



Statkraft

Giant's Burn Wind Farm

Environmental Impact Assessment Scoping Report

February 2023



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1. Introduction

1.1 Overview

- 1.1.1 This Scoping Report has been prepared by Green Cat Renewables (GCR) on behalf of Statkraft UK Limited (hereafter referred to as 'the Applicant'). The Applicant is proposing to submit an application to the Scottish Ministers under Section 36 of the Electricity Act 1989 to construct and operate the Giant's Burn Wind Farm (hereafter referred to as 'the Proposed Development'), located in Argyll and Bute Council area, c2.1km north-west of Dunoon and c1.5km south-west of Sandbank. The location of the Proposed Development is shown in **Figure 1.1 Site Location**.
- 1.1.2 The Proposed Development is anticipated to be comprised of up to 9 turbines with a tip height of up to 200m. Depending on the final turbine selected, the turbines could have a potential generating capacity of up to 7.2MW for a total capacity of up to 64.8MW. Opportunities are being explored to include co-located technologies as part of the Proposed Development, such as up to 20MW of battery storage. Given the Proposed Development will have a capacity greater than 50MW, the application will be made under section 36 of the Electricity Act (1989).

1.2 The Applicant

- 1.2.1 The Applicant is GB Wind Farm Ltd (a wholly owned subsidiary of Statkraft UK Ltd).
- 1.2.2 Statkraft is a leading company in hydropower internationally and Europe's largest generator of renewable energy. The Group produces hydropower, wind power, solar power, gas-fired power and supplies district heating. Statkraft is a global company in energy market operations and has 5,700 employees in 21 countries. Across the UK businesses, Statkraft employs over 450 staff in England, Scotland and Wales.
- 1.2.3 Statkraft is at the heart of the UK's energy transition. Since 2006, Statkraft has gone from strength to strength in the UK, building experience across wind, solar, hydro, storage, grid stability, EV charging, green hydrogen and a thriving markets business.
- 1.2.4 Within Scotland, Statkraft has developed five onshore wind farms, with a combined capacity of over 200MW, and has consent for 6 more, with a combined capacity of c400MW. There is a further 300MW+ in planning, including An Càrr Dubh Wind Farm near Inveraray in Argyll and Bute.
- 1.2.5 In addition, Statkraft has a pipeline of Greener Grid Parks, with operational projects in Keith and Liverpool, and two currently in construction in Renfrewshire and East Yorkshire. These projects facilitate increased renewable energy transmission through the National Grid, by delivering grid stability and energy storage services. This forms part of the National Grid's programme to operate a zero-carbon grid by 2025.
- 1.2.6 Statkraft has invested over £1.3 billion in the UK's renewable energy infrastructure to date and facilitated a further 4GW+ of new-build renewable energy generation, through Power Purchase Agreements (PPAs).
- 1.2.7 Statkraft is well positioned to enable a net-zero future. The Proposed Development would make a very important contribution to this objective.

1.3 Green Cat Renewables Ltd

- 1.3.1 GCR is an environmental and engineering consultancy focused on all aspects of development support, based in Scotland. With a team of 80 staff spread across three offices, the company's multi-disciplinary resource base spans all stages of project delivery from feasibility and concept development through to planning, engineering, project management and operational asset management.
- 1.3.2 While much of the company's experience is within the renewable sector, GCR's emphasis is on supporting farmers, landowners and developers in a wide range of renewable projects. GCR have also developed expertise in helping a range of businesses find sustainable energy solutions to aid economic viability in a climate where energy costs are forecast to continue to rise.
- 1.3.3 The GCR Environmental Impact Assessment (EIA) team brings a diverse skill set that includes planning, environmental and technical expertise, and is comprised of Project Managers, planners, consultants, environmentalists, engineers, acousticians, CAD technicians, hydrologists and resource analysts.

1.4 Purpose of The Scoping Report

- 1.4.1 The Applicant is seeking confirmation, from the Scottish Ministers and key consultees, of the scope of the methodology for the assessments to be included in the EIA by requesting a Scoping Opinion under Regulation 12 of the EIA Regulations:
- A description of the location of the Proposed Development, including a plan sufficient to identify the land (**Figure 1.1.**);
 - A brief description of the nature and purpose of the Proposed Development (**Section 2**) and of any likely significant effects on the environment (sections 5-14); and
 - Such other information or representations as the Applicant may wish to provide or make as per information.
- 1.4.2 This Report has been produced in line with these requirements.

1.5 Environmental Impact Assessment

Introduction

- 1.5.1 The Proposed Development falls within Schedule 2 of the EIA Regulations and as such requires an EIA to be undertaken given the scale and nature of wind farm developments and the potential to have significant environmental impacts.

Approach to Scoping

- 1.5.2 This Scoping Report outlines and focuses the proposed approach to the assessment of environmental impacts and the proposed EIA Report content, for approval by Scottish Government and other Statutory Consultees.
- 1.5.3 It also establishes the availability of baseline environmental data and its source, defines and seeks to agree a survey framework from which a comprehensive overall assessment can be produced and invites consultees to comment on the proposed methodology for assessment as well as identify any concerns that they may have in relation to the Proposed Development.
- 1.5.4 The Applicant has appointed an EIA project team to provide relevant assessment, advice and reporting to support the delivery of the EIA. As per Regulation 5(5) of the EIA Regulations, the appointed team have the necessary experience and qualifications to carry out the assessments and are considered "competent experts".

Potential Environmental Effects

- 1.5.5 The EIA process must identify and assess, in an appropriate manner, in light of the circumstances relating to the Proposed Development, the potential direct and indirect significant effects (positive and negative) of the Proposed Development on a number of factors and the interaction between these factors (Regulation 4(2) and (3)). These factors under the EIA Regulations are:
- Population and human health;
 - Biodiversity, and in particular species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
 - Land, soil, water, air and climate;
 - Material assets, cultural heritage and the landscape.

Scoping Consultation

- 1.5.6 The Scoping Report will include questions to consultees to promote positive and focused early consultation. The Scoping Opinion provided by the Scottish Government's Energy Consents Unit (ECU) will be fed back and integrated to inform the assessments carried out in the EIA Report.

Public Consultation

- 1.5.7 The Applicant is committed to undertaking best practice and meaningful consultation with the local community and stakeholders. During the EIA and Planning process development period an integrated public relations approach will be followed. It is expected that engagement will include the use of a dedicated project website, mail drops, and hybrid exhibitions (virtual and in-person) to distribute information and respond to the public, along with emails, phone calls and meetings with community councils. Consideration will be given to ensure that engagement methods reflect varying levels of access to technology.
- 1.5.8 The Applicant will contact local community councils, detailed on the consultee list, around the time that the EIA Scoping Report is published on the ECU Website, to introduce themselves and the project and

to request the opportunity to meet, should they wish. Following this, it is anticipated that that the first round of in-person public exhibitions will be held early in 2024. This will provide an opportunity for the public to learn about the Proposed Development directly from the project team in attendance and through information panels and visualisations presented at the public exhibition venues. It will be an opportunity for the Applicant to encourage and receive first-hand feedback on the Proposed Development and to help shape the development through the design process and delivery of the EIA Report.

- 1.5.9 The second public exhibition, which is proposed to be held in late 2024, will provide the public with an update on progress, how feedback from stakeholders may have influenced the Proposed Development, and provide further details about the conceptual design of the Proposed Development, an update on the EIA, and further information on community benefits and submission timescales.
- 1.5.10 The way the Applicant has engaged with the community and the ways in which community consultation may have influenced the design of the Proposed Development will be summarised in a pre-application consultation (PAC) Report and included as part of the application submission.

1.6 References

Scottish Government. Electricity Act 1989. Available at:
<https://www.legislation.gov.uk/ukpga/1989/29/contents> (Last Accessed 04/09/2023)

Scottish Government. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> (04/09/2023)

2. Proposed Development

2.1 Site Description

- 2.1.1 The Application Site, hereafter referred to as 'the Site' is located within the administrative boundary of Argyll and Bute Council at BNG 231561 678356. It sits approximately 2.1km north-west of Dunoon on the northeastern side of Bishop's Seat and Giant's Knowe. The area is topographically complex and is characterised by several raised peaks such as Tom Odhar (256m AOD) to the west, and Kilbride Hill (390m AOD) to the North. The area reaches a topographic height at Cruach nan Capall to the north-west, with an elevation of 611m AOD.
- 2.1.2 The Site itself sits at an elevation of 304-469m AOD between Strone Saul and Elligan and is c.2.1km in length north to south along the hill peak. There is commercial forestry surrounding the site, however it is most notable on the eastern border.
- 2.1.3 The area is located within the steep ridges and mountains Landscape Character Type (LCT), and the Argyll and Bute Area of Panoramic Quality encompasses the area to the west, c2.0km from the Proposed Development.
- 2.1.4 The Carbon and Peatland Map 2016 illustrates the area as being underlain with Class 1 and 2 Peat. The majority of the Site is situated within an area of Class 2 Peat, with a small pocket of Class 1 Peat within the northern site area. It is intended that areas of Class 1 Peat will be avoided where necessary, with restoration planned for other areas of the site. Additionally, the site is comprised of Class 3, Class 4 and Class 5 Peat with sections of mineral soil. Additionally, the Spout Burn intersects the central site area, flowing in a northwestern direction to meet Glenkin Burn.

