OIC Archaeology Service to agree viewpoint locations for sensitive cultural heritage receptors.</p>

5.5.5 Possible mitigation and monitoring measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on archaeology and cultural heritage may include:



Impact specific mitigation

- Design mitigation will be incorporated to ensure no direct impacts on any designated or undesignated archaeological features.
- Features in close proximity to the development footprint will be enclosed to ensure their protection.
- Should less significant archaeological remains be revealed, these may be addressed by a programme of archaeological evaluation and, if necessary, archaeological excavation prior to construction, an archaeological watching brief and / or topographic survey of archaeological earth works impacted by the proposal.

Monitoring

- An appropriate archaeological monitoring strategy will be agreed in advance with the OIC Archaeology consultant and incorporated within a Written Scheme of Investigation (WSI) for approval prior to the commencement of construction works.



5.6 LANDSCAPE AND VISUAL AMENITY

5.6.1 Introduction

This chapter describes the landscape and visual amenity within the vicinity of the proposed development area. A high level description of impacts on landscape character, key landscape features, views and visual amenities that may be affected by the proposed development is provided.

Cultural heritage also forms an important aspect of the landscape context in terms of the setting of archaeological features within the wider landscape. Potential impacts on the setting of cultural heritage assets and features are discussed further in Section 5.5: Archaeology and Cultural Heritage.

5.6.2 Baseline

The proposed development will be located within agricultural land on Eday, following the southwestern coastline round to the southern tip. The selected site has been identified within the OIC development plan for renewable energy as a potential area for wind farm development which is described in the OIC Supplementary Guidance (2017) as “*Two or More 'Medium/Large' Turbines or any number of 'Large' or 'Very Large' Turbines*”. The proposed development fits the allocated areas of search for development and complies with the description of potential acceptable development.

The landscape of Eday is gently undulated with a spine of peatland running southwest to north towards London Airport. The land surrounding Ward Hill, where the majority of the peatland exists, is primarily grazing for cattle and sheep. There are no designated landscape features within Eday or protected seascapes. The closest designated landscape feature is on Shapinsay 14.5 km to the southwest, Balfour Castle with Gardens and Designed Landscapes. The ZTV produced as part of the scoping process (Figure A7) illustrates that there will be limited and interrupted visibility of the proposed development from this designated landscape feature.

In the wider landscape, there are existing wind farm developments (Figure A12) that will be visible together with the proposed development, providing a precedent for development and an existing industrial feel to the landscape. The closest of these is the Eday community wind turbine standing at 67 m tip, with the closest wind farm being on Sanday, the Spurness wind farm comprising five turbines of 100 m to tip. On the Orkney mainland there are two existing wind farm developments at Burger Hill with maximum tip heights of 116 m and Hammers Hill, with the recently consented and CfD funded Costa Head (four turbines) and Hesta Head (five turbine) wind farms at 125 m to tip to be constructed by 2023.

5.6.3 Potential impacts

The potential impacts that the proposed development may have upon landscape and visual amenity during each phase include:

Construction and installation

- Potential impacts on landscape character; and
- Potential impacts on visual receptors and visual amenities.

Operation and maintenance

- Potential impacts on landscape character; and
- Potential impacts on visual receptors and visual amenities.



Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.10. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.10 Potential significance of effects on landscape and visual receptors

Potential impact	Phase	Description of effect	Approach to EIA
Potential impacts on landscape character	Construction and installation; operation and maintenance	The presence of turbines and associated infrastructure may give rise to changes in landscape character, including designations and landscape character types, how they are experienced and their perceptual qualities. The proposed development has the potential to give rise to adverse effects on the landscape character within close proximity to the site and from sensitive locations further afield. Likely significance of effect uncertain	Scoped in for further assessment
Potential impact on visual receptors and visual amenities	Construction and installation; operation and maintenance	There is potential for visual impacts from the presence of turbines and associated infrastructure upon sensitive receptors, including key settlements, residential properties, transport routes, recreational routes and visitor destinations. The proposed development has the potential to give rise to adverse effects on visual amenity within close proximity to the site and from sensitive locations further afield. Likely significance of effect uncertain	Scoped in for further assessment

5.6.4 Approach to EIA

A desk study will be carried out to establish the existing conditions, including the landscape and visual resources of the study area, and initial mapping of Zones of Theoretical Visibility (ZTVs) for the proposed development components. Field survey work, initially at strategic/reconnaissance level and later at detailed level, will verify the important landscape, and visual characteristics of the area highlighted by the desk study. This will allow identification of key landscape, and visual receptors.

Baseline landscape character will be described with reference to:



- Landscape Character Types (LCTs) identified in the existing published SNH assessment reports
- Designated landscapes within the Study Area. These include National Scenic Areas (NSAs), Special Landscape Areas (SLAs), Gardens and Designed Landscapes (G&DLs)
- Wild Land Areas (WLAs)

The proposed impact assessment strategy for Landscape and Visual Amenity is outlined in Table 5.11 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 5.10.

Table 5.11 Impact assessment strategy for landscape and visual amenity

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Potential impacts on landscape character Potential impacts on landscape character	<p>A Landscape Visual Impact Assessment will be carried out for the proposed development by a chartered landscape architect. The LVIA will be produced in accordance with the third edition Guidelines for Landscape and Visual Impact Assessment (GLVIA 3) (Landscape Institute and Institute of Environmental Management and Assessment, 2013) and current best practice, including:</p> <p>Visual Representation of Wind Farms, version 2.2, (SNH, 2017);</p> <p>Siting and designing wind farms in the landscape - version 3a, (SNH, 2017);</p> <p>Landscape Character Assessment: guidance for England and Scotland published for SNH/Countryside Agency (2002);</p> <p>Orkney Local Development Plan (2017);</p> <p>OIC Energy Supplementary guidance (2017);</p> <p>SNH Orkney landscape character assessment (No. 100 1998);</p> <p>Scottish Governments Appeals report on Costa and Hesta Head wind farms – landscape review (2019)</p> <p>Assessing the Cumulative Impact of Onshore Wind Energy Developments, (SNH, 2012).</p> <p>An assessment of predicted visibility out to 45 km will be produced, and viewpoints will be selected for agreement with OIC and SNH (refer to Table 5.12 and Figure A7 and Figure A9a to A9i).</p>	Site visits will be undertaken by chartered landscape architects.	Ongoing consultation with OIC and SNH
	<p>A desk-based study will review and assess the following:</p> <ul style="list-style-type: none"> • the landscape character of the site and its surroundings; 	Up to date wind farm data from OIC planning to inform the	Ongoing consultation with OIC landscape officer and SNH



Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
	<ul style="list-style-type: none"> the visual resource of the site and its surroundings, including viewpoint assessment from the agreed viewpoints which would assess the nature and sensitivity of visual receptors; and review of the relevant national, regional and local development plan policies concerned with the protection and conservation of the landscape that apply to the study area (i.e. designations). <p>Site survey will be undertaken by a Chartered Landscape Architect to produce the following:</p> <ul style="list-style-type: none"> assessment of baseline conditions at selected viewpoints using standard professional assessment criteria; assessment of landscape character baseline conditions and identification of local landscape character types related to the Orkney Isles Landscape Character Assessment; assessment of the quality of the landscape within which the proposed development will be sited; and assessment of the potential for cumulative impacts from in-planning, consented and existing wind turbines. 	<p>cumulative assessment</p>	
<p>Potential impact on visual receptors and visual amenities</p>	<p>An assessment will be carried out on the effects of the proposed development on views and visual amenity within the study area, as experienced from:</p> <ul style="list-style-type: none"> key areas of settlement; transport routes; selected recreational routes and visitor destinations; and representative viewpoints. <p>This will focus on the distance of a significant effect on the immediate vicinity of the proposed development and at a distance.</p> <p>The requirement for a residential visual amenity assessment at properties within an identified zone of the proposed turbines (2 km radius) will be discussed with OIC.</p>	<p>Visualisations will be produced that conform to SNH visualisation standards.</p>	<p>Viewpoints for the assessment will be consulted upon with OIC and SNH and HES.</p>



Zone of theoretical visibility (ZTV) mapping and analysis has been undertaken to identify where turbines associated with the proposed development may be theoretically visible from, within a study area of 45 km and height to blade tip of 180 m. A total of nine representative viewpoints, illustrated in Figure A7 and A9a to A9i, have been selected to illustrate the range of views and viewing opportunities across the ZTV within the study area (detailed in Table 5.12). It is proposed that the LVIA will include a full assessment of the visual effects that may be experienced due to the visual presence of turbines from each of these viewpoints.

Table 5.12 Proposed viewpoints for the LVIA

VP location	VP coordinates	Figure reference
VP1 Noltland Castle	E342908 N1048722	A9a
VP2 Tofts Ness cairns	E375760, N1047214	A9b
VP3 North Stronsay	E363104, N1029085	A9c
VP4 East Rousay	E344704, N1032472	A9d
VP5 Pier at Hatston	E343761, N1012899	A9e
VP6 Mull Head	E359161, N1009601	A9f
VP7 Muckle Hill chambered cairn	E355516, N1039402	A9g
VP8 North Ronaldsay broch, settlement and coastal path	E376271, N1051446	A9h
VP9 Evie viewpoint	E334909, N1024644	A9i

5.6.5 Possible mitigation and monitoring measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on landscape and visual amenity may include:

General mitigation

- Sensitive siting, layout and design of the proposed development design, inclusive of embedded mitigation.

Questions for stakeholders

Q8	Are the viewpoints selected satisfactory, or are there any additional or alternative viewpoints that should be considered?
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5.7 TOURISM AND RECREATION

5.7.1 Introduction

This chapter describes the tourism and recreation activity on Eday and, more generally within the Orkney Islands. This includes interests that drive tourism in the local area and recreational activities. A high level description of impacts on tourism and recreation interests that may be affected by the proposed development is provided. The economic consequences of impacts on tourism and recreational activities are addressed in more detail in Section 5.1: Socio-Economics.

The potential subsequent economic effects are considered in section 5.1: Socio-Economics.

Changes to landscape and visual amenity may also indirectly impact tourists and recreational users and is addressed in section 5.6: Landscape and Visual Amenity.

5.7.2 Baseline

Tourism

The main tourism activities on Eday are bird watching, coastal walks to observe aquatic mammals and cultural heritage. This industry is a key source of employment for the residents of the island.

Recreation

There are several undesignated walking trails, some of which are around the boundary of the proposed development site, and these walking trails are in various states of accessibility with some of the coastal paths being unsafe. There is also sea kayaking that is popular around the coastline as well as sailing. There are no core paths or designated walking routes within the proposed development boundary.

5.7.3 Potential impacts

The potential impacts that the proposed development may have upon tourism and recreation during each phase include:

Construction and installation

- Disruption or severance to tourist amenity during construction works; and
- Disruption to recreational activities during construction works.

Operation and maintenance

- Tourism impacted due to presence of wind turbines
- Access improvements for recreation and public amenity

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.13. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.



Table 5.13 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Disruption or severance to tourist amenity during construction works	Construction	The main impact on tourists from the construction of the development is likely to be small scale temporary disruption to tourist amenity through inconvenience due to temporary diversions of coastal walks, and presence of construction traffic. Traffic impacts will be managed and mitigated through the dedicated traffic management plan (see section 5.4: Access, Traffic and Transport). Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Disruption to recreational activities (scrambling, walking, cycling, wildlife watching) during construction works	Construction and decommissioning	There are potential opportunities for recreational activity in the proposed development boundary which could be affected by construction activities however any disruption would be temporary and short term. Potential disruption from traffic impacts are addressed in section 5.4: Access, Traffic and Transport. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Tourism impacted due to presence of wind turbines	Operation	There is potential for tourists and visitors to Eday to be impacted due to the presence of wind turbines. There are strong feelings both for and against their installation and therefore there may be a reduction in tourism to the area. This is to be assessed further and in conjunction with the Socio-economic section and the LVIA. Likely significance of effect uncertain	Scoped in for further assessment
Access improvements for recreation and public amenity	Operation	There is potential to improve and enhance the coastal walking routes, making them safer for residents and visitors to enjoy all year round. The improved access tracks linking the turbines run adjacent to the existing undesignated trail. The proposed development would offer a more attractive option of access allowing those with mobility issues to also be able to enjoy the views from the coast. Beneficial effect likely to be significant	Scoped in for further assessment

5.7.4 Approach to EIA

The proposed impact assessment strategy for tourism and recreation is outlined in Table 5.14 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 5.13.



Table 5.14 Impact assessment strategy for tourism and recreation

Potential impact	Assessment approach	Data collection requirements	Consultation requirements
Tourism impacted due to presence of wind turbines	An assessment of Impacts to visitors and tourism on Eday as a result of the operation of the wind farm. There is no set approach for tourism impacts, however best practice recommends a review and reference to the Moffat centre report (2008) and Biggar Economics (2016).	Baseline data on the current visitation and tourism trends.	Consultation with local residents, tourist guides, Orkney Tourist Board and Visit Scotland throughout the EIA process.
Access improvements for recreation and public amenity	A detailed assessment of access improvement options will be undertaken as part of project design process.	Site walkover	

5.7.5 Possible enhancement and mitigation measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on tourism and recreation receptors may include:

General mitigation

- Transport of abnormal loads shall be scheduled to avoid peak tourist periods and popular sites wherever practicable.
- Significant construction traffic on key routes in the proximity of any recreational peak periods and events of note shall be avoided wherever practicable.

Impact specific mitigation

- Contractors shall ensure on going safe access to all key walking and cycling routes, communicate details and timing of construction activities and provide alternatives where safe and feasible. Investigate improvement of access to coastal walks and scheduled monuments within the proposed site boundary.
- Identify potential opportunities to upgrade access paths to key archaeological assets or historical features
- Improve access to coastal walks via the turbine access tracks



5.8 TELECOMMUNICATIONS

5.8.1 Introduction

The study area will consider the entirety of the Orkney island archipelago for potential fixed radio links and broadcast transmissions that may be affected by the proposed turbines. This will be guided by the outcomes of consultation with key telecommunications stakeholders Ofcom, JRC and BT (see below), who will identify specific links of concern and the extent of their protective buffer zones.

5.8.2 Baseline

There are no telecoms towers or masts located on Eday, with the closest being the digital TV and radio mast at Pierowall, Westray (E344763 N1049745) approximately 24 km to the north west, and Burgar Hill (E337777 N1010303) 25 km to the southwest, both part of the Keelylang Hill transmitter group. There are two telecom links running diagonally through the south of the proposed development site, southwest to northeast. Based on initial consultations with telecoms stakeholders, the links are expected to be BT microwave links. The links transect turbine T06, T07 and T08 directly, mitigation through consultation and design will be undertaken to resolve potential interference.

5.8.3 Potential impacts

The potential impacts that the proposed development may have upon telecommunication during each phase include:

Construction and installation

- No potential impacts are predicted for this phase.

Operation and maintenance

- Interference with microwave radio links;
- Interference with fixed-link radio links; and
- Interference with television signals.

Decommissioning

- As with construction and installation no potential impacts are predicted for this phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.15. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.15 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Interference with microwave radio links	Operation and maintenance	The presence of an operating wind turbine can degrade radio signals by reflection or blocking of the signal. Based on available information, there is uncertainty around the risk to receptors. Likely significance of effect uncertain	Scoped in for further assessment



Potential impact	Phase	Description of effect	Approach to EIA
Interference with fixed-link radio links	Operation and maintenance	Fixed link transmissions are based on point-to-point paths that occur at elevated topographical features, and are considered 'at risk' if a wind farm is directly in line or within the Fresnel Zone ⁷ around the line of sight between two transmission stations or a receiver. This may lead to degrading of the performance or even a loss of service. Based on available information, there is uncertainty around the risk to receptors. Likely significance of effect uncertain	Scoped in for further assessment
Interference with broadcast transmissions	Operation and maintenance	Terrestrial television services are provided by means of UHF radio waves which propagate from transmitters to receiving aerials which then relay the signal to a TV set. For broadcast systems, a wind farm located between a TV transmitter and receiver aerial may cause loss of picture detail, loss of colour or buzz on sound. Viewers situated to the side of a wind farm may experience a delayed image or 'ghost' on the picture, or find the picture liable to flicker as the blades rotate. Digital television (DTV) signals are more robust to interference caused by rotating blades, but their reliability can be affected if signal levels are low while Bit Error Rates (BERs) are high. In most cases a standard television aerial has the capacity to "ignore" reflected signals such that DTV reception will not be noticeably affected. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.

5.8.4 Approach to EIA

It is understood that Ofcom, BT and JRC undertake their own technical assessments to determine whether there is potential for impacts arising from the presence of wind turbines on their assets. Therefore, the position of these stakeholders and any recommendations on suitable measures to mitigate potential impacts in all cases will be acknowledged. Impacts on telecommunications links will be considered throughout the design process and the Developer will continue to consult with the operators through to final installation and operation of the site. The outcome of this consultation and an assessment of the potential impacts on links will be reported within the EIA Report. The potential impacts of each phase of the proposed development on receptors are assessed by taking into account conclusions from telecommunications stakeholders' own assessments and feedback, and using current legislative frameworks and policy guidance outlined.

The proposed impact assessment strategy for telecommunication is outlined in Table 5.16 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for those impacts identified as having the potential to result in 'likely significant effects' or those where the 'likely significance of effect is uncertain' from Table 5.15.

⁷ Fresnel zone: area in the proximity of a transmitter or receiver where the placing of obstacles will either cause phase in or phase out of phase reflections of the radio signal which can lead to distortion and interference.



Table 5.16 Impact assessment strategy for telecommunication

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Interference with microwave radio links	A detailed assessment of the potential effects on point-to-point microwave radio links will be undertaken and presented in the EIA Report.	All microwave links in the proposed development area and near vicinity will be established.	Consult with the Office for Communications (OfCom), JRC and BT about microwave links that could be affected by the proposed development.
Interference with fixed-link radio links	A detailed assessment of the potential effects on fixed-link radio links will be undertaken and presented in the EIA Report.	All fixed-link radio links in the proposed development area and near vicinity will be established.	Consult with OfCom and JRC about fixed-link radio links that could be affected by the proposed development.

5.8.5 Possible mitigation and monitoring measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on telecommunication may include:

Impact specific mitigation

- Mitigation will be identified via consultation with JRC, BT and any other telecoms assets owners.



5.9 AVIATION AND RADAR

5.9.1 Introduction

A high level assessment of the potential impacts on civil and military aviation and radars caused by the proposed development will be presented. The potential impacts of the proposed development on radio links and broadcast transmissions are addressed in section 5.8: Telecommunications.

Study Area

Due to the coverage of safeguarded radar equipment from local to regional scales, defined here as the entirety of the Orkney island archipelago, the focus of the study area for baseline characterisation and assessment of impacts will consider the Orkney region.

5.9.2 Baseline

There is a small airport, London Airport, on Eday approximately 5.5 km north of the proposed development. The airport services residents and visitors with flights connecting to the other outer islands and Orkney mainland. There are private planes that also use the airfield.

NATs online safeguarding maps have been interrogated and found to have no safeguarding areas within Orkney.

There are no known MoD or air defence radar assets in or covering the proposed development site.

Orkney, including Eday, is within Low Flying Area (LFA) 14, which covers an extensive area of mainland Scotland, the Orkney Islands, Shetland Islands and Western Isles (MoD, 2018). The LFA was ranked eighth in reported patterns of military flying across the UK in 2016/17, with 1,021 daytime hours across the entire area compared to over 2,000 hours for the top four LFAs and over 5,000 hours for the highest intensity LFA (MOD, 2018).

The Met Office has a climate station established on the northwest of the Orkney mainland, Loch of Hunderland Climate Station.

5.9.3 Potential impacts

The potential impacts that the proposed development may have upon aviation and radar during each phase include:

Construction and installation

- Collision due to physical infringements to regional flight paths.
- Vertical obstruction hazard to low flying aircraft.

Operation and maintenance

- Collision due to physical infringements to regional flight paths
- Degradation of the performance of electronic aeronautical systems at regional airports;
- Interference with radars signals from air traffic control, air defence and meteorological radars;
- Vertical obstruction hazard to low flying aircraft.



Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 5.17. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 5.17 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Collision due to physical infringements to regional flight paths	All phases	The proposed turbine heights could cause physical infringements to regional flight paths. Without mitigation, this could cause collision and affect the airport's ability to operate safely, in accordance with its licence. Likely significant effect	Scoped in for further assessment.
Vertical obstruction hazard to low flying aircraft	All phases	The proposed development area is situated within LFA 14, which covers an extensive area of Scotland. Although, this area is vast and therefore low flight manoeuvres are well distributed. Likely significance of effect uncertain	Scoped in for further assessment.
Degradation of the performance of electronic aeronautical systems at regional airports	Operation and Maintenance	Wind turbines can affect the propagation of the radiated signal from airport's navigation and communication facilities because of their physical characteristics, such as their situation and orientation in relation to the facility. The development area is situated 5.5 km from Eday airport. As a result, the performance of the airport's electronic aeronautical systems can potentially be degraded. Likely significance of effect uncertain	Scoped in for further assessment.
Interference with radars signals from air defence radars	Operation and Maintenance	Wind turbines can interfere with radar function and as such could have significant impacts on radar systems for defence or domestic purposes. Consultation is required to identify any defence radar systems. Likely significance of effect uncertain	Scoped in for further assessment



Potential impact	Phase	Description of effect	Approach to EIA
Interference with radar signals from air traffic control	Operation and Maintenance	Turbine towers may cause physical blanking and diffracting effects on secondary surveillance radar (SSRs) depending on the size and proximity of the wind farm. There is a potential for reflection and shadowing of radar signals from air traffic control. Following a search on the NATS assets data sets, it has been established that there are no NATs or NERL radar systems within Orkney. Local airport radar has not been assessed to date and will require further consultation with HIAL. Likely significance of effect uncertain	Scoped in for further assessment
Interference with radar signals from meteorological radars	Operation and Maintenance	Consultation was undertaken with the Met Office to determine whether there is a Met radar system within range of the proposed development site, and to what extent they foresee potential impacts. The resulting consultation confirmed there were no Met Office radar or monitoring assets within range and that no further action or consultation was required - Email correspondence from T. Allott, Met Office, 18/10/2019. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further

5.9.4 Approach to EIA

A desk-based review will be used to characterise the baseline characteristics for radar receptors. This will include the various origins, radii and scanning heights over which coverage is considered important and critical.

The proposed impact assessment strategy for aviation and radar is outlined in Table 5.18 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for those impacts identified as having the potential to result in 'likely significant effects' or those where the 'likely significance of effect is uncertain' from Table 5.17.

Table 5.18 Impact assessment strategy for aviation and radar

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Collision due to physical infringements to regional flight paths	A detailed assessment of the potential effects on flight paths will be undertaken and presented in the EIA Report.	No surveys are considered necessary	Consult with Eday's London Airport, HIAL and Civil Aviation Authority (CAA) about airports that could be affected by the proposed development.
Vertical obstruction hazard to low flying aircraft	A detailed assessment of the potential effects on low flight training exercises will be undertaken and presented in the EIA Report.	MoD flight zone maps	MoD



Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Degradation of the performance of electronic aeronautical systems at regional airports	A detailed assessment of the potential effects on the performance of electronic aeronautical systems at nearby airports will be undertaken and presented in the EIA Report.	response to turbine locations via consultation with relevant stakeholders	Consult with Eday's London Airport, HIAL, CAA and NATS about airports that could be affected by the proposed development.
Interference with radars signals from air defence radars	A detailed assessment of the potential effects on the performance of air defence radar systems at nearby airports will be undertaken and presented in the EIA Report.	Radar assets confirmed by MoD via email form and response.	Consult with Defence Infrastructure Organisation (Ministry of Defence Safeguarding) about radars that could be affected
Interference with radar signals from air traffic control	Consultation with HIAL to establish any potential interference and proposed mitigation	None	Consultation with HIAL, Kirkwall airport and London airport

5.9.5 Possible mitigation and monitoring measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on aviation and radar may include:

- There is a CAA requirement in the UK for all structures over 300 ft high to be charted on civil aviation maps and documentation (the MoD uses a lower threshold height). Consequently, the developer will be required to provide details of the proposed development to the Defence Geographic Centre (DGC) at least ten weeks prior to construction, including location, accurate maximum heights, lighting status and estimated timeline of construction and decommissioning;
- Aviation stakeholders will be made aware of the turbines through the issue of a Notice to Airmen (NOTAM) at least 14 days prior to starting construction; and

There is expected to be a requirement for aviation warning lights to be fitted to turbines, which will be determined upon consultation with the HIAL, CAA and MOD;



6 ECOLOGICAL ENVIRONMENT

6.1 ORNITHOLOGY

6.1.1 Introduction

This chapter describes the ornithological environment including any internationally, nationally or locally designated sites and protected species of the wider countryside (Figure A14). A high level description of potential impacts on ornithological interests that may be affected by the proposed development is provided. Reference should be made to Section 6.2: Terrestrial and Coastal Ecology for a description of terrestrial habitats within the proposed development area.

The findings of survey work undertaken to date has been used to inform the baseline and the identification of potential likely significant effects. A summary of consultation responses provided by Scottish Natural Heritage (SNH) to date is also presented (see Table 6.2).

6.1.2 Field surveys

A comprehensive programme of bird surveys at the proposed development site commenced in late March 2019 (Table 6.1). These surveys are currently ongoing and are due to continue until August 2020 (inclusive). This will provide data for two complete breeding seasons and one complete non-breeding season. Further consultation with SNH will be required to determine the need for a second year of non-breeding season surveys (see Table 6.2).

The aim of the bird surveys is to gather data on the distribution of birds and flight activity across the site to inform the baseline and to determine which species require consideration in the EIA. The proposed survey scope was sent to SNH prior to the surveys commencing and the feedback received from SNH was used to amend the survey scope to ensure that it met their requirements (see Table 6.2).