2.2 Cumulative Context

- 2.2.1 The Cruach Mhor Wind Farm is an operational wind farm with 24 turbines with a tip height of 71m. It is located c11.7km to the north-west of the Proposed Development along the northern face of Cruach Mhor mountain.
- 2.2.2 There are two wind farm developments to the south-west of the Site. The operational Inverclyde wind farm is a 10-turbine development with a tip height of 110m and is c15.3km from the Site, across the River Clyde estuary.
- 2.2.3 The Corlarach Hill Wind Farm was a proposed 14-turbine scheme with a 125m tip height directly south of the Proposed Development, in 2007. The wind farm was refused due to the potential significant adverse impacts on nationally important landscapes. The decisions resulting in the refusal of the development will be taken into consideration for the planning application and will be assessed against new policy such as NPF4.
- 2.2.4 The Strone Saul Hill Wind Farm (2009) was a proposed 8-turbine scheme, with a proposed tip height of 100m. It was primarily refused on the grounds that there was insufficient assessment regarding potential impact on golden eagle and black grouse populations.
- 2.2.5 Consideration will be given to the decisions that informed the refusal of the two developments and will be assessed against new policy such as NPF4 to inform the planning process and application for the Proposed Development.

2.3 Proposed Development Description

Turbines

- 2.3.1 The Proposed Development is anticipated to comprise of up to 9 wind turbines with a blade tip of up to 200m. The Site Boundary (**Figure 1.1**) defines the extent of the area relating to the Application.
- 2.3.2 An initial design process, taking account of the key technical, environmental, and economic constraints, has been undertaken and will continue throughout the EIA process as required. Key constraints are mapped in **Figure 2.1**. The result of this initial design process is the scoping layout shown in **Figure 2.2**. OS grid coordinates for turbines of the preliminary layout are listed in Table 2.1 below.

Table 2.1: Proposed Turbine Locations

Turbine Number	Easting	Northing
1	213998	677952
2	214348	678325
3	214718	678683
4	214804	679190

Turbine Number	Easting	Northing
5	213809	678428
6	214160	678806
7	214302	679299
8	214253	679808
9	213769	679987

2.3.3 The Proposed Development is anticipated to include the following ancillary components and associated infrastructure:

- Wind Turbines
- Crane hardstandings and laydown area adjacent to each wind turbine;
- Turbine foundations;
- Power cables, linking the wind turbines, laid in trenches underground, including cable markers;
- A control building including substation, parking and a small storage compound;
- Battery storage compound, located adjacent to the substation compound;
- Temporary (and possibly also permanent) power performance assessment (PPA) anemometry masts;
- Health and Safety and other directional signage;
- New and upgraded access tracks, passing places and turning heads;
- Drainage works;
- Borrow pits;
- Temporary construction compound; and
- Aviation warning lighting to comply with Article 222 of the UK Air Navigation Order (ANO 2016)

2.4 Forestry

2.4.1 Currently there are no turbines located within areas of forestry. There is a small area of commercial forestry within the Site. At this stage it is not known if there will be an impact to commercial forestry or any woodland. As the design evolves it will be better understood if there will be a requirement to remove forestry for either turbines or access to the site. Should this be the case the Applicant will seek to minimise any felling that may be required and to contact Scottish Forestry (SF) to ensure that any proposed changes to the woodland are undertaken in line with the Scottish Government's Control of Woodland Removal Policy and any other relevant guidance. This would involve replanting an area of similar size to account for any felling that does occur.

2.5 Construction Works

2.5.1 The construction period for the Proposed Development is expected to have a duration of approximately 12-18 months. It is expected that construction will commence in 2027. Construction activities will include:

- Enabling works such as;
 - Forestry felling (if applicable);
 - Development of borrow pits;
- Construction/upgrading of site access tracks, passing places and any watercourse crossings;
- Construction of culverts under tracks to facilitate drainage and maintain existing hydrology;
- Construction of secure site compound including welfare facilities;
- Construction of crane hardstandings;
- Construction of wind turbine foundations;
- Wind Turbine delivery and erection;

- Installation of cabling, communication, and earthing arrays;
- Construction of substation;
- Construction of battery storage facility;
- Commissioning of development; and
- Reinstatement and site restoration works, as required.

2.5.2 The construction works would broadly follow the order as outlined above, however, to reduce the construction time, a number of these activities may be carried out concurrently.

2.6 Wind farm Lifecycle and Decommissioning

Operation and Maintenance

2.6.1 The Applicant is seeking consent to operate for ~50 years. Therefore, the assessment of potential effects on all environmental aspects considers the operational phase of the Proposed Development to be 50 years.

2.6.2 Following the commissioning of the Proposed Development, the temporary construction elements, such as cranes and other plant will be removed from Site. Reinstatement works will be undertaken where appropriate and in line with planning conditions.

2.6.3 During operation, the Site will be visited at regular intervals by approved technicians to undertake maintenance and to ensure the safe operation throughout the lifetime of the Proposed Development. These visits will be undertaken utilising standard road vehicles, there will be no requirement for the specialist vehicles utilised during the operation phase to visit site under normal circumstances.

Decommissioning Phase

2.6.4 Decommissioning effects are not generally considered in detail at this stage. It is proposed that a decommissioning plan will be agreed with the Council and relevant consultees in line with planning conditions. The decommissioning of the Site will broadly involve similar works at the construction phase and include reinstatement of the Site as agreed with Argyll and Bute Council.

2.7 References

Argyll and Bute Council. <https://portal360.argyll-bute.gov.uk/my-requests/document-viewer?DocNo=20191401>

Argyll and Bute Council. <https://portal360.argyll-bute.gov.uk/civica/Resource/Civica/Handler.ashx/Doc/pagestream?cd=inline&pdf=true&docno=20411212>

Scottish Government. The Air Navigation Order 2016. <https://portal360.argyll-bute.gov.uk/civica/Resource/Civica/Handler.ashx/Doc/pagestream?cd=inline&pdf=true&docno=20411212>

3. Planning and Energy Policy Context

3.1 Introduction

- 3.1.1 This Section describes the statutory framework within which the application will be submitted and outlines relevant policy and guidance documents that will be taken into consideration to help inform the design of the Proposed Development.
- 3.1.2 The EIA Report will set out the relevant policies that have been considered as part of the assessments undertaken throughout the EIA. A separate Planning Statement will provide a detailed appraisal of the Proposed Development against the relevant Development Plan policies, national planning and energy policy and other material considerations.

3.2 The Statutory Framework

- 3.2.1 The Proposed Development will have an installed capacity of over 50 Megawatts (MW). In Scotland, onshore renewable energy developments that have capacity to generate over 50MW require consent from the Scottish Ministers under the Electricity Act 1989 (the 'Electricity Act'). In such cases the Planning Authority is a statutory consultee in the development management process and procedures.
- 3.2.2 In an application under Section 36 of the Electricity Act the Development Plan does not have primacy in the decision-making process.
- 3.2.3 The provisions of Schedule 9 of the Electricity Act are relevant to the assessment of the Proposed Development. The provisions of Schedule 9 of the Electricity Act set out a number of features to which regard must be had by the Scottish Ministers and such features have been addressed in the Environmental Impact Assessment (EIA) process.
- 3.2.4 The Scottish Ministers will determine the application having regard to the statutory duties in Schedule 9 of the Electricity Act, so far as relevant, and any other relevant material considerations, one of which will be relevant aspects of the statutory Development Plan.

3.3 The Renewable Energy Policy Framework: Overview

- 3.3.1 In recent years United Kingdom (UK) and Scottish Government policies have focussed increasingly on concerns about climate change. Each tier of Government has developed targets, policies and actions to achieve targets to deal with the climate crisis and generate more renewable energy and electricity.
- 3.3.2 The UK Government retains responsibility for the overall direction of energy policy, although some elements are devolved to the Scottish Government. The UK Government has published a series of policy documents setting out how targets can be achieved. Onshore wind generation, located in Scotland, is identified as an important technology to achieve these various goals.
- 3.3.3 The Scottish Government has published a number of policy documents and has set its own targets. The most relevant policy, legislative documents and more recent policy statements published by the Scottish Government include:
- The Scottish Energy Strategy (December 2017);
 - The Scottish Government's declaration of a Climate Emergency (April 2019);
 - The Scottish Climate Change Plan Update (2020);
 - The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 and the legally binding net zero target for 2045 and interim targets for 2030 and 2040;
 - The Scottish Government's 'Programme for Government' (2022);
 - The Onshore Wind Policy Statement (OWPS) (December 2022);
 - The Draft Energy Strategy and Just Transition Plan (January 2023); and
 - The Scottish Government's 'Programme for Government' (2023);
 - The Onshore Wind Sector Deal (2023).
- 3.3.4 The Proposed Development relates to the generation of electricity from renewable energy sources and comes as a direct response to national planning and energy policy objectives.
- 3.3.5 The Proposed Development would make a contribution to the attainment of emissions reduction, renewable energy and electricity targets at both the Scottish and UK levels. Detailed reference to the renewable energy policy framework will be provided in the Planning Statement.

3.4 National Planning Policy and Guidance

National Planning Framework 4

- 3.4.1 National Planning Framework 4 (NPF4) forms part of the statutory development plan. Section 13 of the Planning (Scotland) Act 2019 amends Section 24 of the Town and Country Planning (Scotland) Act 1997 Act (the '1997 Act') regarding the meaning of 'development plan'. Such that for the purposes of the 1997 Act, the development plan for an area is taken as consisting of the provisions of:
- The National Planning Framework; and
 - Any Local Development Plan (LDP).
- 3.4.2 NPF4 introduces centralised development management policies which are to be applied Scotland wide, and also provides guidance to Planning Authorities with regard to the content and preparation of LDPs.
- 3.4.3 NPF4 continues the approach set out in NPF3 of identifying national developments. Proposed National Development 3 (ND3) is entitled 'Strategic Renewable Electricity Generation and Transmission Infrastructure'. The Proposed Development would therefore have national development status as per these provisions of NPF4. The most relevant policies include the following:
- Policy 1: Tackling the Climate and Nature Crisis;
 - Policy 3: Biodiversity;
 - Policy 4: Natural Places;
 - Policy 5: Soils;
 - Policy 6: Forestry, Woodland and Trees;
 - Policy 7: Historic Assets and Places; and
 - Policy 11: Energy.
- 3.4.4 For the consideration of onshore wind energy development, Policy 11 is the lead policy. NPF4 will be the key policy consideration for the determination of the Proposed Development as part of the statutory Development plan.