Table 6.1 Scope of work for bird surveys undertaken to date and ongoing

Survey type	Season of interest	Status	Details
Vantage point (VP) surveys	Breeding	First year complete. Second year will be undertaken April – August 2020.	Four VPs used initially from late March to early May 2019 with six hours of observation per VP per month. From late May onwards, three VPs were used. Six hours per VP in late May, 12 hours per VP per month from June to August, six hours per VP in early September. Overall total 58 hours of observation per VP during the breeding season (April to early September).
Moorland breeding birds	Breeding	First year complete. Second year will be undertaken for the 2020 breeding season.	Adapted Brown & Shepherd (1993) method with four visits covering out to 500 m including the shoreline area.
Breeding skua surveys	Breeding	First year complete. Second year will be undertaken for the 2020 breeding season.	Survey area covered all moorland habitat on the south of the island. Three visits undertaken (late May, early June and late June). A further two follow-up visits were carried out in July/August to check productivity.
Breeding raptor surveys	Breeding	First year complete. Second year will be undertaken for the 2020 breeding season.	Up to four visits carried out covering the area out to 2 km.
Vantage point surveys	Non-breeding	Ongoing	Six hours per VP per month (September 2019 to March 2020).



Survey type	Season of interest	Status	Details
Hen harrier roost surveys	Non-breeding	Ongoing	Monthly visits from October 2019 to March 2020, covering out to 2 km.
Winter shorebirds and seafowl	Non-breeding	Ongoing	Monthly counts of wintering shorebirds and offshore seafowl out to a distance of 500 m offshore.

6.1.3 Stakeholder consultation

A summary of the key points raised by SNH during pre-scoping consultations is provided in Table 6.2.

Table 6.2 Consultation responses received from SNH

Date/nature of consultation	Topic	Comment	Response/Action
10 th April 2019 SNH response to proposed bird survey scope for first year of bird surveys	Survey area boundaries	The survey scope identifies two potential survey area boundaries. As per SNH guidance, the area of the wind farm plus a surrounding buffer of 500 m should be the principal survey area. There may be an opportunity to exclude some habitat near houses to the east.	Noted.
	Whimbrel	Whimbrel should also be targeted during skua surveys.	Noted.
	Peregrine	SNH recommend a minimum 500 m disturbance distance for peregrine. The location of any nest site should be identified and the breeding activity assessed.	Noted.
	VP surveys	36 hours of survey per VP location is proposed during the breeding season (April to August). This is the minimum requirement, the level of survey effort should be in proportion with the nature of the site and the species involved. It is possible that further survey effort may be necessary.	Noted. Survey effort was increased from 6 hours per VP per month to 12 hours per VP per month from late May to August (providing a total of 54 hours per VP for the breeding season).
	Breeding skua surveys	The survey scope identifies three potential boundary options for the additional skua surveys. SNH's preference was for option 3 (the area covering all of the south of Eday) to gather data that would allow an assessment of the total breeding skua population	Noted. Option 3 was surveyed.
9 th October 2019 SNH response to presentation of interim breeding bird survey findings	Duration of bird surveys	Two years of breeding bird surveys will be required due to the level of bird activity on the site. SNH can advise on the need for a second year of winter survey once data up to March 2020 have been collected.	Noted.
	Cumulative risk	Cumulative impacts, especially for peregrine, hen harrier and Arctic skua should be considered.	Noted.
	Collision risk modelling outputs	Collision risk modelling outputs will be required to assess the feasibility of the proposed turbine layout.	Noted. Collision risk modelling will be undertaken based on the first year of breeding season VP data to investigate the suitability of the proposed turbine layout.



6.1.4 Baseline

Habitat

The proposed development site is located on the lands of Greentoft Farm in the southwest of the island of Eday. It is a coastal site comprising an area of heather moorland around Ward Hill, which lies at the centre of the site, and agricultural fields to the east and southeast of Ward Hill currently used for grazing and silage. At the southern tip of the island, there is an area of rough grassland with neutral flushes present.

Natural heritage designations

A search of publically available digital datasets indicates that there are a number of natural heritage designations with ornithological interests within 10 km of the proposed development site. Those sites considered relevant to the proposed development are listed in Table 6.3 and shown on Figure A14.

Table 6.3 Natural heritage designations with ornithological interests within 10 km of the proposed development

Site name	Designation	Distance from Proposed development (km)	Ornithological interests
Doomy and Whitemaw Hill	SSSI	0	Arctic skua (breeding); Whimbrel (breeding).
Ward Hill and Chapel Hill	LNCS	0	Arctic tern; Arctic skua; great skua; golden plover; lapwing; curlew; snipe; skylark and twite (breeding).
North Orkney	pSPA	2.7	Aggregations of breeding red-throated diver <i>Gavia stellata</i> . Aggregations of wintering birds: great northern diver <i>Gavia immer</i> ; Slavonian grebe <i>Podiceps auritus</i> ; common eider <i>Somateria mollissima</i> ; long-tailed duck <i>Clangula hyemalis</i> ; velvet scoter <i>Melanitta fusca</i> ; red-breasted merganser <i>Mergus serrator</i> and European shag <i>Phalacrocorax aristotelis</i> .
Orkney Inshore Waters	pSPA	2.7	Aggregations of breeding red-throated diver <i>Gavia stellata</i> . Aggregations of wintering birds: great northern diver <i>Gavia immer</i> ; black-throated diver <i>Gavia arctica</i> ; Slavonian grebe <i>Podiceps auritus</i> ; common eider <i>Somateria mollissima</i> ; long-tailed duck <i>Clangula hyemalis</i> ; velvet scoter <i>Melanitta fusca</i> ; Common goldeneye <i>Bucephala clangula</i> ; red-breasted merganser <i>Mergus serrator</i> and European shag <i>Phalacrocorax aristotelis</i> .
Calf of Eday	SSSI	4.5	Cormorant (breeding)
Calf of Eday	SPA	5.5	Cormorant <i>Phalacrocorax carbo</i> ; great black-backed gull; northern fulmar <i>Fulmarus glacialis</i> ; black-legged kittiwake <i>Rissa tridactyla</i> ; common guillemot <i>Uria aalge</i> and breeding seabird assemblage (breeding)
Rousay	SPA	7.5	Arctic skua; Arctic tern; northern fulmar, common guillemot; black-legged kittiwake and breeding seabird assemblage (breeding).
Rousay	SSSI	9.4	Arctic skua; Arctic tern; common guillemot; black-legged kittiwake and breeding bird assemblage (breeding).



The proposed development site overlaps with the southern part of Doomy and Whitemaw Hill Site of Special Scientific Interest (SSSI), a nationally important site designated for breeding populations of Arctic skua *Stercorarius parasiticus* and whimbrel *Numenius phaeopus* (see Figure A14). This SSSI continues to hold a breeding population of Arctic skua however no whimbrels have been recorded breeding at this site for many years (none were recorded in 2003) (SNH, 2010).

The proposed development site also overlaps with Ward Hill and Chapel Hill Local Nature Conservation Site (LNCS) designated for ornithological and botanical interests (see Figure A14). This site is important for breeding birds including a number of waders (golden plover *Pluvialis apricaria*, curlew *Numenius arquata*, lapwing *Vanellus vanellus* and snipe *Gallinago gallinago*), Arctic skua, great skua *Stercorarius skua*, Arctic tern *Sterna paradisaea* and passerines such as skylark *Alauda arvensis* and twite *Carduelis flavirostris*. Important habitats located within the proposed development site include upland heath (see Section 6.2.2).

North Orkney proposed Special Protection Area (pSPA) is located 2.7 km to the west of the proposed development site. Orkney Inshore Waters pSPA (currently at the consultation stage), is an alternative option for designation, which combines North Orkney pSPA and Scapa Flow pSPA into a single site. These pSPAs provide important foraging habitat for breeding red-throated diver *Gavia stellata* and important wintering grounds used by aggregations of non-breeding waterfowl including divers, grebes and seaducks.

Calf of Eday Special Protection Area (SPA) is located 5.5 km to the northeast and Rousay SPA is 7.5 km to the west of the proposed development site. The breeding seabird interests of these sites would not be expected to fly over the proposed development site, as they are primarily marine species restricted to the breeding cliffs; the only SPA qualifying features that could potentially be present at the proposed development site are great black-backed gull *Larus marinus* and Arctic skua.

Summary of breeding season findings

A preliminary review of data from the first year of breeding season surveys indicates that the proposed development site and surrounding area is of value to a number of important ornithological receptors.

Breeding sites

A summary of the breeding birds recorded during the 2019 breeding season surveys is shown in Table 6.4. No whimbrel were recorded during any of the surveys.

Table 6.4 Summary of breeding season survey findings

Species	Conservation status ⁸	Number recorded breeding within the survey area	Notes
Hen harrier	WCA Schedule 1; EU Birds Directive Annex 1; BoCC4 Red List	4 nests	Three successful breeding attempts with six young fledged. One failed breeding attempt.
Peregrine	WCA Schedule 1; EU Birds Directive Annex 1	1 pair	Successful breeding attempt. Two fledged young.
Red-throated diver	WCA Schedule 1; EU Birds Directive Annex 1	1 pair	An unsuccessful breeding attempt, pair failed before eggs hatched.

⁸ Wildlife and Countryside Act (1981) Schedule 1 species; EU Birds Directive Annex 1 species; Birds of Conservation Concern 4 Red List species (Eaton et al, 2015).



Species	Conservation status ⁸	Number recorded breeding within the survey area	Notes
Short-eared owl	EU Birds Directive Annex 1	One confirmed nest and 7 other territories	One nest was found from which young successfully fledged. A fledged young from another nest was found predated.
Arctic skua	Notified feature of Doomy and Whitemaw Hill SSSI; Listed feature of Ward Hill and Chapel Hill LNCS; BoCC4 Red List	34 apparently occupied territories (AOTs)	18 AOTs were located within the proposed development site boundary. 15 AOTs were located within the SSSI boundary. Two AOTs were within the small area of the proposed development site that overlaps with the SSSI. Three AOTs were outwith both the proposed development site and SSSI boundaries. 24 fledged young from 22 AOTs.
Great skua	Listed feature of Ward Hill and Chapel Hill LNCS	56 apparently occupied territories (AOTs)	20 AOTs were located within the proposed development site boundary. 23 AOTs were located within the SSSI boundary. Two AOTs were within the small area of the proposed development site that overlaps with the SSSI. Fifteen AOTs were outwith both the proposed development site and SSSI boundaries. Only 11 young successfully fledged.
Golden plover	EU Birds Directive Annex 1; Listed feature of Ward Hill and Chapel Hill LNCS	9 pairs	Three pairs within the proposed development site.
Curlew	Listed feature of Ward Hill and Chapel Hill LNCS; BoCC4 Red List	15 pairs	Twelve pairs within the proposed development site.
Snipe	Listed feature of Ward Hill and Chapel Hill LNCS	Minimum of 24 pairs	Eighteen pairs within the proposed development site.
Dunlin	n/a	Birds seen in four locations	Three within the proposed development site.
Redshank	n/a	7 pairs	All within the proposed development site.
Great black-backed gull	Calf of Eday SPA qualifying interest	14 pairs	Three pairs located within the proposed development site.
Herring gull	BoCC4 Red List	23 pairs	Mostly in a mixed colony to the northeast of the proposed development site with three pairs within the proposed development site along the western coast.
Lesser black-backed gull	n/a	21 pairs	Mostly in a mixed colony to the northeast of the proposed development site. None within the proposed development site.
Common gull	n/a	146 pairs	One large colony (110 pairs) to the northeast of the proposed development site. Twenty four pairs within the proposed development site.



VP flight lines

Information on bird flight activity during the breeding season was collected during timed watches from the selected VPs in accordance with SNH guidance (SNH, 2017). The main objective of these surveys was to quantify the levels of flight activity and types of flight behaviour of species, particularly those of conservation importance, within the survey area. Flying elevation was classified into six recording height bands: <20 m; 20 – 50 m; 50 – 100 m; 100 – 150 m; 150 – 200 m and >200 m, with the four height bands between 20 m and 200 m considered 'at-risk' height. Six primary target species were recorded during the breeding season at risk height, these were:

- red-throated diver;
- hen harrier;
- short-eared owl;
- peregrine;
- merlin *Falco columbarius*; and,
- white-tailed eagle *Haliaeetus albicilla*.

An alternative snapshot count recording method was implemented to record flight activity by Arctic skua, great skua, great black-backed gull and golden plover. Snapshot counts were undertaken at the end of each 5-minute interval (except when a primary target species was being followed). During each snapshot count, the number of each species flying at risk height within pre-defined recording zones was recorded during one or two relatively rapid sweeps across the viewing arc. Individual birds were counted only once and allocated to the at-risk height band within the recording zone in which they were first detected. Three recording zones at each VP were used. The snapshot counts give a sample of the density of birds flying at risk height within each recording zone, which can be converted to flight distance using an average flight speed and extrapolated across the breeding season.

Non-breeding season interests

Bird interest across the site during the non-breeding season is likely to be limited to raptor activity with foraging hen harrier, peregrine and short-eared owl likely to be present. A hen harrier roost was located during the preliminary walkover survey in March 2019. A survey will be undertaken during the non-breeding season (October 2019 to March 2020) to locate any hen harrier roosts within 2 km.

6.1.5 Potential impacts

The potential impacts that the proposed development may have on ornithology receptors have been identified for each phase of the proposed development (construction, operation and maintenance and decommissioning); these are:

Construction

- Direct loss or degradation of habitat through construction of wind farm infrastructure
- Disturbance (noise and visual) due to construction activities

Operation and maintenance

- Displacement due to avoidance of the turbines
- Mortality due to collision with operating turbine blades



Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance are presented in Table 6.5. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA will be those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 6.5 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Direct loss or degradation of habitat through construction of wind farm infrastructure	Construction	The construction of the wind farm will result in land-take to enable access roads, turbine foundations and ancillary infrastructure to be built. The footprint of the development may result in the direct loss or degradation of breeding, foraging or roosting habitat. Likely significance of effect uncertain	Scoped in for further assessment.
Disturbance (noise and visual) due to construction (and decommissioning) activities	Construction; Decommissioning	During construction and decommissioning of the wind farm there will be noise and visual disturbance associated with the works. Construction activities may result in potential disturbance to breeding, foraging or roosting birds. Construction and decommissioning activities will be of limited duration and any disturbance effects will be temporary. The findings of the bird surveys will determine which species are present and to inform placement and routing of infrastructure to minimise effects. Likely significance of effect uncertain	Scoped in for further assessment.
Displacement due to avoidance of the turbines	Operation and maintenance	The presence and operation of the wind farm and associated maintenance activities may result in the indirect loss of habitat through displacement of breeding, foraging or roosting birds within the surrounding area if birds avoid the area due to the physical presence of proposed development infrastructure and maintenance activities. Displacement can include barrier effects in which birds are deterred from using their normal routes to feeding or roosting grounds. Likely significance of effect uncertain	Scoped in for further assessment.



Potential impact	Phase	Description of effect	Approach to EIA
Mortality due to collision with operating turbine blades	Operation and maintenance	Birds that collide with a turbine blade are likely to be killed or fatally injured. The frequency of collision with turbines is assumed to be dependent on the amount of flight activity across the site and the ability of birds to detect the rotating blades and take avoidance action. Increased mortality rates from collision with turbines could potentially affect the maintenance of bird populations, particularly for species that are otherwise experiencing poor reproductive or survival levels due to other factors e.g. food availability. Likely significance of effect uncertain	Scoped in for further assessment.

6.1.6 Approach to EIA

The proposed impact assessment strategy for ornithology is outlined in Table 6.6 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 6.5

It should be noted that information to inform Habitats Regulations Appraisal (HRA) for SPAs considered relevant to the proposals will be presented in an HRA report and submitted with the EIA and full planning application.

Table 6.6 Impact assessment strategy for ornithology

Potential impact	Assessment approach	Data collection requirements	Consultation requirements
Direct loss or degradation of habitat through construction of wind farm infrastructure	A desk-based study of available data will be carried out to gather existing and historical data for the proposed development site and wider ecological study area up to 2 km from the site boundary (the zone of influence). The desk-study will seek to identify existing data from statutory and non-statutory organisations such as Orkney Raptor Study Group which, if available, will be used to supplement the findings of the surveys currently ongoing. The findings of the bird surveys will be used to inform the baseline with full details of the methodologies and findings presented within a technical report. The findings of the bird surveys will inform site layout and placement of proposed development infrastructure to avoid and minimise effects where possible. A detailed assessment of the potential effects of the direct loss or degradation of habitat for important ornithological receptors will be undertaken in accordance with CIEEM, (2018) guidance.	Breeding and non-breeding season surveys are currently ongoing (see Table 6.1).	Further consultation will be undertaken with SNH, if required, regarding the findings of the ongoing surveys and the scope of the second year of surveys.
Disturbance (noise and visual) due to construction activities	A detailed assessment of the potential effects of disturbance (noise and visual) due to construction activities on important ornithological receptors will be undertaken in accordance with CIEEM (2018) guidance. A desk-based study will be undertaken (as above).		Further consultation will be undertaken with SNH, if required, regarding the findings of the



Potential impact	Assessment approach	Data collection requirements	Consultation requirements
	<p>Two years of breeding bird survey data will be required to allow for variation in locations of breeding sites between years. The hen harrier roost survey will provide data on any roosts present in the area. The findings of the bird surveys will inform site layout and placement of proposed development infrastructure to avoid and minimise effects where possible.</p> <p>Mitigation will be required to avoid disturbance to breeding birds and any roosting hen harriers present.</p> <p>A detailed assessment of the potential effects of disturbance (noise and visual) on breeding birds (see Table 6.4) and roosting hen harriers due to construction activities will be undertaken and presented in the EIA.</p>		<p>ongoing surveys and the scope of the second year of surveys.</p> <p>Consultation with SNH will be undertaken regarding possible mitigation measures.</p>
<p>Displacement due to avoidance of the turbines</p>	<p>A detailed assessment of the potential effects of displacement due to avoidance of the turbines on important ornithological receptors will be undertaken in accordance with CIEEM (2018) guidance.</p> <p>Displacement of breeding, foraging and roosting birds will be assessed.</p>		<p>Further consultation will be undertaken with SNH, if required, regarding the findings of the ongoing surveys and the scope of the second year of surveys.</p>
<p>Mortality due to collision with operating turbine blades</p>	<p>Collision risk calculations will be carried out in accordance with SNH guidance (SNH, 2000).</p> <p>Collision risk calculations will be carried out for primary target species recorded flying at risk height through the wind farm area. Snapshot count data will be used to estimate collision risk for secondary species. For the 2019 breeding season, collision risk calculations will be undertaken for four primary target species (red-throated diver; hen harrier; short-eared owl and peregrine) and four secondary species (Arctic skua, great skua, golden plover and great black-backed gull). The level of flight activity observed at risk height for merlin and white-tailed eagle was considerably lower and unlikely to be significant, so collision risk calculations are not considered necessary.</p> <p>The impacts of the wind farm will be assessed at the relevant scale for each species population e.g. the designated site population where relevant, or at the regional scale i.e. the Natural Heritage Zone (NHZ) population.</p> <p>An assessment of cumulative effects will consider the cumulative effects of mortality due to collision risk. No other cumulative effects are anticipated.</p>		<p>Preliminary collision risk calculations will be undertaken based on the first year of breeding season data. Consultation will be undertaken with SNH to discuss these interim findings and to determine the relevant species population.</p>



The potential effects of the proposed development will also be considered cumulatively and in-combination with other operational, consented or within planning developments. Cumulative impacts will be assessed following SNH guidance (SNH, 2018).

6.1.7 Possible mitigation and monitoring measures

If it is considered that mitigation is necessary to reduce any adverse environmental effects on bird populations, mitigation will be proposed in the EIA Report to reduce the significance of these effects to an acceptable level. During the proposed development design process, mitigation measures will seek to follow the recognised hierarchy of avoidance, reduction, enhancement and compensation.

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for significant effects on ornithological receptors may include:

- A suitably experienced Ecological Clerk of works (ECoW) will be appointed to ensure compliance with ecological good practice measures during the construction and decommissioning phases (and during the operational phase, should any significant maintenance works be required).
- An outline Construction Environmental Management Plan (CEMP) will accompany the EIA Report and form part of the embedded development design. The CEMP will comprise methods and works that are established and effective measures to which the Developer will be committed through the development consent. Measures in order to protect ornithology will be outlined in the CEMP and will be based on good construction practice.
- The site CEMP would include an Ecological Management Plan and a Post Construction Restoration Plan to help safeguard and where practical enhance biodiversity interests. The plans would include measures to ensure that habitats are protected and restored.

Questions for Stakeholders	
Q9	Based on the breeding bird survey findings, a turbine layout has been selected that as far as possible avoids locating turbines within 500 m disturbance buffers around raptor and diver breeding sites and 300 m buffers around skua breeding sites. Do you have any concerns with this layout?
Q10	Vantage point flight line data for the period 27th March 2019 to late July 2019 have been digitised. Some flight lines at risk height have been recorded for red-throated diver, hen harrier, peregrine and short-eared owl. Snapshot scan data have been gathered for Arctic skua and great skua. Collision risk assessment will be carried out for all of these species. Are there any concerns with the layout option provided?
Q11	SNH was carrying out a skua census in Orkney this year. Would it possible to make these data available to us to provide an estimate of the current Orkney arctic skua and great skua populations?



6.2 TERRESTRIAL AND COASTAL ECOLOGY

6.2.1 Introduction

This chapter considers the non-avian terrestrial and coastal ecology environment including any locally, nationally or internationally designated sites and protected habitats and species (Figure A13). A brief overview of the habitat types within the proposed development boundary together with a description of sensitive terrestrial ecological receptors that may be present occurring within or within close proximity to the site is provided. A high level description of potential impacts on terrestrial ecological interests that may be affected by the proposed development is provided.

Ornithological interests are considered separately in Section 6.1: Ornithology. Further information on the importance of peatland habitat and groundwater dependent terrestrial ecosystems (GWDTEs) is provided in section 7.1: Hydrology, Geology and Soils.

6.2.2 Baseline

Natural heritage designations

A search of publically available digital datasets indicates that there are a number of natural heritage designations with ecological interests within 10 km of the proposed development site. These are listed in Table 6.7 and shown on Figure A13.

Table 6.7 Natural heritage designations with ecological interests within 10 km of proposed development

Site name	Designation	Distance from Proposed development (km)	Ecological interests
Ward Hill and Chapel Hill	Local Nature Conservation Site (LNCS)	0	Upland heath; crowberry heath; blanket bog
Muckle and Little Green Holm	Site of Special Scientific Interest (SSSI_)	2.1	Grey seal <i>Halichoerus grypus</i>
Faray and Holm of Faray	Special Area of Conservation (SAC)	3.5	Grey seal
Faray and Holm of Faray	SSSI	4.2	Grey seal

The proposed development site overlaps with Ward Hill and Chapel Hill LNCS which lists upland heath, crowberry heath and blanket bog as special habitats.

There are no other natural heritage designations with terrestrial or coastal ecological interests within proximity of the proposed development. In the coastal environment, there are a number of sites in the wider vicinity designated for grey seal *Halichoerus grypus*, the nearest of which are Muckle and Little Green Holm SSSI and Faray and Holm of Faray SAC and SSSI, however there is no pathway for disruption to these colonies or identified potential for impacts. These sites will therefore not be considered further.

There are also coastal features in the area that are recognised for their geological interest and importance (see Section 7.1: Geology and Soils). These features are also unlikely to be affected by the proposed development and therefore have been scoped out for any further assessment.



Fauna

Otter

Otter is classed as a European Protected Species (EPS) under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Otter are widespread throughout Orkney, commonly found along watercourses and in the nearshore and coastal environments. As the proposed development site is a coastal site on the west coast of Eday, it is likely that otter are present around the coastline and along any watercourses, drains or ditches within the site. A search of NBN Gateway (NBN Gateway, 2019) found five records of otter within the proposed development site from November 2013 and February, March and June 2014. An otter holt was found within the proposed development boundary during a bird survey in March 2019.

Seals

Both grey seal and harbour (common) seal *Phoca vitulina* are present in Orkney waters and may be present around the coast of Eday. There are a number of designated haul-out sites for seals within 10 km of the proposed development area (see Figure A13) however, there are no designated seal haul-outs around the coast of Eday where the proposed development is located. Seals, and designated seal haul out sites, will therefore be scoped out of the EIA.

Bats

There are no recorded bat sightings on Eday (Orkney Bat Group, 2019)⁹. A search of the NBN Gateway found no records of bats on Eday (NBN Gateway, 2019). The proposed development area has no suitable buildings or trees that could be used as roosting sites. Additionally, open moorland and heathland habitats are considered to be generally poor habitat for bats with limited opportunity for foraging (JNCC, 2001) therefore bats will be scoped out of the EIA.

Flora and habitats

The proposed development site largely covers areas of improved pasture, rough grazing and heather moorland. The proposed development infrastructure will be limited to areas within rough grazing and improved pasture with a dedication to avoiding heather moorland where peat may be present.

Based on available habitat data for the Ward Hill and Chapel Hill LNCS, the predominant habitat type within the area that overlaps with the proposed development site is dry heath with patches of dry modified bog, wet heath and unimproved and semi-improved grassland (OIC, 2017). There is no blanket bog habitat within the proposed development boundary (OIC, 2017).

The south end of the proposed development area is outwith the LNCS therefore there is no habitat data available. A number of natural upwellings or flushes were noted during a bird survey in March 2019 therefore further surveys will be required to determine if there are GWDEs present. GWDEs are discussed within section 7.1 Hydrology, Geology and Soils

6.2.3 Potential impacts

The potential impacts that the proposed development may have on terrestrial and coastal ecological receptors during each phase include:

Construction and installation

- Loss or degradation of habitat; and,

⁹ Aquatera correspondence with Orkney Bat Group 31/10/2019



- Disturbance, displacement, injury or mortality of otter.

Operation and maintenance

- Disturbance, displacement, injury or mortality of otter.