National Planning Guidance

- 3.4.5 National planning guidance and advice are material considerations, which are relevant to the Proposed Development and will be considered in the EIA Report. These include, but are not limited to, the following documents:
- Planning Advice Note (PAN) 1/2011 Planning and Noise (Scottish Government, March 2011);
 - PAN 2/2011 Planning and Archaeology (Scottish Government, July 2011);
 - PAN 1/2013 Environmental Impact Assessment (Scottish Government, August 2013);
 - PAN 51 Planning, Environmental Protection and Regulation (Scottish Government, October 2006);
 - PAN 60 Planning for Natural Heritage (Scottish Government, January 2008);
 - PAN 69 Planning and Building Standards Advice on Flooding (Scottish Government, August 2004);
 - PAN 75 Planning for Transport (Scottish Government, August 2005);
 - PAN 79 Water and Drainage (Scottish Government, September 2006).

3.5 Local Development Plan

- 3.5.1 The local planning policy context applicable to the Application Site will be taken into account and will be described in the EIA Report. The application site is located within the administrative area of Argyll and Bute Council.
- 3.5.2 The Local Development Plan for the site comprises the Argyll and Bute Local Development Plan (the 'ABLDP') (adopted 2015) and associated Supplementary Guidance (SG).
- 3.5.3 ABLDP policies of particular relevance are as follows:
- LDP STRAT 1 - sustainable development;
 - LDP DM1 - development within development management zones;
 - LDP 3 – Supporting the Protection, Conservation and Enhancement of our Environment;

- LDP 5 – Supporting the Sustainable Growth of Our Economy Policy; and
 - LDP10 – Maximising our Resources and Reducing our Consumption.
- 3.5.4 The ABLDP was adopted prior to NPF4 coming into force and reflects the provisions of NPF3 and Scottish Planning Policy, both now superseded.
- 3.5.5 The Council's LDP2 has completed its Examination and is to be adopted by the end of February 2024.
- 3.5.6 Given the imminent adoption of LDP2 its policy provisions will be considered and taken into account. Within LDP2 the lead policy will be Policy 30 'The Sustainable Growth of Renewables'. Other relevant LDP2 policies will include the following:
- Policy 02 – Outwith Settlement Areas;
 - Policy 04 - Sustainable Development;
 - Policy 59 – Water Quality and the Environment;
 - Policy 71 – Development Impact on Local Landscape Areas (LLA);
 - Policy 77 – Forestry, Woodland and Trees; and
 - Policy 79 – Protection of Soil and Peat Resources.
- 3.5.7 Many of the considerations in these policies are already covered in LDP2 Policy 30.
- 3.5.8 The Council's Landscape Wind Energy Capacity Study (LWECS) is not part of the Development Plan and was last updated in 2017, prior to publication of the OWPS and NPF4. The policy context and NatureScot advice described in section 1.1 of LWECS has all been superseded and is out of date and inconsistent with current NatureScot guidance. In addition, once LDP2 is adopted the Supplementary Guidance will no longer be a material consideration.
- 3.5.9 It should be noted that a Planning Statement will be provided with the application for consent (but separate from the EIA Report) which will contain an assessment of the accordence of the Proposed Development with relevant policy documents as referred to above.

3.6 Conclusions

- 3.6.1 The Proposed Development will make a contribution to the attainment of renewable energy and electricity targets and emissions reduction at both the Scottish and UK levels and the quantification of this contribution would be described in the EIA Report.
- 3.6.2 The EIA Report will summarise the renewable energy policy framework, but the detail and policy appraisal will be provided in a supporting Planning Statement to accompany the Section 36 application.

4. Landscape and Visual

4.1 Introduction

- 4.1.1 This chapter sets out the proposed scope of assessment to consider the significant landscape and visual effects that may arise on landscape fabric, character and designations, and for visual receptors – both during the day and at night.
- 4.1.2 The proposed scope of Residential Visual Amenity Assessment (RVAA) is also set out within this chapter. This is a separate technical assessment to Landscape and Visual Assessment (LVIA) as set out at 4.4.14 below.

4.2 Environmental Baseline

Policy, guidance and documented baseline

- 4.2.1 The Site is located within Argyll and Bute. Policy and local guidance relevant to the LVIA for the Proposed Development includes the following national and local policy:
- National Planning Framework 4 (NPF4), Scottish Government, Feb. 2023 – in particular policies 4 and 11;
 - Onshore Wind Policy Statement (OWPS), Scottish Government, Dec. 2022; and
 - Argyll and Bute Local Development Plan, Argyll and Bute Council (March 2015).
- 4.2.2 It is also noted that Argyll and Bute LDP2 is in the late stages of preparation prior to adoption and a "Notification of Intention to Adopt" was issued on 05/02/2024. Following adoption, current Argyll and Bute Supplementary Guidance will no longer be in force, though a reference to the Landscape Wind Energy Capacity Study will be retained under proposed Policy 30 - The Sustainable Growth of Renewables.
- 4.2.3 Prior to the adoption of LDP2, local planning guidance relevant to the LVIA for the Proposed Development includes landscape related policies of potential relevance to the LVIA. However, it is considered that the provisions of NPF4 take precedence over this soon to be superseded supplementary guidance.
- 4.2.4 Other local planning authorities within 20km of the Site include Loch Lomond and the Trossachs National Park, Inverclyde, North Ayrshire and a very limited area of Renfrewshire beyond 17.5km to the south-east. Argyll and Bute, North Ayrshire and Inverclyde include local landscape designations within their planning policy as shown on Figure 4.2.
- 4.2.5 The following baseline studies will be used to inform the LVIA:
- Argyll and Bute Landscape Wind Energy Capacity Study (ABLEWCS), Carol Anderson Landscape Associates, 2017;
 - North Ayrshire Landscape Wind Capacity Study (NALWCS), 2018;
 - ClydePlan Landscape Capacity Study for Wind Turbine Development in Glasgow and the Clyde Valley, 2018
 - National Landscape Character Assessment, NatureScot, 2019;
 - The Special Landscape Qualities of the Loch Lomond and The Trossachs National Park, Scottish Natural Heritage, 2010 and related description under Outcome 2 of the Loch Lomond and the Trossachs 2018-2023 Partnership Plan;
 - Special Qualities of the National Scenic Areas, Scottish Natural Heritage, 2010; and
 - West Renfrew Hills Local Landscape Area Statement of Importance, 2019.
- 4.2.6 Character areas identified in the capacity studies will be assessed as the receptors in the consideration of effects on landscape character within their respective areas of coverage, with the national character areas used within other local authority areas. The character descriptions provided in the national character assessment will also be referred to. The documents relating to national and local designations will be used to inform the assessment of effects on the relevant designated areas. No such documents have been identified during initial searches for Argyll and Bute or North Ayrshire.

The Site and Context

- 4.2.7 **Figures 4.1 and 4.2** illustrate the site location and surrounding context.

- 4.2.8 The Site is located within the 1 Steep Ridgeland and Mountains Landscape Character Type (LCT), which forms the upland areas between Loch Fyne and the Firth of Clyde. Nearby character types include an area of the 4 Mountain Glens LCT around the shores of Holy Loch.
- 4.2.9 The Site is not designated either nationally or locally. The nearest designated landscapes are the locally designated Bute and South Cowal Area of Panoramic Quality (APQ) located 1.7km to the west, and Loch Lomond and the Trossachs National Park 2.7km to the north-east.
- 4.2.10 The proximity to the Clyde and sea lochs has a strong influence over the visual character of views in the area, with lochs, sea lochs, and islands often featuring in views which are contained and channelled along and across the water from lower lying settled coastal areas and transport routes. Uplands, moorlands and forestry provide backdrops and skylines to these coastal locations. The Site lies within an open upland area which is surrounded by forest to the south and east and smaller areas of woodland to the north and west. Inland transport routes typically follow valleys and are often vegetated with limited outward visibility. Views from accessible areas of higher ground often offer extensive panoramic outlooks.

Cumulative Baseline

- 4.2.11 Cruach Mhor wind farm is located approximately 11.7km to the north-west of the Site, and Inverclyde 15.3km to the south-east.

4.3 Potential Sources of Impact

- 4.3.1 Effects arising from the Proposed Development will be considered at the following key stages. The nature of the potential impacts relevant to the assessment for each stage will be:

Construction

- 4.3.2 The construction of the project would involve the delivery of materials and components to site; groundworks to form the tracks, turbine foundations and hardstanding areas and the construction of the substation and control building. A crane would be used to erect the turbines and would be on site for a small part of the short-term construction period.
- 4.3.3 Impacts during construction on landscape fabric would be expected to arise from:
- groundworks for the turbine foundations, crane hardstandings control building/substation and associated hardstanding areas and access tracks; and
- 4.3.4 Impacts during construction on landscape character would arise from:
- Short-term construction activity within the Site;
 - changes to landscape fabric as described above, and
 - changes to views towards the Site which would include the crane (when on site), completed and partially completed turbines.
- 4.3.5 Impacts during construction on visual receptors would arise from:
- Short-term movement of vehicles and plant including a large crane within and travelling to and from the Site to deliver and install the turbines and other site infrastructure; and
 - changes to views towards the Site which would include the crane (when on site), completed and partially completed turbines, with increasing similarity to the operational scheme as turbine construction is completed.
- 4.3.6 Impacts during construction on designated landscapes would arise from:
- Short-term changes to the special qualities as a result of the construction activity taking place in a nearby area (given the site is not located within a landscape designation).