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 6.8. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA will be those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 6.8 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Loss or degradation of habitat	Construction and decommissioning	The construction of the wind farm will result in land-take to enable access roads, turbine foundations and ancillary infrastructure to be built. The footprint of the development may result in the direct loss or degradation of habitat including potential GWTDEs. There is no connectivity with designated sites. Likely significance of effect uncertain.	Scoped in for further assessment.
Disturbance, displacement, injury or mortality of otter	All phases	Disturbance, displacement, injury or mortality to otter or damage to their holts. The level of disturbance will depend upon the presence of otter holts in the study area and the length of the construction phase. Likely significance of effect uncertain.	Scoped in for further assessment.

6.2.4 Approach to EIA

The proposed impact assessment strategy for coastal and terrestrial ecology is outlined in Table 6.9 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 6.8.



Table 6.9 Impact assessment strategy for terrestrial ecology

Potential impact	Assessment approach	Data collection requirements	Consultation requirements
Loss or degradation of habitat	<p>The baseline terrestrial habitat, including any sensitive features such as GWDTE will be characterised.</p> <p>Reference will be made to geology, soils and hydrology studies for GWDTE and peatland systems.</p> <p>A detailed assessment of the potential effects on sensitive and protected habitats will be undertaken with a focus on measures to avoid or mitigate impacts, following industry best practice guidance including Guidelines For Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018).</p>	<p>The requirement for a Phase 1 Habitat survey will be considered and discussed with consultees. Any requirements for NVC would focus on sensitive features only i.e. conducted in areas where infrastructure is proposed and GWDTEs present, which will then be mapped and assessed in accordance with Appendix 3 of SEPA's guidance note 31: <i>Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems</i>. Efforts will be made to avoid siting of infrastructure in highly sensitive areas.</p>	<p>Further consultation with SNH, OIC Ecologist and SEPA to confirm data collection and assessment requirements.</p>
Disturbance, displacement, injury or mortality of otter	<p>A detailed assessment of the potential effects on otter and their habitat will be undertaken with a focus on measures to avoid or mitigate impacts, following industry best practice guidance including Guidelines For Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018).</p>	<p>An otter survey will be undertaken covering all suitable habitat within the proposed development area. This will cover coastal habitat (extending to 100m inland from mean high water mark) and any watercourses or drainage ditches within the site boundary and at least 250m beyond the site boundary.</p> <p>Furthermore, a pre-construction otter survey will also be undertaken to identify potential holts, the positive identification of which may require remedial action.</p>	<p>Further consultation with SNH to ensure the approach to assessment is considered appropriate, to agree mitigation measures and any requirement for a European Protected Species licence.</p>

6.2.5 Possible mitigation measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on terrestrial and coastal ecology receptors may include:



General mitigation

- A site Construction Environmental Management Plan (CEMP) will include an Ecological Management Plan and a Post Construction Restoration Plan to help safeguard, and where practical, enhance biodiversity interests. The plans would include measures to ensure that habitats are protected and restored.
- Ground disturbance will be minimised during turbine, access track and other ancillary construction work, by for example, removing spoil progressively with operations and avoiding heap creation.
- All power and cabling on site from and between the wind turbines would be buried in trenches located adjacent to the internal access track where possible in order to minimise ground disturbance. Cabling routes would avoid any areas of ecological interest.
- Reinstatement of vegetation will be focused on natural regeneration utilising vegetated turves or soils stripped and stored with their intrinsic seed bank. Turfs will be re-laid after cable installation and backfilled to achieve rapid restoration.

Impact specific mitigation

Loss of habitat

- Micro-siting of proposed development infrastructure to avoid sensitive habitats

Displacement, disturbance, injury or mortality of otter

- A Species Protection Plan will be prepared to address any potential impacts to otter during construction and operational phases of the proposed development. This will include details of best practice measures that will be implemented to ensure any impacts are avoided or minimised, including for example; mammal exit ramps for potential hazards such as steep-sided exposed trenches or holes where appropriate, and temporarily exposed pipe systems would be capped when contractors are off site to prevent otters from gaining access.



7 PHYSICAL ENVIRONMENT

7.1 HYDROLOGY, GEOLOGY AND SOILS

7.1.1 Introduction

This chapter describes the hydrological and geological baseline conditions within the development boundary including hydrogeology, surface water drainage and water quality; and geological formations and superficial geology, including soils and peat. A high level description of potential impacts on hydrological and geological features that may be affected by the proposed development is provided.

7.1.2 Baseline

Study Area

The study is restricted to within the proposed development site boundary. The site is currently used for agricultural purposes as noted in section 5.2 Land Use. Historically, there has been oil storage in relation to WWII activities within the proposed development site. The oil containers have since been removed; however, it is possible that there will be residual contamination from leaks and spills contained within the soils.

Designated sites

There is a Local Nature Conservation Site designated for geological features, Newbigging to Neven Point- Index 162, designated due to the Eday Sandstones, Eday Flags and Middle Eday Sandstone in folded 'Syncline' formations. This designated geological area runs adjacent north to south along the north-western boundary of the proposed development site where turbine T1 is located.

There are no known protected areas within or adjacent to the proposed development site that are dependent on hydrological connectivity.

Solid geology, superficial geology and peat

Eday is a low lying island with rocky coastlines, high water lines and coastal grasslands. The geology is comprised of improved grassland and rough grazing over superficial deposits of till with bedrock of Middle Old Red Sandstone (undifferentiated) - conglomerate, sandstone, siltstone and mudstone to the south of the site and Lower Eday Sandstone Formation to the north and west of the site. There is a Sacquoy Sandstone Member formation which slices into the Middle Old Red sandstone formations midway up the western edge of the site cutting diagonally through to the east side.

The proposed development site is largely covered with peat, with the exception of the southern point which is semi improved grassland and coastal grasslands, mainly used for livestock grazing and hay/haylage cutting. The main areas of peat cover Ward Hill, with the quality and depth increasing from the low lying fringes to the summit. Areas which may be impacted by development, are along the fringes where any peat is likely to be poor quality, shallow, sandy acrotelm. These areas are around the proposed locations for turbine T1 and turbine T8, along with some stretches of access tracks. Where possible, access infrastructure will be limited to existing historic tracks and areas where peat cutting has occurred to expose bedrock so as not to remove or disturb quality peat habitat. All areas of deep and good quality peat will be avoided.



Hydrological features

There are no open hydrological features within the development site. To the north of the site boundary, there is an inverse crag formation leading west towards the shore where a land drain has been connected. To the south, where sections of flushes are located there are no open ponds or pools, although the ground is moist and bog-like in places.

Groundwater

The proposed development site is situated within an area with a locally important and moderately productive aquifer with a low groundwater yield which feeds the private water supplies. The groundwaters are not listed as protected or vulnerable areas (SEPA flood risk maps).

Flood Risk

There are no known surface water flood risks within the proposed development site (SEPA flood risk map). There may be some low risk of coastal erosion and coastal flooding, however the levels of SEPA predicted risk are outwith any infrastructure related to the proposed development. It is proposed that flood risk is scoped out of the EIA.

GWDTEs

In the southern area of the proposed development site, there are four sections of flushes where there are likely to be hydrologically connected groundwater dependent terrestrial ecosystems (GWDTE). A Phase 1 Habitat survey and National Vegetation Classification (NVC) survey will be required to detail these areas and will be included in the EIA report to identify the complexity and richness of the habitat to inform appropriate mitigation measures.

Private and Public Abstractions

There are four listed private water supplies on Eday (Drinking Water Quality Regulator for Scotland, 2018). Only one of these listed private supplies is within the proposed development site, this is the private abstraction for Greentoft farm. There are no further water supplies, either private or public infrastructure, within the site.

Licensed Sites

There are no water licence sites within the proposed development site.

7.1.3 Potential impacts

The potential impacts that the proposed development may have upon hydrology, geology and soils during each phase include:

Construction and installation

- Physical disturbance to aquifer and groundwater flow from excavation of turbine foundations, crane pads and access tracks;
- Peat loss or disturbance arising from excavation works;
- Chemical pollution and sedimentation of groundwater arising from run off from excavations, dewatering activities and materials storage; and
- Alterations to drainage and hydrology leading to loss or degradation of sensitive wetlands and GWDTEs.

Operation and maintenance

- Alterations to drainage and hydrology leading to loss or degradation of sensitive wetlands and GWDTEs.



Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.

A description of the effects of each potential impact and likely significance is presented in Table 7.1. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 7.1 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Physical disturbance to aquifer and groundwater flow from excavation of turbine foundations, crane pads and access tracks	Construction and installation	<p>Given the bedrock is shallow, the aquifer and groundwater may be at depths similar to excavations and therefore may require further assessment to identify the potential impacts on the hydrogeology.</p> <p>The main impacts on underlying geology are linked to potential for groundwater transportation.</p> <p>The aquifer is assessed as being locally important (particularly as a local abstraction supply), moderately productive, offering a small yield of groundwater.</p> <p>Likely significance of effect uncertain.</p>	Scoped in for further assessment.
Peat loss or disturbance arising from excavation works	Construction and installation	<p>Excavations on peat have the potential to degrade the carbon sequestering ability of the peat, specifically in rich catotelm peat deposits as they are exposed, dry out and lose carbon.</p> <p>The proposed development avoids peat deposits, with the exception of a small section to the east of the site where an existing access track will be improved as part of the turbine access infrastructure. The peat here is sandy shallow acrotelm of poor quality and therefore has little sequestering properties.</p> <p>Effect unlikely to be significant</p>	Scoped out of assessment and will not be considered further
Chemical pollution and sedimentation of groundwater arising from run off from excavations, dewatering activities and materials storage.	Construction and installation	<p>Excavation and construction activities may have an impact on the aquifer which is present within the proposed development site, and is an important local abstraction source. The aquifer is listed as productive and is a likely source of PWS. Sedimentation and chemical spills could cause accidental pollution of the aquifer.</p> <p>Likely significance of effect uncertain.</p>	Scoped in for further assessment.



Potential impact	Phase	Description of effect	Approach to EIA
Alterations to drainage and hydrology leading to loss or degradation of sensitive wetlands and GWDTEs	All phases	The proposed development is underlain by low permeability rocks, compaction and drainage changes adjacent to or on GWDTEs may degrade habitat. Likely significance of effect uncertain.	Scoped in for further assessment.

7.1.4 Approach to EIA

The proposed impact assessment strategy for coastal and terrestrial ecology is outlined in Table 7.4 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for impacts taken forward from Table 7.3.

Table 7.2 Impact assessment strategy for hydrology and geology

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Physical disturbance to aquifer and groundwater flow from excavation of turbine foundations, crane pads and access tracks	Identification of the key hydrological receptors including aquifers, groundwater and GWDTEs. A catchment boundary analysis will be undertaken using hydrology terrain analysis tools. The requirement for any further modelling will be investigated following further desk-based analysis and consultation with SEPA and Scottish Water. Production of an outline Construction Environmental Management Plan (CEMP) with measures for groundwater protection. Consultation and mapping PWS against site infrastructure to characterise potential impact pathways. A 2 km search radius from the Site Boundary will be adopted to request details on public and private water supplies and update existing information.	Digital Terrain Model data, OS river network map, site walkovers, water quality data (SEPA).	SEPA, OIC EPO, Scottish Water
Chemical pollution and sedimentation of groundwater arising from run off from excavations, dewatering activities and materials storage.	Identification of key hydrological receptors. Production of an outline Water and Construction Environmental Management Plan (WCCEMP) with measures for groundwater protection.	Digital Terrain Model data, OS river network map. Water quality data (SEPA)	SEPA, OIC EPO
Alterations to drainage and hydrology leading to loss or degradation of sensitive wetlands and GWDTEs	Identification of GWDTEs. Layout design mitigation to reduce potential impacts.	National Vegetation Classification (NVC) habitat surveys	SNH and SEPA



7.1.5 Possible mitigation and monitoring measures

Possible mitigation and monitoring measures that will be considered in the EIA process where there is the potential for likely significant effects on geology and peat may include the following:

General mitigation

- Infrastructure is located appropriately to reduce the potential for encroachment on peat
- Measures to protect the water environment will be provided in the CEMP and be based on good practice outlined in publications including Pollution Prevention Guideline (PPGs) 1 – 27¹⁰, and SNH Good Practice During Wind Farm Construction (SNH, 2013)
- An outline Construction Environmental Management Plan (CEMP) will accompany the EIA Report and form part of the embedded development design. The CEMP will comprise methods and works that are established and effective measures to which the Developer will be committed through the development consent. Measures in order to protect the water environment will be outlined in the CEMP and will be based on good construction practice.

Impact specific mitigation

- Measures to adequately avoid areas with GWDTE and other relevant Annex 1 habitats dependent on the quality of the peat and hydrological connections will be set out, taking into consideration SEPA Guidance on GWDTE and the requirements for detailed risk assessment / site investigation (SEPA, 2017b).