Operation

- 4.3.7 The Proposed Development would be in operation for up to 50 years. Impacts during operation on landscape fabric would arise from:
- Changes as a result of the implementation of habitat management; and
 - Presence of the wind farm infrastructure.
- 4.3.8 Impacts during operation on landscape character would arise from:
- The presence and motion of the wind turbines and the presence of associated infrastructure within the Site.
- 4.3.9 Impacts during operation on visual receptors would arise from:

- Changes to views towards the Site to include the presence and motion of the wind turbines and some limited views of the other on site infrastructure, both from static locations and when moving along routes (both existing and proposed).

4.3.10 Impacts during operation on designated landscapes would arise from:

- Changes to the special qualities as a result of visibility of the wind farm in a nearby landscape.

Decommissioning

4.3.11 Impacts during decommissioning would be short-term and similar to those arising during construction except in reverse.

4.4 Methodology and Scope of Assessment and Reporting

Guidance

4.4.1 The primary reference is Guidelines for Landscape and Visual Impact Assessment, 2013 (GLVIA3) as clarified by Landscape Institute Technical Guidance Note 05/23 (draft).

4.4.2 In addition to GLVIA3, the approach to the assessment will be informed by the following key documents (in addition to other relevant guidance):

- General pre-application and scoping advice for onshore wind farms, NatureScot, 2023;
- Siting and Designing Wind Farms in the Landscape, NatureScot, 2017;
- Visual Representation of Wind Farms, NatureScot, 2017;
- Assessing the cumulative landscape and visual impact of onshore wind energy developments, NatureScot, 2021; and
- TGN 02/19 Residential Visual Amenity Assessment (RVAA), Landscape Institute, 2019.

Study Area

4.4.3 An initial study area of 45km radius has been used to prepare a bare ground, tip height (200m) ZTV study (See **Figure 4.1**) based on NatureScot guidance. In addition, two further ZTV studies have been prepared as shown in **Figure 4.2** and **Figure 4.3**. Figure 4.2 is based on the wind turbine tip heights and shows a 20km study area with modelling of screening by woodland and buildings. **Figure 4.3** is based on nacelle heights (120m) as a guide to the potential visibility of aviation lighting.

4.4.4 Based on the theoretical visibility indicated by these ZTV studies, which is very limited beyond 20km, landscape and visual receptors within 20km will be considered in the LVIA. Those receptors beyond 20km will be scoped out.

Assessing Landscape Effects

4.4.5 Effects will be assessed on landscape character areas and types identified by the baseline studies listed in Section 4.3 above, which are within 20km and would have theoretical visibility as indicated by the ZTV studies.

4.4.6 Effects on designated landscapes (except Gardens and Designed Landscapes) will be assessed based on the purposes of designation; and on the documented special qualities set out in the baseline studies listed in Section 4.3 above.

4.4.7 Effects on the historic significance of Gardens and Designed Landscapes will be considered within the heritage assessment. For LVIA purposes they will be considered as indicators of landscape value, and as visual receptors if they are readily accessible to the public.

Assessing Visual Effects

4.4.8 The assessment of visual effects will focus on public amenity and will consider the effects on the views people see when in settlements; using roads and recreational routes; at tourist and recreational destinations and from near, but not within, their private homes and gardens. As noted in 4.4.4 above, all visual receptors with theoretical visibility of the Proposed Development within 20km will be considered within the LVIA.

Viewpoints

4.4.9 Viewpoint analysis is used to inform the LVIA from selected viewpoints within the study area. The purpose of this is to assess both the scale of visual impact for receptors and to help guide the assessment of the overall effect on visual amenity and landscape character. The viewpoints have been selected to represent views from a range of distances, directions and receptor types (landscape character, visual receptors, specific viewpoints known for their valued views, visitor destination and

designated landscapes) in the proposed 20km detailed study area. Proposed viewpoint locations are set out in Table 4.1 below.

- 4.4.10 As the wind turbines are over 150m in height they will require 2000 candela aviation lighting affixed to the nacelle and 32 candela tower lighting halfway up the towers on all or some of the turbines (subject to agreement of a suitable lighting scheme with the CAA). In line with NatureScot's General Pre-application and Scoping Advice for Onshore Wind Farms (2023), it is anticipated that three photomontages would be sufficient to illustrate the impact of this proposed aviation lighting, given that the position of the aviation lights on the wind turbines will also be indicated on wirelines. Four locations are proposed (see Table 4.1) based on the nacelle height ZTV study (**Figure 4.3**) and the consideration of locations where changes to night-time views may be of most importance. However, visibility from these locations will be checked based on the final aviation lighting design (which may not require lighting of all turbines) and alternative viewpoints proposed if required.

Table 4.1 - Proposed Viewpoints

VP	Location	Distance / Direction	Receptors
1	Lazaretto Point, Ardnadam	2.7km, E	Local residents & road users
2	Dunoon, Ardenslate Road (proposed night photomontage)	3.0km, E	Local residents & road users. Close views of lights from well-populated area.
3	Dunoon Castle Viewpoint	3.6km, SE	Local residents and visitors to panoramic viewpoint and castle
4	Strone Pier	4.4km, NE	Local residents and road users, view from National Park
5	A815, Orchard (proposed night photomontage)	3.3km, N	Local residents and road users, view from National Park. Representing views of lighting from National Park.
6	Benmore	5.5km, N	Visitors to Botanic Gardens, view from National Park
7	Glen Lean	6.2km, NW	Road users, cyclists on Dunoon - Portavadie cycle route. View from Area of Panoramic Quality / proposed Local Landscape Area.
8	A815, Loch Eck	10.8km, N	Road users, view from National Park
9	Kilcreggan (proposed night photomontage)	8.2km, E	Local residents, road users, ferry users (Kilcreggan-Gourock) Views of lighting from residential area with limited lighting - representing settled areas to the east.
10	Three Lochs Way, Garelochhead	15.7km, NE	Long distance trail users
11	A817, Glen Fruin	19.0km, NE	Road users, view from National Park
12	A814, Helensburgh	15.6km, E	Local residents & road users
13	Craigs Top	11.1km, E	Visitors to panoramic viewpoint, local residents
14	McInroy's Point, Gourock	7.4km, E	Local residents, road users, ferry users (Gourock – Dunoon), cyclists on National Cycle Route 753
15	Lunderston Bay	6.9km, SE	Beach visitors, cyclists on National Cycle Route 753, view from Ardgowan GDL
16	Inverkip (proposed night photomontage)	8.6km, SE	Local residents and road users, visitors to war memorial and picnic area. Views of lighting - representing settled areas to the south-east.
17	Wemyss Bay	9.6km, SE	Local residents and road users, ferry users (Wemyss Bay to Rothesay)
18	Kelly's Cut	11.8km, SE	Recreational walkers in West Renfrew Hills LLA & Clyde Muirshiel Regional Park, plus nearby Special Landscape Area.
19	Great Cumbrae	21.1km,	Visitors to panoramic viewpoint at Barbay Hill, view from Special Landscape Area. Beyond detailed study area, but included by exception.
20	Rothesay	14.2km, S	Local residents and road users, visitors to seafront park, ferry users (Wemyss Bay to Rothesay). View from Area of Panoramic Quality / proposed Local Landscape Area.

Cumulative Landscape Visual Assessment

- 4.4.11 Cumulative assessment will be undertaken to identify impacts arising from the Proposed Development when considered together with other wind development in the area, based on NatureScot 'Assessing the Cumulative Impact of Onshore Wind Energy Developments', 2021. Wind farms within the proposed 20km detailed study area will be considered within the cumulative assessment, as it is not considered likely that significant cumulative effects would arise with other wind farms beyond this area given the limited visibility of the Proposed Development beyond 20km.

- 4.4.12 Single turbines and clusters of under 50m in height will not be considered, or modelled in visualisations, unless within 5km of the Proposed Development.
- 4.4.13 Operational and consented wind farms will be included in the assessment baseline and future baseline, and wind farms in planning will be considered in the assessment of potential cumulative effects. Wind farms at the pre-application stage will not be considered unless there is a particular reason to do so (such as proximity or the expected timing of the application is close to that of the Proposed Development) and sufficient information publicly available to inform an assessment.

Residential Properties

- 4.4.14 A Residential Visual Amenity Assessment (RVAA) for all dwellings within 2km of the proposed wind turbine locations will be carried out. The assessment will be accompanied by illustrative material such as ZTV studies, wirelines and/or photomontages where appropriate. The Residential Visual Amenity Assessment, Landscape Institute, 2019 will be used when conducting this part of the assessment.

4.5 Consultation

- 4.5.1 NatureScot and Argyll and Bute Council will be consulted with regards to the scope of the LVIA as proposed within this chapter.

4.6 Matters Scoped Out

- 4.6.1 The following matters and receptors are proposed to be scoped out of assessment:
- Consideration of landscape and visual receptors beyond 20km from the proposed turbine locations;
 - Consideration of effects on Wild Land Areas;
 - Cumulative assessment of single turbines, and clusters of turbines of 50m tip height or lower unless within 5km of the proposed turbine locations.
 - Cumulative assessment of wind farms at the pre-application stage unless there is a specific reason to include them.
 - Residential Visual Amenity Assessment of homes beyond 2km from the proposed turbine locations.

4.7 Questions to Consultees

Q4/1: Do the Council and consultees agree with the proposed scope of assessment?

Q4/2: Do the Council and consultees agree with the proposed viewpoints, identified Table 4.1?

Q4/3: Do the Council and consultees agree with the scope of the cumulative assessment?