Monitoring

- Monitoring is not expected to be necessary however standard best practice as relevant to the environment and habitat types will be followed and detailed in the outline CEMP that will accompany the EIA Report

¹⁰ NetRegs: Guidance for Pollution Prevention (GPPs) Full List Available online <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/> (Accessed 10/12/2019)



7.2 AIR AND CLIMATE

7.2.1 Introduction

In accordance with the EIA Regulations, a climate assessment will be undertaken to evaluate the potential effects of the windfarm on the climate (a 'greenhouse gas' assessment). The air and climate chapter will include an assessment of the wind farm's susceptibility to climate change including a review of coastal flooding during storm surges, sea level rise, increased extreme weather events (and the resulting wind increase), using the UK Government and Met Office's UKCP18 projections, where required.

7.2.2 Baseline

Air Quality

Air quality in Orkney is very high, with very little pollution due to the near constant wind, low population, small urban centres and absence of large scale industrial activity. Eday has no industrial operations, with a very low population and no built up urban areas. Many of the residents utilise multi fuel stoves either as a primary heat source or as a secondary heating source, with many using coal, and peat as a fuel source as well as wood.

Climate

The Orkney climate is temperate with mild summers and winters. There is an above average rainfall throughout the year compared to the national average and the island is prone to high and sustained wind conditions. The climate makes Orkney specifically attractive to wind and tidal/wave developments.

The warm gulf stream which flows close to the Orkney archipelago maintains above average temperatures for the latitude of the islands. The additional impact this micro climate has is a reduction in snow fall and freezing conditions, with winter temperatures generally staying above 4 degrees during the day and rarely dropping past 0 degrees overnight. However, in summer, the northerly latitude does prohibit temperatures higher than 19 degrees typically and the wind chill from the near constant wind can make the 'real feel' less than that.

7.2.3 Potential impacts

The potential impacts that the proposed development may have upon air quality and climate during each phase include:

Construction and installation

- Dust generation during dry spells as a result of (i) construction of the temporary construction compound, access tracks, and hardstanding areas, (ii) excavation works associated with underground cabling and (iii) traffic on unsurfaced tracks;
- Carbon costs associated with the manufacturing of materials (concrete and steel), and their transportation; and
- Increase in CO₂ emissions from exhaust fumes of increased traffic flows, and NO₂ emissions from diesel engines (IAQM, 2014).

Operation and maintenance

- Carbon savings associated with turbine operation through reduction of CO₂ emissions.

Decommissioning

- Potential impacts arising during the decommissioning phase are expected to be similar to, but not exceeding, those arising during the construction phase.



A description of the effects of each potential impact and likely significance is presented in Table 7.3. As described in Section 4.1 Approach to Scoping and Table 4.1, impacts taken forward to the EIA stage are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

Table 7.3 Description of potential effects and approach to EIA

Potential impact	Phase	Description of effect	Approach to EIA
Dust generation during dry spells as a result of construction activities	Construction and decommissioning	Construction of the proposed development is expected to take 18 months depending on final design, and is highly weather dependent. High precipitation and near constant winds across Eday and Orkney as a whole may naturally mitigate any dust impacts. A Dust Management Plan (DMP) will be implemented in line with construction best practice, as detailed in section 7.2.5. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Carbon costs associated with material manufacturing and their transportation	All phases	The initial manufacture of materials (e.g. steel) will generate CO ₂ emissions. The supply chain from manufacture to delivery on site also has an emissions cost. Many materials will be sourced locally, with a reduced carbon footprint. Large specialised components will be sourced and delivered in the most efficient way practical. Given the nature of the development, as a fossil-free and renewable source of energy production, the carbon savings are likely to offset any carbon costs. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Increase in CO ₂ emissions from exhaust fumes of increased traffic flows, and NO ₂ emissions from diesel engines	Construction and decommissioning	Increased traffic flows during construction, maintenance visits, and decommissioning will cause temporary increases in CO ₂ and potential NO ₂ emissions from exhaust fumes. However, due to the nature and scale of the proposed development (installation of eight wind turbines), the effects of CO ₂ emissions associated with these factors are not expected to be significant. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Carbon savings associated with turbine operation	Operation and maintenance	Operation of the wind turbines will be carbon neutral while offsetting the equivalent energy generation from traditional fossil fuel sources thereby reducing overall CO ₂ emissions and providing a possible improvement climate. Beneficial effect – likely to be significant	Scoped in for further assessment.



7.2.4 Approach to EIA

The proposed impact assessment strategy for air quality and climate is outlined in Table 7.4 and identifies additional data collection requirements, the proposed assessment approach and planned consultation for those impacts identified as having the potential to result in 'likely significant effects' or those where the 'likely significance of effect is uncertain' from Table 7.3.

Table 7.4 Impact assessment strategy for air quality and climate change

Potential impact	Approach to assessment	Data collection requirements	Consultation requirements
Carbon savings associated with turbine operation	A carbon balance tool (e.g. the Scottish Government's Carbon Calculator for Wind Farms on Scottish Peatlands V1.5.1 (2018)) will be used to calculate the carbon balance of the proposed windfarm. A final statement of expected carbon savings over the proposed development lifetime will be presented in the EIA Report.	Carbon costs involved in each phase of the proposed development will be estimated based on proposed materials, and quantities. Carbon savings associated with renewable energy savings will be estimated.	OIC

7.2.5 Possible mitigation and monitoring measures

Possible mitigation measures that will be considered in the EIA process where there is the potential for likely significant effects on air quality and climate change may include:

General mitigation

- A Dust Management Plan (DMP) will be developed as part of the Construction Environmental Management Plan (CEMP), which will detail best practices in line with mitigation measures in IAQM guidelines (2014) and Pollution Prevention Guidelines (PPG6; SEPA *et al.*, 2012);
- If the potential for dust nuisance from construction and decommissioning activities to nearby properties is identified (e.g. during dry windy conditions), water sprays would be used to dampen down and control dust on the temporary construction compound, access tracks, and other sources;
- Appropriate speed limits would be imposed on access tracks to keep dust levels at a minimum near residential properties;
- All vehicles leaving the site would pass through a dry wheel wash to prevent mud being tracked onto the proposed B9063 route;
- Vehicles carrying rock or soil would be covered, if required;
- Stockpiles will be covered or dampened down to prevent drying.



8 APPROACH TO EIA

8.1 EIA PROCESS

The EIA process will comply with the requirements of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations') and will ensure that a proportionate and transparent EIA Report is delivered focussing on likely significant effects with mitigation clearly set out.

The EIA Report will be based on the Scoping Opinion provided by the planning authority (OIC) and include the information that may reasonably be required for reaching a reasoned conclusion on the likely significant effects of the development on the environment, taking into account current knowledge and methods of assessment. Reference will be made to the latest available EIA best practice and guidance, including but not limited to:

- Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment¹¹;
- Planning Circular 1/2017: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017; and
- the Chartered Institute of Ecology and Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, freshwater and Coastal (2019).

A common approach will be used for the assessment of each environmental topic:

- establishing the **baseline conditions** through a combination of desk review using existing information as far as possible, consultations and site surveys taking account of any committed development projects which could change the baseline in the future;
- identifying **potential environmental impacts** and associated **likely significant effects** which could result from development of the proposals;
- identification of **mitigation measures** to avoid, reduce and, where possible offset any impacts which could either by themselves, or in combination with other impacts have a significant adverse effect; and
- assessment of the level of **significance of residual effects** in relation to likely significant effects only (direct and indirect, adverse and beneficial, short-term and long-term, permanent and temporary) taking account of committed mitigation measures.

Where the potential for a significant adverse effect - either by itself or in combination with other impacts - is identified, these would be taken into account in the proposed development design including the location/layout of the components, the construction methodology, the approach to maintenance and ultimately the strategy for decommissioning/site abandonment.

Significance is not defined in the EIA Regulations. The definition of a significant effect which will be adopted in this assessment is one which the project team considers, in isolation or in combination with others, is material¹² to the environment and should be taken into account in the decision-making process. The significance of an effect results from the interaction between its magnitude (which is related to the extent of the physical change, its spatial extent, duration and frequency) and the value of the resource and the sensitivity of those receptors that/who might be affected. Professional expert judgement will be used to determine impact significance, and details of competent expertise will be provided within a statement accompanying the EIA Report.

¹¹ Revision 1.0 to take account of the 2017 EIA Regulations.

¹² i.e. important or having an important effect and of sufficient importance to take into account in development decisions.



The approach to assessing significance will include:

- selecting criteria (for each receptor/discipline) from suitable recognised sources where available (including legal standards, policy and best practice guidance and accepted practice) against which effects have been assessed (assessment criteria);
- establishing significance thresholds drawing on the above sources, consultations, experience etc.¹³; and
- comparing the predicted impacts with the significance thresholds and defining the nature of residual effects taking account of the reversibility of the effect, its probability of occurring and confidence in prediction including any uncertainty.

Where there are not anticipated to be likely significant effects for particular receptors, those topics will be addressed at an appropriate level of detail. Under the EIA Regulations, such impacts may be of little or no significance for the particular development in question and, if included in the EIA Report, will need only very brief treatment to indicate that their possible relevance has been considered.

8.2 CUMULATIVE AND IN-COMBINATION EFFECTS

A list of developments to be considered in the CIA will be submitted to the Council and relevant statutory consultees at least three months prior to the completion of the EIA Report. This list will be agreed and signed-off with OIC and form the basis of the proposed development CIA.

It is proposed that the following relevant developments will be included in the CIA:

- Developments that have been consented and are yet to be constructed;
- Developments for which an application has been submitted but which are not yet consented;
- Developments that have submitted a Scoping Report may be defined as being 'reasonably foreseeable' and therefore may need to be included in the CIA; however, it is recognised that due to lack of information available only a qualitative assessment may be possible¹⁴.

Existing activities will be considered in the main EIA Report as part of the existing baseline and therefore not in the CIA. It is proposed that activities not subject to licensing/consent will not be included in the CIA.

Once the relevant development (sources) and receptors have been identified, possible pathways linking the two will be identified, the pathways between the source and the receptor will help determine the spatial extent and thus whether there will be any potential for cumulative and in-combination effects. The key principle for CIA is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process¹⁵.

¹³ For some environmental aspects such as noise or air quality it is possible to use measurable, quantifiable criteria from legislation or guidance to establish at what level an effect becomes significant. For other areas it may be necessary to rely on more qualitative criteria and this necessarily involves the use of professional judgement.

¹⁴ 'Occasionally it may be appropriate to include proposals which are in the early stages of development in an assessment, particularly where clusters of development or "hotspots" emerge. However, a degree of pragmatism is required to enable proposals to progress to determination' SNH (2012). Assessing the cumulative impact of onshore wind energy developments (2012).

¹⁵ SNH (2012). Assessing the cumulative impact of onshore wind energy developments.



8.3 ENVIRONMENTAL MITIGATION AND MONITORING

An outline Construction Environmental Management Document (CEMD) for construction and operational monitoring, following best practice, will be prepared and will be used to inform the development of a full CEMD in the future. The CEMD will set out procedures to ensure that all activities with potential to affect the environment are appropriately managed. All environmental risks and necessary protection measures (including mitigation measures set out in the EIA Report) will be identified and integrated into method statements for all major construction activities. The CEMD will demonstrate how all topic specific and locational specific mitigation will be delivered.

The CEMD will provide a framework for environmental management and protection during construction, any operational monitoring activities and future decommissioning of the proposed development. It is proposed that an overarching CEMD will be produced which will then be used in conjunction with a series of Environmental Management Plans which contain environmental and health and safety management controls, licence/consent conditions and supporting information in relation to specific requirements.

8.4 REPORTING – EIA REPORT

The EIA Report will be produced as an integrated document so that all inputs by individuals follow an agreed structure giving cohesion to the document. All technical information and lengthy survey data etc. will be included in appendices to each technical chapter and will be summarised and referenced in the main text. Each assessment will demonstrate how consultation feedback has been taken into account and how the requirements of statutory consultees have been met.

In accordance with the EIA Regulations, the EIA report will include:

- A description of the development comprising information on the site, design and other relevant features of the development;
- A description of the reasonable alternatives considered by the developer and an indication of the main reasons for the option chosen, taking into account the effect of the development on the environment;
- A description of the likely significant effects of the development on the environment; and
- A description of the features of the development and any measures proposed to avoid, reduce and offset likely significant adverse effects on the environment.

A non-technical summary will accompany the document to ensure the public can fully comment on the EIA Report. This will report the main findings of the EIA Report in plain English, presenting complex scientific data and analysis in a form that is readily understandable by the lay person.

An example structure for the EIA Report is shown in Box 1.



Box 1: Potential structure for the EIA ReportNon-Technical SummaryIntroduction

Chapter 1: Introduction: project overview; its statutory context; the objectives of the EIA Report; scope and structure of the EIA Report; project team etc.

Chapter 2: Need for the project; objectives

Chapter 3: Alternatives considered

Chapter 4: Project description including construction, operation and decommissioning phases

Chapter 5: Legislative context and regulatory requirements

Chapter 6: Consultation process

Chapter 7: EIA scope and methodology

Human Environment

Chapter 8: Socio Economics

Chapter 9: Land use and Utilities

Chapter 10: Population and Human Health

Chapter 11: Access, Traffic and Transport

Chapter 12: Archaeology and Cultural Heritage

Chapter 13: Landscape and Visual Amenity

Chapter 14: Tourism and Recreation

Chapter 15: Telecommunications

Chapter 16: Aviation and Radar

Ecological Environment

Chapter 17: Ornithology

Chapter 18: Terrestrial and Coastal Ecology

Physical Environment

Chapter 19: Hydrology, Geology and Soils

Chapter 21: Air and Climate

Chapter 22: Cumulative Impact Assessment

Chapter 23: Accidental and unplanned events

Summary

Chapter 24: Environmental mitigation, monitoring and management

Chapter 25: Summary of likely significant effects (including in-combination and cumulative effects)

Chapter 26: Conclusions

Example Annexes/Appendices:

- Planning Statement
- Design and Access Statement
- Outline Construction Environmental Management Plan (CEMP)
- Technical appendices as required i.e. baseline survey reports
- Information to inform a Habitats Regulations Appraisal (HRA)



9 SUMMARY OF LIKELY SIGNIFICANT EFFECTS

As described in Section 4.1 Approach to Scoping and Table 4.1, the impacts that will be considered further in the EIA are those where the effects are likely to be significant or the effects are uncertain. Where it is determined that the effects are unlikely to be significant, those impacts will not be considered further in the EIA.

A summary of likely significant effects and those that will be considered further in the EIA are detailed in Table 9.1 for the Human Environment, Table 9.2 for the Ecological Environment and Table 9.3 for the Physical Environment.

Table 9.1 Human Environment – Likely Significant Effects

SOCIO-ECONOMICS			
Potential impact	Phase	Description of effect	Approach to EIA
Development of improved electrical infrastructure providing opportunities for renewable energy generation and export	All phases	The proposed development will contribute to the 135 MW of new projects required to satisfy Ofgem conditions for a new transmission connection to the Scottish Mainland. A new interconnector would provide greater energy security for Orkney, enable the Orkney to export electricity, stimulate further development in the marine renewables sector and provide opportunities for deployment of other renewable energy developments. This in turn, supports the expansion of a dynamic and growing economy in Orkney, whilst contributing to sustainable development and decarbonisation. Beneficial effect - likely to be significant	Scoped in for further assessment.
Financial benefit through increased employment and use of the supply chain	All phases	Construction and O&M activity associated with the proposed development may create employment both directly and through the supply chain at a national scale, regionally throughout Orkney and more locally on Eday. Beneficial effect - likely to be significant	Scoped in for further assessment.
Financial benefit to the local community through increased use of local facilities and services	All phases	The influx of workers that will be required to construct and maintain the proposed development will result in an increased use of local facilities and services providing income for these businesses that may otherwise have not been available. Beneficial effect - likely to be significant	Scoped in for further assessment.



SOCIO-ECONOMICS			
Potential impact	Phase	Description of effect	Approach to EIA
Pressure on local facilities and services (e.g. ferries) through an influx of workers during construction activities	Construction and decommissioning	<p>The influx of workers that will be required to construct the proposed development may result in pressure to local facilities and services on Orkney and Eday specifically. However, the proposed development will consist of eight turbines so will not require a major influx of workers. The MV Varagen can carry 144 passengers and 32 cars. It is therefore expected that this service has sufficient capacity to cope with any influx of workers for the proposed development. Any increase in pressure would be small scale and temporary and therefore unlikely to be significant.</p> <p>Effect unlikely to be significant</p>	Scoped out of the assessment and will not be considered further.
Financial benefit to the local community through re-investment of profits into the community	Operation and maintenance	<p>The proposed development is being taken forward by a local organisation who will re-invest a portion of the profits made from the energy produced by the wind farm through various initiatives, providing financial benefit to the community and its members.</p> <p>The proposed development may therefore result in potential beneficial effects on the receptor, which are likely to be significant.</p> <p>Beneficial effect - likely to be significant</p>	Scoped in for further assessment.
Added Social Value from partaking in the community shares scheme	Operation and maintenance	<p>There are indirect effects with regard to added social value of fostering business skills, entrepreneurial experience and sustainable self-development in Orkney and Eday specifically. Local ownership of the proposed development will also provide opportunities to develop new community uses for the wind farm development area. The access tracks to the wind turbines can be used to facilitate community access for a range of sustainable development purposes, such as mountain biking, recreational walking, easy access to the archaeological assets currently only accessible via rough ground walking and any other new community use that may emerge over the life of the wind farm.</p> <p>Beneficial effect – likely to be significant</p>	Scoped in for further assessment.



LAND USE AND UTILITIES			
Potential impact	Phase	Description of effect	Approach to EIA
Loss of agricultural and grazing land during construction activities for turbine foundations, access tracks, crane pads and laydown areas	All phases	In order to construct the proposed development, there will be a requirement for land take, some of which will be land which is currently used for agricultural purposes. As the proposed development is being taken forward by a local landowner, any detrimental impact as a result of a loss of land is likely to be outweighed by the financial benefits that would be realised by the wind farm being taken forward by local developers. The Site is not classified as prime agricultural land. Livestock grazing in the area will likely be restricted during construction however this will be temporary and will be able to continue once construction is completed. The full land take will be restored back to baseline on decommissioning. Effect unlikely to be significant.	Scoped out of assessment and will not be considered further
Disruption to utility infrastructure and services within the development boundary area	Construction and installation, decommissioning	There are no public water utilities within the development boundary site. There are 11kV overhead lines which run north to south along the eastern site boundary to service Greentoft farm which will not be impacted by the proposed development. The Developer will liaise with SSE throughout project development to ensure no impacts arise. Effect unlikely to be significant.	Scoped out of assessment and will not be considered further.
POPULATION AND HUMAN HEALTH			
Potential impact	Phase	Description of effect	Approach to EIA
Noise generated within the proposed development boundary as a result of civil engineering, turbine installation, and onsite transportation	Construction and decommissioning	Temporary increases in onsite noise from civil engineering works and turbine installation has the potential to disturb residents at nearby dwellings. However, the nearest inhabited dwelling to the proposed site perimeter is approximately 0.4 km away, with no properties within 0.6 km of any of the planned turbine locations. The proposed aggregate extraction site is located 0.3 km from the nearest residence; noise may be a temporary disturbance if blasting is required. Likely significance of effect uncertain	Scoped in for further assessment.



POPULATION AND HUMAN HEALTH			
Potential impact	Phase	Description of effect	Approach to EIA
Noise generated by increased traffic passing residential areas	Construction and decommissioning	During construction and decommissioning of the wind farm there will be noise and vibration associated with the movement of HGVs involved in construction, including component and aggregate deliveries, which could be a source of nuisance to local residents. Deliveries of turbine components will arrive from the Eday Orkney Ferry Terminal which is a rural road situated close to residential receptors, increased vehicle access may disrupt nearby residents during daytime operations. Likely significance of effect uncertain	Scoped in for further assessment.
Increased risk of road traffic accidents due to presence of heavy construction traffic and increased levels of traffic on the road networks	Construction and decommissioning	Temporary increases in LGVs, HGVs, and abnormal load movements may increase the risk of collision with other road users accessing private residential or commercial properties. However, construction traffic will be slow moving and operate under a traffic management plan to prevent any increased risk of road traffic accidents. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Vibration impacts at nearby dwellings	Construction and decommissioning	The levels of vibration generated by mineral workings are well below those required to cause structural damage to properties from breaking or blasting (PAN 50). The nearest dwelling to the stone excavation site is approximately 0.3 km away, which is unlikely to be affected by vibration. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Air pollution from dust generated during construction works	Construction and decommissioning	Dust and particulates from general construction works, concrete batching, disturbed soils and stone processing can cause short term localised air pollution which could be a source of nuisance for local residents in close proximity to the construction site. Best practice construction measures will be implemented in line with relevant standards as part of the Construction Environmental Management Plan, including dust minimisation and control (as detailed in section 7.2.5). Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Noise from operational turbines	Operation and maintenance	Noise produced by the turbines during their operation has potential to cause disturbance to residents at nearby dwellings. Likely significance of effect uncertain	Scoped in for further assessment.



POPULATION AND HUMAN HEALTH			
Potential impact	Phase	Description of effect	Approach to EIA
Shadow flicker causing disturbance at nearby dwellings	Operation and maintenance	<p>Under certain conditions, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off resulting in an effect known as shadow flicker. This effect only occurs inside buildings and under a limited set of circumstances, e.g. when meteorological conditions are clear, the sun is low in the sky and the moving shadow of a turbine is cast onto a narrow window. Due to the movement of the sun, these shadows pass any point quickly and the effect therefore only lasts a short period of time.</p> <p>Where recommended separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), 'shadow flicker' should not be an issue (Scottish Government, 2014). Figure A5 illustrates that no properties are likely to be affected.</p> <p>Effect unlikely to be significant</p>	Scoped out of the assessment and will not be considered further.
Ice throw from turbine blades during winter conditions	Operation and maintenance	<p>Ice may accumulate on turbines under certain atmospheric conditions and may also cause ice to shed, leading to safety concerns. Ice throw is only considered a public health and safety concern when there is the possibility of human receptors within 350 m of a turbine (Joakim Renström 2015). The nearest residential property is 400 m. Modern turbine technology also has built in mitigation to reduce ice build up such as sensor activated heating mechanisms within the nacelle and de-icing blade coatings.</p> <p>Effect unlikely to be significant</p>	Scoped out of the assessment and will not be considered further.



POPULATION AND HUMAN HEALTH			
Potential impact	Phase	Description of effect	Approach to EIA
Component failure resulting in blade throw	Operation and maintenance	The possibility of component failure such as rotor blade dropping or being thrown from the nacelle is a potential public safety concern. Blade throw is only considered to be a health and safety concern where there is the possibility of human receptors being in sufficiently close proximity to the turbines that injuries may occur, which there is not in this case. Modern technology has in-built mitigation to prevent serious structural malfunctions, such as sensors to warn of any joint strain and all turbines undergo regular visual inspection and maintenance as good operational practice. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
ACCESS, TRAFFIC AND TRANSPORT			
Potential impact	Phase	Description of effect	Approach to EIA
Increased traffic flows on local roads associated with HGVs and abnormal load movements resulting in severance and driver delay for local road users	Construction and decommissioning	LGVs, HGVs and abnormal load movement may adversely impact on other road users due to a temporary increase in traffic volume and during the transport of turbine components due to the slow moving and large size of vehicles. Likely significance of effect uncertain	Scoped in for further assessment.
Road widening and strengthening works on local roads resulting in severance and driver delay for local road users	Construction and decommissioning	Works may be required to enable passage of abnormal loads on the local road network, which will potentially lead to temporary driver delay or severance along routes that require widening works. Likely significance of effect uncertain	Scoped in for further assessment.
Increased traffic flows on local roads associated with development maintenance traffic resulting in driver delay for local road users	Operation and maintenance	The volume of traffic that is likely to arise from the development once the wind farm is operational will be low. LGVs (or similar) are likely to be used for regular site visits and occasional deliveries using HGVs. The impact on traffic flows will be negligible. Effect unlikely to be significant.	Scoped out of assessment and will not be considered further.



ARCHAEOLOGY AND CULTURAL HERITAGE			
Potential impact	Phase	Description of effect	Approach to EIA
Direct impacts on known and unknown (buried) archaeology within the proposed development boundary.	Construction and decommissioning	Potential for damage to known and unknown remains through full range of construction and decommissioning activities. Likely significance of effect uncertain	Scoped in for further assessment.
Indirect impacts on cultural heritage features out with the proposed development boundary through changes to the overall setting of these features	Operation	The visual presence of wind turbines have the potential to materially change the setting of cultural heritage receptors. Likely significance of effect uncertain	Scoped in for further assessment.
Indirect impacts on the setting of undesignated archaeology	Operation	Any undesignated sites with visibility of the proposed wind turbines are anticipated to be of low sensitivity. Effect unlikely to be significant	Scoped out and will not be considered further.
LANDSCAPE AND VISUAL AMENITY			
Potential impact	Phase	Description of effect	Approach to EIA
Potential impacts on landscape character	Construction and installation; operation and maintenance	The presence of turbines and associated infrastructure may give rise to changes in landscape character, including designations and landscape character types, how they are experienced and their perceptual qualities. The proposed development has the potential to give rise to adverse effects on the landscape character within close proximity to the site and from sensitive locations further afield. Likely significance of effect uncertain	Scoped in for further assessment
Potential impact on visual receptors and visual amenities	Construction and installation; operation and maintenance	There is potential for visual impacts from the presence of turbines and associated infrastructure upon sensitive receptors, including key settlements, residential properties, transport routes, recreational routes and visitor destinations. The proposed development has the potential to give rise to adverse effects on visual amenity within close proximity to the site and from sensitive locations further afield. Likely significance of effect uncertain	Scoped in for further assessment