Q4/4: Are the Council and consultees aware of any pre-application stage wind farms that they judge warrant inclusion within the cumulative assessment based on their proximity and/or similar application timescales?

Q4/5: Do the Council and consultees agree with the proposed scope of assessment for Residential Visual Amenity?

Q4/6: Are there documented special qualities for the proposed Local Landscape Areas within Argyll and Bute, or for the Special Landscape Areas within North Ayrshire?

4.8 References and Standard Guidance

Landscape Institute and IEMA (2013). Guidelines for Landscape and Visual Impact Assessment.

Landscape Institute (2023). Draft Technical Guidance Note 05/23 'Notes and Clarifications on aspects of the 3rd Edition Guidelines on Landscape and Visual Impact Assessment (GLVIA3)'. Available at: <https://www.landscapeinstitute.org/technical-resource/notes-and-clarifications-on-aspects-of-the-3rd-edition-guidelines-on-landscape-and-visual-impact-assessment-glvia3-consultation/>

Scottish Government (2023). National Planning Framework 4 (NPF4). Available at: <https://www.gov.scot/publications/national-planning-framework-4/>

Scottish Government (2022). Onshore Wind Policy Statement. Available at: <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/>

Argyll and Bute Council (2015). Argyll and Bute Local Development Plan. Available at: <https://www.argyll-bute.gov.uk/planning-and-building/planning-policy/local-development-plan>

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- ClydePlan (2018). Landscape Capacity Study for Wind Turbine Development in Glasgow and the Clyde Valley. Available at: <https://www.clydeplan-sdpa.gov.uk/docman/current-plan-july-2017-other-reports/56-additional-supporting-material-background-report-10-gcv-landscape-capacity-study-january-2016/file>
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- Scottish Natural Heritage (2010). The Special Landscape Qualities of the Loch Lomond and The Trossachs National Park. Available at: <https://www.nature.scot/doc/naturescot-commissioned-report-376-special-landscape-qualities-loch-lomond-and-trossachs-national>
- Loch Lomond and the Trossachs National Park (2018). National Park Partnership Plan (outcome 2). Available at: [Outcome 2: Landscape Qualities - Here. Now. All of us. - Loch Lomond & The Trossachs National Park \(lochlomond-trossachs.org\)](https://www.lochlomond-trossachs.org/Outcome-2-Landscape-Qualities-Here-Now-All-of-us-Loch-Lomond-The-Trossachs-National-Park)
- West Renfrew Hills Local Landscape Area Statement of Importance, 2019. Available at <https://www.inverclyde.gov.uk/assets/attach/10387/WRH-LLA-Statement-of-Importance-2019.pdf>
- NatureScot (2023). General pre-application and scoping advice for onshore wind farms. Available at: <https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms>
- NatureScot (2017). Siting and Designing Wind Farms in the Landscape. Available at: <https://www.nature.scot/doc/siting-and-designing-wind-farms-landscape-version-3a>
- NatureScot (2017). Visual Representation of Wind Farms. Available at: <https://www.nature.scot/doc/visual-representation-wind-farms-guidance>
- NatureScot (2021). Assessing the cumulative landscape and visual impact of onshore wind energy developments. Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments>
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5. Ecology

5.1 Introduction

- 5.1.1 This chapter sets out the proposed approach to the assessment of potential effects on ecology during the construction and operation of the Proposed Development.
- 5.1.2 Ecological features scoped into the assessment have been informed by key legislative and policy drivers, as they relate to nature conservation in Scotland, and include:
- Sites designated for their nature conservation value via:
 - The Conservation (Natural Habitats, &c) Regulations (1994);
 - The Wildlife and Countryside Act (1991);
 - National/local planning policy; and
 - National/local nature conservation policy (including the Ancient Woodland Inventory).
 - Species and habitats offered legislative or policy protection via:
 - The Conservation (Natural Habitats, &c) Regulations (1994);
 - The Wildlife and Countryside Act (1991);
 - The Protection of Badgers Act 1992 (as amended); and
 - National/local planning policy (including relevant Biodiversity Action Plans).
- 5.1.3 The assessment will follow the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK (2018).

5.2 Environmental Baseline

- 5.2.1 Ecology baseline surveys are scheduled for 2024 and no ecological surveys, with the exception of ongoing ornithological surveys, have been undertaken at the time of writing.
- 5.2.2 The environmental baseline has therefore been analysed using publicly available datasets and aerial imagery of the Site.
- 5.2.3 **Figure 5.1** shows the scoping Site boundary. At present, the Ecological Survey Area (in which baseline ecology surveys will be undertaken in 2024) will mirror this boundary. However, it is anticipated that this will be reduced in size by the time the surveys commence, once a defined 'turbine area' has been identified, informed by the iterative design process.

Designated Sites

- 5.2.4 There are no statutory designated sites within the Site boundary. However, one non-statutory site, a stand of unnamed ancient woodland, crosses the western boundary. Ecologically designated sites within 10km of the Site boundary are summarised in **Table 5.1** below and shown on **Figure 5.1**.

Table 5.2 - Statutory and Non-Statutory Ecological Designated Sites within 10km of the Site.

Name	Designation	Qualifying Features	Distance at Closest Point and Orientation from Site Boundary
Statutory Sites			
Loch Eck	Site of Special Scientific Interest (SSSI)	<ul style="list-style-type: none"> – Freshwater habitats: oligotrophic loch. – Fens: flood-plain fen. – Non-vascular plants: bryophyte assemblage. – Freshwater and estuarine fish: common whitefish <i>Coregonus lavaretus</i>, Arctic charr <i>Salvelinus alpinus</i> and fish assemblage. 	6.5km north
Shielhill Glen	SSSI	<ul style="list-style-type: none"> – Woodlands: lowland mixed broadleaved woodland. – Fens: fen meadow. 	9.8km south-east
North End of Bute	SSSI	<ul style="list-style-type: none"> – Woodlands: upland oak woodland. 	9.9km south-west

Name	Designation	Qualifying Features	Distance at Closest Point and Orientation from Site Boundary
		– Upland habitat: upland assemblage.	
Non-statutory Sites			
Unnamed woodland	Ancient Woodland Inventory (AWI)	– Ancient (of semi natural origin).	Within the Site. Stand crosses the western boundary.
Holy Loch	Local Nature Conservation Site (LNCS)	– Habitats: ungrazed coastal marsh, vegetated gravel and damp carr woodland, watercourses, waterbody and permanent and ephemeral pools.	1.8km north-east
	Local Nature Reserve (LNR)		
Loch Striven	LNCS	– Biodiversity ¹	4.7km west
Burneven Hill	LNCS	– Biodiversity	6.6km east
Cloch Road Woodlands	LNCS	– Biodiversity	6.7km east
Ardgowan Woods	LNCS	– Biodiversity	7.5km south-east
Peaton Glen, Ardpeaton Woods	LNCS	– Biodiversity	8km north-east
Cove Tributary Woodlands	LNCA	– Biodiversity	8km north-east
Commoncraig Wood	LNCS	– Biodiversity	8.3km south-east
Swallow Brae Plantation	LNCS	– Biodiversity	8.4km south-east
Daff and Beatock Burns	LNCS	– Biodiversity	8.6km south-east
Creagan Breac, Clach Mackeeney	LNCS	– Biodiversity	8.7km north-east
Wemyss Plantation	LNCS	– Biodiversity	8.6km south-east
Weymss Castle Wood	LNCS	– Biodiversity	9.0km south-east
Square Wood	LNCS	– Biodiversity	9.2km south-east
Kilcreggan Woodlands and Raised Beach	LNCS	– Biodiversity	9.6km north north-east
Coves Reservoir	LNCS	– Biodiversity	9.8km east
Various blocks of named and unnamed woodlands	AWI	– A range of ancient (of semi-natural origin) woodland and long established (of plantation origin) woodland are present within 10km of the Site Boundary as illustrated in Figure 5.1 .	Widespread within 10km

Habitats

- 5.2.5 Habitat and vegetation surveys are scheduled to commence in 2024. The environmental baseline has therefore been assessed using publicly available aerial imagery.
- 5.2.6 Due to its high elevation (504m above sea level at 'Bishop's Seat'), the Site is expected to support a mosaic of typical upland habitats. Undulating topography, as well as widespread deposits of peat, which can be viewed on Scotland's Soils Carbon and Peatland Map (2016), suggest that a variety of vegetative communities will be abundant within the Site. This will likely include blanket bog, wet and dry heath, marshy grassland, acid grassland and scrub communities, among others. Blanket bog communities are particularly likely, however, their condition, structure and function may range extensively due to land management practices, such as grazing, within the Site.
- 5.2.7 The Site is bordered to the north, east and west by commercial forestry, and also supports a complex network of flowing watercourses, many of which flow through the upland habitats.

Protected Species

- 5.2.8 A desk study was undertaken to identify publicly available records of extant protected species populations within 5km of the Site (records from 2000 onwards; up to 10km for bat species).

¹ 'Biodiversity' is assigned when there is no further information available on the qualifying features.

- 5.2.9 The National Biodiversity Network Atlas (n.d.) identified five records of protected species within the 5km search area, and 22 records of bat species within 10km. None of the records were located within the Site boundary. See **Table 5.2** for details.

Table 5.2 – NBN Atlas Protected Species Records within 5km and 10km of the Proposed Development

Species	Scientific Name	No. of Records	Most Recent Record
Terrestrial/Marine Species (within 5km)			
Eurasian otter	<i>Lutra lutra</i>	1	2021
Common porpoise	<i>Phocoena phocoena</i>	4	2018
Bats (within 10km)			
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	7	2022
Brown long-eared bat	<i>Plecotus auritus</i>	5	2020
Unidentified bat species	Chiroptera	7	2019
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	2	2016
Unidentified <i>Pipistrellus</i> species	<i>Pipistrellus</i> sp.	1	2002

- 5.2.10 NBN did not return any publicly available records of wildcat, red squirrel, badger, pine marten or water vole within 5km.
- 5.2.11 The Site is expected to be primarily unsuitable for most terrestrial protected species. The Site's habitat structure, is expected to be comprised of extensive open moorland/bog habitat with a limited areas of dense forestry (largely outwith the Site boundary) to the north, west and east. This provides, in general, sub-optimal habitat for most terrestrial protected species. Nevertheless, the Site provides limited potential for a range of protected species, including:
- bats;
 - otter;
 - pine marten;
 - red squirrel;
 - water vole.

5.3 Potential Sources of Impact

- 5.3.1 The Ecology Chapter of the EIA Report will include a detailed assessment of potential effects, following current best practice, as defined by CIEEM (2018).
- 5.3.2 The assessment will consider the potential effects associated with construction and operation of the Proposed Development as detailed below.

Potential Effects Scoped into the Assessment

- 5.3.3 The assessment will consider the following potential effects:
- Potential effects on designated sites structurally or functionally connected to the Site, during construction;
 - Potential effects on habitats of conservation concern², during construction;
 - Potential effects on protected species recorded within the Site, during construction; and
 - Potential effects on bats, during operation.

Cumulative Assessment

- 5.3.4 The effects of the Proposed Development will be assessed in isolation and in combination with predicted effects of other consented wind farm developments and relevant large-scale developments within 5km of the Proposed Development.

5.4 Method of Assessment and Reporting

- 5.4.1 All field surveys will be carried out in accordance with best practice methods described and endorsed by CIEEM and NatureScot.

² Habitats included on Annex 1 of the Nature Conservation (Habitats, &c.) Regulations (1994), the Scottish Biodiversity List and/or the Local Biodiversity Action Plan, and potential Groundwater Dependent Terrestrial Ecosystems.

- 5.4.2 All field surveys will be completed by competent, professionally qualified ecologists, within accepted ecological survey windows and will include:
- Phase 1 habitat (JNCC,2010), and National Vegetation Classification (NVC) surveys of habitats of conservation concern². NVC communities are described in Rodwell *et al.* (1991-2002).
 - Protected species walkover³ to identify suitable habitat for, and direct evidence of:
 - otter;
 - pine marten;
 - red squirrel;
 - badger; and
 - water vole.
 - Bat roost potential surveys: ground-based survey of potential roost features within 50m plus rotor radius of turbines, escribed in NatureScot guidance (2021).
 - Bat activity surveys: in compliance with current good practice methods (NatureScot, 2021), to include the deployment of up to nine⁴ static full-spectrum bat detectors for a minimum of ten nights each in Spring, Summer and Autumn 2024;
- 5.4.3 All data collected through field surveys will be analysed and interpreted in compliance with best practice methods (Kitchener,2012).

Design Considerations

- 5.4.4 Design considerations relevant to ecological features include:
- Where possible, maintaining a minimum 50m buffer between turbine locations and 1:50,000 scale Ordnance Survey mapped watercourses/bodies;
 - Minimisation of water-crossings;
 - The design of water-crossings to be passable by both mammals and fish;
 - Avoidance of habitats of conservation concern² (see **Chapter 9** in relation to buffers for GWDTEs);
 - Avoidance of deepest peat deposits and use of floating track construction methods where deep peat deposits cannot be avoided; and
 - Avoidance of protected species resting sites (including buffers where appropriate).

Approach to Mitigation

- 5.4.5 Ecological baseline data will be used to inform the emerging design process.
- 5.4.6 Where effects are assessed as being significant, within the context of the EIA regulations, mitigation measures will be identified and agreed. All mitigation measures will be developed on the basis of robust science, drawing on current and emerging good practice, and its likely efficacy and success will be considered.
- 5.4.7 Mitigation measures may include:
- Design iteration to avoid or reduce impacts on ecological features (embedded mitigation);
 - Onsite construction support to advise on, and monitor, impact reduction on ecological features; and
 - Post construction monitoring to ensure mitigation remains successful and proportionate.
- 5.4.8 Plans for biodiversity enhancement, deliverable as part of the Proposed Development, will be outlined within the EIAR. The appropriateness and feasibility of plans will be confirmed with key stakeholders and relevant consultees over the course of the EIA, with a view to appropriate targeted measures being detailed post-consent within an Outline Restoration and Enhancement Plan (OREP). The OREP will aim to facilitate biodiversity enhancement (in line with NPF4, Policy 3), nature recovery and nature restoration focusing on habitats of conservation concern², and will be developed in collaboration with the needs of ornithological enhancement and mitigation. The measures within the OREP will be detailed in a post-consent Restoration and Enhancement Plan (REP).

³ Species-specific survey methods to comply with best practice, as defined by CIEEM and described on www.cieem.net, including appropriate buffers ranging from 50m – 200m.

⁴ Based on the nine turbine scoping layout.

5.5 Consultees

5.5.1 It is proposed that the following statutory consultees will be consulted in relation to the assessment, as field data becomes available:

- NatureScot;
- Scottish Environmental Protection Agency (SEPA); and
- Argyll and Bute Council.

5.5.2 In addition, non-statutory consultees will be consulted as appropriate.

5.6 Matters Scoped Out

5.6.1 The assessment will not consider the following:

- Potential effects on wildcat, as the Site is not in a known wildcat hotspot.
- Potential effects on freshwater pearl mussel and fisheries, as the aquatic environment and features will be protected through standard good practice design considerations and construction methods (subject to discussion and agreement with NatureScot); and
- Effects on ecological features (excluding bats) during operation.

5.7 Questions to Consultees

Q5/1: Do consultees agree with the survey scope set out above?

Q5/2: Do consultees agree with the assessment method (including scoped in/scoped out features)?

Q5/3: Do consultees hold any existing ecological data relating to the Site that may further inform the ecological baseline?

Q5/4: Are consultees aware of any local nature conservation organisation with whom further consultation should be undertaken?

5.8 References and Standard Guidance

CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland (Online). Available at: <https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/> [Accessed November 2023].

JNCC (2010). Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit.

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6. Ornithology

6.1 Introduction

- 6.1.1 This chapter sets out the proposed approach to the evaluation of the ornithological interest of the Site, and to the assessment of potential effects on birds during construction and operation of the Proposed Development.
- 6.1.2 The ornithological assessment will be carried out in line with relevant legislation and standards, as well as having due regard to the following guidance:
- European Commission (2011) Wind energy developments and Natura 2000.
 - NatureScot (SNH, 2016) Assessing connectivity with Special Protection Areas (SPAs).
 - NatureScot (SNH, 2017) Recommended bird survey methods to inform impact assessment of onshore wind farms.
 - NatureScot (SNH, 2018a) Assessing significance of impacts from onshore wind farms outwith designated areas, and
 - NatureScot (SNH, 2018b) Assessing the cumulative impacts of onshore wind farms on birds.

6.2 Environmental Baseline

Designated Sites

- 6.2.1 **Table 6.1** lists the sites designated for their ornithological features within 20 km of the Site and these are also shown in **Figure 6.1**.

Table 6.1 - Designated Sites within 20km of the Proposed Development

Designation	Name	Designated for	Distance from Site boundary
SPA	Renfrewshire Heights	Hen harrier	10.6 km south-east
SSSI	Renfrewshire Heights	Hen harrier	10.6 km south-east
SSSI	North End of Bute	Breeding bird assemblage	11.9 km south-west
SSSI	Central Lochs, Bute	Greylag goose, non-breeding	14.6 km south
SPA	Inner Clyde Estuary	Redshank, wintering	15.3 km east
SSSI	Inner Clyde	Cormorant, wintering Eider, wintering Goldeneye, wintering Oystercatcher, wintering Red-breasted merganser, wintering Red-throated diver, wintering Redshank, wintering	15.3 km east

- 6.2.2 Likely significant effects upon Renfrewshire Heights SPA and Inner Clyde Estuary SPA have been dismissed due to the distances between the Site and the SPAs being greater than the reported connectivity distance for the respective qualifying species (SNH, 2016); it is therefore unlikely that significant effects will occur. It follows, therefore, that there will be no detrimental effects on the respective SSSI designations which spatially overlap those of the SPAs.
- 6.2.3 Similarly, the distance between the Site and the North End of Bute SSSI is greater than the reported connectivity distance for the respective qualifying species (SNH, 2016); it is therefore unlikely that significant effects will occur.
- 6.2.4 The distribution of feeding Icelandic greylag geese in Scotland has been mapped in Mitchell (2012). This enables the identification of areas where impacts from proposed developments on geese may be of concern and, conversely, areas which despite being within 20 km have no connectivity with the qualifying interests. Following current NatureScot guidance (SNH, 2016), the Proposed Development, despite being within 20 km of the Central Lochs, Bute SSSI, has no connectivity with the qualifying interests; it is therefore unlikely that significant effects will occur.

Field Survey

- 6.2.5 NatureScot guidance (SNH, 2017) was used for initial survey design. A range of baseline ornithological surveys commenced within the Site and surrounding area in April 2021 and continued until end of August 2023 (providing 30 months of data), exceeding the minimum requirement of up to two years of baseline survey.