TOURISM AND RECREATION			
Potential impact	Phase	Description of effect	Approach to EIA
Disruption or severance to tourist amenity during construction works	Construction	The main impact on tourists from the construction of the development is likely to be small scale temporary disruption to tourist amenity through inconvenience due to temporary diversions of coastal walks, and presence of construction traffic. Traffic impacts will be managed and mitigated through the dedicated traffic management plan (see section 5.4: Access, Traffic and Transport). Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Disruption to recreational activities (scrambling, walking, cycling, wildlife watching) during construction works	Construction and decommissioning	There are potential opportunities for recreational activity in the proposed development boundary which could be affected by construction activities however any disruption would be temporary and short term. Potential disruption from traffic impacts are addressed in section 5.4: Access, Traffic and Transport. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Tourism impacted due to presence of wind turbines	Operation	There is potential for tourists and visitors to Eday to be impacted due to the presence of wind turbines. There are strong feelings both for and against their installation and therefore there may be a reduction in tourism to the area. This is to be assessed further and in conjunction with the Socio-economic section and the LVIA. Likely significance of effect uncertain	Scoped in for further assessment
Access improvements for recreation and public amenity	Operation	There is potential to improve and enhance the coastal walking routes, making them safer for residents and visitors to enjoy all year round. The improved access tracks linking the turbines run adjacent to the existing undesignated trail. The proposed development would offer a more attractive option of access allowing those with mobility issues to also be able to enjoy the views from the coast. Beneficial effect likely to be significant	Scoped in for further assessment
TELECOMMUNICATIONS			
Potential impact	Phase	Description of effect	Approach to EIA
Interference with microwave radio links	Operation and maintenance	The presence of an operating wind turbine can degrade radio signals by reflection or blocking of the signal. Based on available information, there is uncertainty around the risk to receptors. Likely significance of effect uncertain	Scoped in for further assessment



TELECOMMUNICATIONS			
Potential impact	Phase	Description of effect	Approach to EIA
Interference with fixed-link radio links	Operation and maintenance	Fixed link transmissions are based on point-to-point paths that occur at elevated topographical features, and are considered 'at risk' if a wind farm is directly in line or within the Fresnel Zone around the line of sight between two transmission stations or a receiver. This may lead to degrading of the performance or even a loss of service. Based on available information, there is uncertainty around the risk to receptors. Likely significance of effect uncertain	Scoped in for further assessment
Interference with broadcast transmissions	Operation and maintenance	Terrestrial television services are provided by means of UHF radio waves which propagate from transmitters to receiving aerials which then relay the signal to a TV set. For broadcast systems, a wind farm located between a TV transmitter and receiver aerial may cause loss of picture detail, loss of colour or buzz on sound. Viewers situated to the side of a wind farm may experience a delayed image or 'ghost' on the picture, or find the picture liable to flicker as the blades rotate. Digital television (DTV) signals are more robust to interference caused by rotating blades, but their reliability can be affected if signal levels are low while Bit Error Rates (BERs) are high. In most cases a standard television aerial has the capacity to "ignore" reflected signals such that DTV reception will not be noticeably affected. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
AVIATION AND RADAR			
Potential impact	Phase	Description of effect	Approach to EIA
Collision due to physical infringements to regional flight paths	All phases	The proposed turbine heights could cause physical infringements to regional flight paths. Without mitigation, this could cause collision and affect the airport's ability to operate safely, in accordance with its licence. Likely significant effect	Scoped in for further assessment.
Vertical obstruction hazard to low flying aircraft	All phases	The proposed development area is situated within LFA 14, which covers an extensive area of Scotland. Although, this area is vast and therefore low flight manoeuvres are well distributed. Likely significance of effect uncertain	Scoped in for further assessment.



AVIATION AND RADAR			
Potential impact	Phase	Description of effect	Approach to EIA
Degradation of the performance of electronic aeronautical systems at regional airports	Operation and Maintenance	<p>Wind turbines can affect the propagation of the radiated signal from airport’s navigation and communication facilities because of their physical characteristics, such as their situation and orientation in relation to the facility. The development area is situated 5.5 km from Eday airport. As a result, the performance of the airport’s electronic aeronautical systems can potentially be degraded.</p> <p>Likely significance of effect uncertain</p>	Scoped in for further assessment.
Interference with radars signals from air defence radars	Operation and Maintenance	<p>Wind turbines can interfere with radar function and as such could have significant impacts on radar systems for defence or domestic purposes. Consultation is required to identify any defence radar systems.</p> <p>Likely significance of effect uncertain</p>	Scoped in for further assessment
Interference with radar signals from air traffic control	Operation and Maintenance	<p>Turbine towers may cause physical blanking and diffracting effects on secondary surveillance radar (SSRs) depending on the size and proximity of the wind farm. There is a potential for reflection and shadowing of radar signals from air traffic control. Following a search on the NATS assets data sets, it has been established that there are no NATs or NERL radar systems within Orkney. Local airport radar has not been assessed to date and will require further consultation with HIAL.</p> <p>Likely significance of effect uncertain</p>	Scoped in for further assessment
Interference with radar signals from meteorological radars	Operation and Maintenance	<p>Consultation was undertaken with the Met Office to determine whether there is a Met radar system within range of the proposed development site, and to what extent they foresee potential impacts. The resulting consultation confirmed there were no Met Office radar or monitoring assets within range and that no further action or consultation was required - Email correspondence from T. Allott, Met Office, 18/10/2019.</p> <p>Effect unlikely to be significant</p>	Scoped out of the assessment and will not be considered further



Table 9.2 Ecological Environment– Likely Significant Effects

ORNITHOLOGY			
Potential impact	Phase	Description of effect	Approach to EIA
Direct loss or degradation of habitat through construction of wind farm infrastructure	Construction	The construction of the wind farm will result in land-take to enable access roads, turbine foundations and ancillary infrastructure to be built. The footprint of the development may result in the direct loss or degradation of breeding, foraging or roosting habitat. Likely significance of effect uncertain	Scoped in for further assessment.
Disturbance (noise and visual) due to construction (and decommissioning) activities	Construction; Decommissioning	During construction and decommissioning of the wind farm there will be noise and visual disturbance associated with the works. Construction activities may result in potential disturbance to breeding, foraging or roosting birds. Construction and decommissioning activities will be of limited duration and any disturbance effects will be temporary. The findings of the bird surveys will determine which species are present and to inform placement and routing of infrastructure to minimise effects. Likely significance of effect uncertain	Scoped in for further assessment.
Displacement due to avoidance of the turbines	Operation and maintenance	The presence and operation of the wind farm and associated maintenance activities may result in the indirect loss of habitat through displacement of breeding, foraging or roosting birds within the surrounding area if birds avoid the area due to the physical presence of proposed development infrastructure and maintenance activities. Displacement can include barrier effects in which birds are deterred from using their normal routes to feeding or roosting grounds. Likely significance of effect uncertain	Scoped in for further assessment.
Mortality due to collision with operating turbine blades	Operation and maintenance	Birds that collide with a turbine blade are likely to be killed or fatally injured. The frequency of collision with turbines is assumed to be dependent on the amount of flight activity across the site and the ability of birds to detect the rotating blades and take avoidance action. Increased mortality rates from collision with turbines could potentially affect the maintenance of bird populations, particularly for species that are otherwise experiencing poor reproductive or survival levels due to other factors e.g. food availability. Likely significance of effect uncertain	Scoped in for further assessment.



TERESTRIAL AND COASTAL ECOLOGY			
Potential impact	Phase	Description of effect	Approach to EIA
Loss or degradation of habitat	Construction and decommissioning	The construction of the wind farm will result in land-take to enable access roads, turbine foundations and ancillary infrastructure to be built. The footprint of the development may result in the direct loss or degradation of habitat including potential GWTDEs. There is no connectivity with designated sites. Likely significance of effect uncertain.	Scoped in for further assessment.
Disturbance, displacement, injury or mortality of otter	All phases	Disturbance, displacement, injury or mortality to otter or damage to their holts. The level of disturbance will depend upon the presence of otter holts in the study area and the length of the construction phase. Likely significance of effect uncertain.	Scoped in for further assessment.

Table 9.3 Physical Environment – Likely Significant Effects

HYDROLOGY, GEOLOGY AND SOILS			
Potential impact	Phase	Description of effect	Approach to EIA
Physical disturbance to aquifer and groundwater flow from excavation of turbine foundations, crane pads and access tracks	Construction and installation	Given the bedrock is shallow, the aquifer and groundwater may be at depths similar to excavations and therefore may require further assessment to identify the potential impacts on the hydrogeology. The main impacts on underlying geology are linked to potential for groundwater transportation. The aquifer is assessed as being locally important (particularly as a local abstraction supply), moderately productive, offering a small yield of groundwater. Likely significance of effect uncertain.	Scoped in for further assessment.
Peat loss or disturbance arising from excavation works	Construction and installation	Excavations on peat have the potential to degrade the carbon sequestering ability of the peat, specifically in rich catotelm peat deposits as they are exposed, dry out and lose carbon. The proposed development avoids peat deposits, with the exception of a small section to the east of the site where an existing access track will be improved as part of the turbine access infrastructure. The peat here is sandy shallow acrotelm of poor quality and therefore has little sequestering properties. Effect unlikely to be significant	Scoped out of assessment and will not be considered further



HYDROLOGY, GEOLOGY AND SOILS			
Potential impact	Phase	Description of effect	Approach to EIA
Chemical pollution and sedimentation of groundwater arising from run off from excavations, dewatering activities and materials storage.	Construction and installation	Excavation and construction activities may have an impact on the aquifer which is present within the proposed development site, and is an important local abstraction source. The aquifer is listed as productive and is a likely source of PWS. Sedimentation and chemical spills could cause accidental pollution of the aquifer. Likely significance of effect uncertain.	Scoped in for further assessment.
Alterations to drainage and hydrology leading to loss or degradation of sensitive wetlands and GWDTEs	All phases	The proposed development is underlain by low permeability rocks, compaction and drainage changes adjacent to or on GWDTEs may degrade habitat. Likely significance of effect uncertain.	Scoped in for further assessment.
AIR AND CLIMATE			
Potential impact	Phase	Description of effect	Approach to EIA
Dust generation during dry spells as a result of construction activities	Construction and decommissioning	Construction of the proposed development is expected to take 18 months depending on final design, and is highly weather dependent. High precipitation and near constant winds across Eday and Orkney as a whole may naturally mitigate any dust impacts. A Dust Management Plan (DMP) will be implemented in line with construction best practice, as detailed in section 7.2.5. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Carbon costs associated with material manufacturing and their transportation	All phases	The initial manufacture of materials (e.g. steel) will generate CO ₂ emissions. The supply chain from manufacture to delivery on site also has an emissions cost. Many materials will be sourced locally, with a reduced carbon footprint. Large specialised components will be sourced and delivered in the most efficient way practical. Given the nature of the development, as a fossil-free and renewable source of energy production, the carbon savings are likely to offset any carbon costs. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.



AIR AND CLIMATE			
Potential impact	Phase	Description of effect	Approach to EIA
Increase in CO ₂ emissions from exhaust fumes of increased traffic flows, and NO ₂ emissions from diesel engines	Construction and decommissioning	Increased traffic flows during construction, maintenance visits, and decommissioning will cause temporary increases in CO ₂ and potential NO ₂ emissions from exhaust fumes. However, due to the nature and scale of the proposed development (installation of eight wind turbines), the effects of CO ₂ emissions associated with these factors are not expected to be significant. Effect unlikely to be significant	Scoped out of the assessment and will not be considered further.
Carbon savings associated with turbine operation	Operation and maintenance	Operation of the wind turbines will be carbon neutral while offsetting the equivalent energy generation from traditional fossil fuel sources thereby reducing overall CO ₂ emissions and providing a possible improvement climate. Beneficial effect – likely to be significant	Scoped in for further assessment.



10 SCOPING QUESTIONS

A number of questions have been posed to stakeholder consultees throughout this document with regard to the content of the Scoping Report and approach to the EIA, which should be considered, where relevant, when formulating a response:

Questions for stakeholders	
Q1	Have all the relevant consenting requirements been identified?
Q2	Has sufficient information been provided on the nature and purpose of the development for the planning authority to form a Scoping Opinion?
Q3	Have all of the relevant legislative requirements and policies been identified?
Q3	Have all the relevant factors been identified for Scoping?
Q5	Have all of the likely significant effects been identified for further assessment?
Q6	Is the proposed approach to impact assessment acceptable for each factor?
Q7	Are the proposed mitigation and monitoring measures appropriate for each factor?
Q8	Are the viewpoints selected satisfactory, or are there any additional or alternative viewpoints that should be considered?
Q9	Based on the breeding bird survey findings, a turbine layout has been selected that as far as possible avoids locating turbines within 500 m disturbance buffers around raptor and diver breeding sites and 300 m buffers around skua breeding sites. Do you have any concerns with this layout?
Q10	Vantage point flight line data for the period 27th March 2019 to late July 2019 have been digitised. Some flight lines at risk height have been recorded for red-throated diver, hen harrier, peregrine and short-eared owl. Snapshot scan data have been gathered for Arctic skua and great skua. Collision risk assessment will be carried out for all of these species. Are there any concerns with the layout option provided?
Q11	SNH was carrying out a skua census in Orkney this year. Would it possible to make these data available to us to provide an estimate of the current Orkney arctic skua and great skua populations?



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