- 6.2.6 The Study area has been defined with reference to the Site boundary and encompasses a series of buffers of up to 6 km radius from the Site, with buffer size dependent on the sensitivity of key species to potential effects associated with the Proposed Development.
- 6.2.7 During the design process the Site boundary changed between survey periods, as such the boundaries of the Study area also changed. Accordingly, between April 2021 and August 2022 the original boundary of the Proposed Development, plus buffers of 500 m, 1.5 km, 2.0 km and 6.0 km around this, was surveyed (**Figure 6.2**). Between September 2022 and March 2023, the revised boundary of the Proposed Development was increased, and buffers of 500 m, 1.5 km, 2.0 km and 6.0 km around this, was surveyed (**Figure 6.3**). In April 2023, following finalisation of the turbine layout and application boundary, new buffers were defined to allow the assessment of the finalised Proposed Development (**Figure 6.4**).
- 6.2.8 The assessment will be informed by the following surveys:
- Moorland Bird Surveys (four visits between April and July in 2021, 2022 and 2023; within Site and respective 500 m buffer) amounting to 132.7 hours of survey effort.
 - Scarce Breeding Bird surveys (April to September 2021; February to August 2022; and February to August 2023; within Site and respective buffer extending up to 6 km) amounting to 440.5 hours of survey effort.
 - Black grouse surveys (April and May 2021, 2022 and 2023; within Site and respective 1.5 km buffer) amounting to 50.2 hours of survey effort;
 - Flight activity (vantage point) surveys (April 2021 to August 2023; within Site and respective 500 m buffer) amounting to 987 hours of survey effort, and
 - Winter walkovers (September 2021 to March 2022 and September 2022 to March 2023; within Site and 500 m buffer) amounting to 56 hours of survey effort.
- 6.2.9 Survey methods follow contemporary best practice guidance; further details of the survey methods are provided below.
- Breeding Bird Surveys**
- 6.2.10 Moorland Bird Surveys were carried out on the Site between April and July in each year to gain a preliminary insight into the bird assemblage and possible sensitivities. The survey area for these included the Site and a 500 m buffer zone (**Figures 6.2, 6.3 and 6.4**).
- 6.2.11 The Brown & Shepherd (1993) method for surveying upland waders was modified to provide reliable estimates for some breeding moorland passerines by undertaking some surveys during the first few hours of daylight.
- 6.2.12 Survey visits were conducted four times in 2021, 2022 and 2023. Survey visits were spread across each month to allow for differences in detection rates between early and late breeding species.
- Scarce Breeding Bird Surveys**
- 6.2.13 Priority was given to detecting the species considered most likely to occur; golden eagle (*Aquila chrysaetos*), goshawk (*Accipiter gentilis*), hen harrier (*Circus cyaneus*), peregrine (*Falco peregrinus*), merlin (*Falco columbarius*) and short-eared owl (*Asio flammeus*). Surveys focussed on areas or sites suitable for nesting and foraging within a buffer of between 2 and 6 km of the Site (**Figures 6.2, 6.3 and 6.4**).
- 6.2.14 The survey area for golden eagles consists of suitable habitat within the Site plus a buffer of 6km. For other raptors the survey area consists of suitable habitat within the Site plus a buffer of 2 km. The survey methods used for each species are described below.
- Golden eagle
- 6.2.15 Survey methods given in Hardey *et al.* (2013) were followed. Visits were coordinated with the Argyll Raptor Study Group to avoid unnecessary disturbance. As well as observations from a distance, specific visits to a known nest location were completed outwith the breeding season to check for signs of occupancy and breeding.
- Goshawk
- 6.2.16 Survey methods devised by Dr M. Marquiss (NRP, unpublished) were followed. These methods consisted of observing potential nesting habitat (woods > 3 ha with numerous large and well-spaced mature trees, providing good canopy cover). Observers listened for calling birds and watched for display flights. Areas were also searched for evidence of goshawk occupation (such as faeces, prey

remains, moulted feathers and nests). Particular emphasis was given to stream sides, where tree growth is faster and whorls of branches are further apart.

Peregrine

- 6.2.17 Survey methods given in Hardey *et al.* (2013) were followed. Potential nest sites were visited and checked for evidence of occupation in March and April. Sites to be checked included any nest sites found in previous years by raptor study group workers and crags and steep banks identified from OS maps and searches of the survey area. Surveyors looked for birds or signs of occupation (e.g. faecal splash, fresh plucked prey). Occupied sites would be re-visited between 20 March and 10 May to verify incubation. Where this is not possible sites would be watched from a suitable vantage point for circa 3 hours or until a nest is located.

Hen harrier

- 6.2.18 Survey methods given in Hardey *et al.* (2013) were followed. Emphasis was given to searching habitats considered potentially suitable for nesting; in this case including areas of heath/bog with stands of heather >0.4m tall, and suitable habitats within plantation forest.

Merlin

- 6.2.19 Survey methods given in Hardey *et al.* (2013) were followed. Within suitable habitats, old crow nests (which could be re-used by merlin), fenceposts, hummocks, bushes and trees were checked for signs of occupation (e.g., plucked prey, moulted feathers, pellets and faeces). Emphasis was given to heath/bog habitats with stands of heather >0.4m tall.

Short-eared owl

- 6.2.20 Survey methods given in Hardey *et al.* (2013) were followed. Suitable habitat was checked during April and May for evidence of hunting males, territorial activity and other signs of occupation.

Black grouse lek surveys

- 6.2.21 Suitable habitat within the 1.5 km survey buffer was surveyed for displaying (lekking) male black grouse during April and May in each year (**Figures 6.2, 6.3 and 6.4**). Survey methods were based on those in Gilbert *et al.* (1998) and care was taken to avoid disturbing birds.
- 6.2.22 In areas which were identified as being potentially suitable for display by black grouse, two visits were undertaken within two hours of dawn to locate leks. Visits were conducted in calm, dry weather with good visibility. Observers watched and listened for lekking birds from a number of suitable vantage points.

Flight Activity Surveys

- 6.2.23 Information on bird flight activity was collected during timed watches from strategic Vantage Points (VPs) using the methods described by Band *et al.* (2007). The Flight Activity Survey Area is defined by a polygon around the outermost turbines of the Scoping layout plus an additional 500 m strip around that polygon (**Figures 6.5, 6.6 and 6.7**).
- 6.2.24 Vantage Points were selected through a mix of GIS analysis and field trials, with the aim of maximising ground visibility within the site using the minimum number of points. Viewsheds are derived using a 20 m vertical cut-off and are truncated horizontally to 2 km (**Figures 6.5, 6.6 and 6.7**).
- 6.2.25 During the period April 2021 to August 2022 five VPs were selected. However, due to changes in the turbine layout, during the period September 2022 to March 2023 eight VPs were selected. Due to ornithological constraints the site layout was reduced in size requiring only four VPs during the period April to August 2023.
- 6.2.26 Watches from these VPs did not exceed three hours in length and were timed to ensure each vantage point has observations spread throughout daylight hours each month. A minimum of 36 hours of observation has been completed from each VP for each season, where between April and August is considered the breeding season (**Table 6.2**) and between September to March is the non-breeding season (**Table 6.3**).

Table 6.2 - Summary of Vantage Point watch effort during breeding season (data are hours of observation).

Year	VP No.	Apr	May	Jun	Jul	Aug	Total
2021	1	9.00	9.00	6.00	6.00	9.00	39.00
	2	10.00	9.00	6.00	6.00	3.00	34.00
	3	9.00	9.00	6.00	6.50	6.00	36.50
	4	9.00	9.00	6.00	6.00	9.00	39.00
	5	10.00	9.00	6.00	6.00	6.00	37.00
2022	1	9.00	6.00	9.00	6.00	6.00	36.00
	2	6.00	3.00	9.00	12.00	6.00	36.00
	3	9.00	6.00	9.00	6.00	9.00	39.00
	4	9.00	6.00	3.00	12.00	6.00	36.00
	5	6.00	6.00	12.00	6.00	6.00	36.00
2023	1	9.00	9.00	6.00	6.00	6.00	36.00
	3	9.00	9.00	6.00	6.00	6.00	36.00
	5	9.00	9.00	6.00	6.00	6.00	36.00
	6	9.00	9.00	6.00	6.00	6.00	36.00

Table 6.3 - Summary of Vantage Point watch effort during non-breeding season (data are hours of observation).

Year	VP No.	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2021-2022	1	9.00	6.00	2.00	2.00	5.00	6.00	3.00	33.00
	2	12.00	4.00	2.00	2.00	6.00	6.00	7.00	39.00
	3	9.00	6.00	2.00	2.00	5.00	6.00	6.00	36.00
	4	6.00	6.00	2.00	2.00	6.00	6.00	8.00	36.00
	5	6.00	4.00	2.00	2.00	6.00	6.00	10.00	36.00
2022-2023	1	6.00	3.00	9.00	-	11.00	3.00	4.00	36.00
	2	6.00	3.00	6.00	5.00	5.00	7.00	3.50	35.50
	3	6.00	3.00	3.00	10.00	4.00	6.00	4.00	36.00
	4	6.00	3.00	6.00	3.00	8.00	6.00	4.00	36.00
	5	6.00	3.00	5.00	5.00	7.50	6.00	3.50	36.00
	6	6.00	6.00	11.00	-	7.00	3.00	9.00	42.00
	7	6.00	-	12.00	-	7.00	7.00	4.00	36.00
	8	6.00	6.00	10.00	-	4.00	6.00	4.00	36.00

6.2.27 The height above ground level of flights by target and secondary species were judged to be within one of several bands so that an estimate can be made of flight activity within the zone where turbine blades would be operating. The height bands used in the flight activity surveys are <20m, 20-50m, 50-100m, 100-150m, 150-200m and >200m.

6.3 Potential Sources of Impact

6.3.1 Particular consideration will be given in the assessment to potential effects on bird species whose populations are of moderate to high Nature Conservation Importance and that belong to taxonomic groups that are considered to be particularly susceptible to impacts from the proposed Development. These include:

- Species listed on Annex 1 of European Council Directive 2009/147/EC on the conservation of wild birds (i.e. 'Annex 1' species), in particular those that may be associated with populations of species that are qualifying interests of SPAs in the wider area;

- Species listed in Schedule 1 to the Wildlife and Countryside Act 1981, as amended (i.e. 'Schedule 1' species); and
 - Species of national conservation concern, not included within the above categories, but that are present within the study area in nationally or regionally important numbers (e.g. species on the UK Red List of Birds of Conservation Concern (Stanbury *et al.*, 2021)).
- 6.3.2 Taking account of the findings of the work undertaken to date, whilst still adopting a precautionary approach, potential ornithological effects associated with construction and/or operation of the proposed Development include:
- Disturbance and/or displacement from supporting habitats during construction works.
 - Loss/degradation of habitats through construction works, permanent structures and access tracks.
 - Displacement from and disturbance to foraging, nesting, roosting habitat from the operational Development.
 - Mortality from collision with wind turbine blades; and
 - The potential for cumulative effects arising from the combined effects of other existing and proposed developments within the wider area affecting the same bird populations.
- 6.3.3 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from other similar projects, species of low conservation concern (e.g., green-listed Birds of Conservation Concern), or those not considered sensitive to wind farm developments are proposed to be scoped out of the assessment, as per NatureScot guidance (SNH, 2018a).

6.4 Method of Assessment and Reporting

- 6.4.1 Effects will be assessed against the existing baseline conditions, i.e., without the proposed Development present. This assessment will be carried out assuming that there are no existing significant adverse effects on the population, range or distribution of a species (i.e., no significant effect on the species' conservation status) and no significant interference with the flight paths of migratory birds.
- 6.4.2 The assessment will therefore first identify the possible effects of the proposed Development and will then consider the likelihood of their occurrence. A judgement will then be made as to whether or not these effects are significant with respect to the EIA Regulations. In judging whether a possible effect is significant or not, two principal factors will be taken into account; the nature conservation importance of the bird populations present and the magnitude of the likely effect. In assessing the effects, emphasis will be given to the national and regional populations of the species.
- 6.4.3 Impacts will be assessed in relation to species' population, range and distribution. Key considerations will include territory occupancy, breeding success, foraging success and ranging behaviour. The assessment will:
- Evaluate the nature conservation importance of the bird interest in a systematic manner; and
 - Estimate the magnitude of likely effects on each species as a result of the proposal.
- 6.4.4 The significance of each potential effect will be judged by integrating scales relating to ecological value, behavioural sensitivity and effects magnitude in a reasoned way, in the context of the status of, and trends within, species' regional populations (as defined by NatureScot Natural Heritage Zones - NHZ). If required, measures will be presented to mitigate any effects deemed to be significant in terms of the EIA Regulations.

Cumulative effects

- 6.4.5 The effects of the proposed Development will be assessed in isolation and in combination with predicted effects of other wind farm developments in the same NHZ. The assessment of cumulative effects will be undertaken following published guidance (SNH, 2018b).

Approach to Mitigation

- 6.4.6 Baseline results will be taken into consideration in the process of finalising the proposed Development layout.
- 6.4.7 A number of mitigation measures will be considered to minimise the effect of the proposed Development on bird species. Where possible, the findings of the survey work will be used to inform the detailed scheme design.
- 6.4.8 The review of construction timing and land management regimes will also be considered as appropriate, in consultation with the appropriate statutory consultees.

- 6.4.9 The need for, and scope of, further monitoring of bird activity in relation to the proposed Development will also be defined as part of the assessment process.

Design Considerations (Embedded Mitigation)

- 6.4.10 The following considerations relating to ornithological interests will be incorporated into the proposed Development design:
- All golden eagle breeding sites recorded during baseline surveys will be buffered by a minimum of 1400 m.
 - The final turbine layout will be designed to minimise potential effects on golden eagle by avoiding the creation of turbine strings and outliers, and by maintaining a turbine cluster (Prospective guidance from Natural Research to NatureScot (NatureScot, 2021)).

6.5 Consultation

- 6.5.1 It is proposed to consult the following stakeholders in relation to the assessment:

- NatureScot.
- Royal Society for the Protection of Birds (RSPB); and
- Argyll Raptor Study Group.

6.6 Questions to Consultees

Q6/1: Do the consultees agree that SPAs can be scoped out of the EIA given the lack of connectivity?

Q6/2: Are the consultees content with and / or have any comments on the baseline survey methods and level of survey effort, taking into consideration current guidance, the proposed scale and location of the proposed Development?

Q6/3: Are the consultees content with and / or have any comments on the list of potential effects and impact assessment methods?

Q6/4: Are there any consultees in addition to those listed in paragraph 6.5.1 who should be contacted?

6.7 References and Standard Guidance

Band, W., Madders, M. & Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at wind farms. In de Lucas, M, Janss, G.F.E. and Ferrer, M. (Eds.) Birds and Wind Farms: Risk assessment and Mitigation, pp. 259 - 275. Quercus, Madrid.

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7. Cultural Heritage

7.1 Introduction

- 7.1.1 This section outlines the baseline archaeological and cultural heritage conditions within the Site and study areas and outlines the methodology that will be utilised for the identification and assessment of direct and settings effects on heritage assets within the EIA Report. This section also considers the potential for significant effects on heritage assets arising from the Proposed Development and highlights instances where mitigation measures may be required.
- 7.1.2 This section of the EIA Scoping Report has been produced by AOC Archaeology Group, a Registered Organisation of the Chartered Institute for Archaeologists (CIfA). This Scoping Report is supported by the following Figures:
- Figure 7.1: Constraints map showing all heritage assets within 1km of the Site
 - Figure 7.2: Constraints map of all designated assets within 5km of the Site (with ZTV)
 - Figure 7.3: Constraints map of selected designated assets within 10km of the Site (with ZTV)

7.2 Environmental Baseline

- 7.2.1 The following scoping baseline has been informed by:
- The National Record for the Historic Environment (NRHE) as held by Historic Environment Scotland (HES) including that available via Canmore and Pastmap;
 - Historic Environment Record (HER) data as available online via Pastmap;
 - The British Geological Survey (BGS);
 - National Collection of Aerial Photography (NCAP); and
 - National Library of Scotland for Ordnance Survey maps.
- 7.2.2 Each asset within the 1km Study Area has been assigned an 'Asset No.' unique to this report. These assets are depicted on Figure 7.1. Figures 7.2 and 7.3 show the locations of the Designated Heritage Assets that are referred to within this Chapter. Designated heritage assets referred to in the chapter are identified by their designation number as applied by HES.

Proposed Development

- 7.2.3 The Proposed Development would comprise of up to nine wind turbines (up to 200m high), up to 20MW of battery storage and Access Tracks. The currently proposed wind turbine locations are illustrated on Figure 7.1. Potential effects in regard to the construction of the access tracks and battery storage (whose design is yet to be finalised) will be limited to direct impacts.

Site Context

- 7.2.4 The British Geological Survey (BGS, 2023) records that the western end of the Site and the northern half of the Site is largely underlain by the Beinn Bheula Schist Formation – Psammite, a metamorphic bedrock formed between 1000 and 541 million years ago in the Tonian and Ediacaran periods. The BGS also records a bedrock geology formed by the Southern Highland Group – Metabasalt, another metamorphic bedrock formed between 1000 and 499 million years ago between the Tonian and Cambrian periods at the very northern end of the Site. The southern half of the Site is underlain by metamorphic bedrocks of the Loch Katrine Volcaniclastic Formation that formed between 635 and 541 million years ago during the Ediacaran period. The BGS only records superficial deposits within limited areas in the northern part of the Site. Where recorded these superficial deposits are recorded as Devensian Till.
- 7.2.5 A constraints map provided by the client indicates that a section of the western and northern part of the Site is underlain by 'Class 1 Peat' with the majority of the rest of the area within the redline boundary being underlain by 'Class 2 Peat'. Paleoenvironmental and archaeological remains are also known to survive buried in peat deposits. Historic and modern research in Scotland suggests that paleoenvironmental remains can survive beneath accumulations of peat and that this can help to better our understanding of vegetational and landscape development and thus anthropogenic activity in the region. As such, there is the potential for archaeological and paleoenvironmental remains to survive in the identified peat deposits within the Site.

Non-designated Heritage Assets

- 7.2.6 No non-designated heritage assets have been identified within the Site. Only four heritage assets have been identified within 1km of the Site (Figure 7.1); a trio of non-designated post-medieval farmhouses

named 'Stronsaul' (Asset 1 - HER Id: NS17NW 9), 'Glenkin' (Asset 2 - HER Id: NS17NW 7) and Inverchaolain Glen (Asset 3 – HER Id: NS17NW 4) and a cairn named Ellers Burn, 'bodach Bochd' (Asset 4 - HER Id: NS17NW 3). The farmstead at Stronsaul (Asset 1) has no description. 'Glenkiln' (Asset 2) has a description which notes that is a 'farmstead, comprising two roofed buildings, one unroofed building and five enclosures' that is depicted on the 1st edition of the OS 6-inch map and that now 'Two roofed buildings, one partially roofed building and one enclosure' are shown on the current edition of the OS 1:10000 map (<http://canmore.org.uk/site/153762>). 'Inverchaolain Glen' (Asset 3) is described as being a 'farmstead, comprising one unroofed building and two enclosures, and a sheepfold' that are depicted on the 1st edition of the OS 6-inch map and that 'they are not shown on the current edition of the OS 1:10000 map (1978)' (<https://canmore.org.uk/site/81915>). 'Ellers Burn, 'bodach Bochd' (Asset 4) is described as being a 'a pile of stones situated near the watershed' with the name meaning 'Poor Old Man' (<https://canmore.org.uk/site/78867>).

- 7.2.7 The First Edition Ordnance Survey (OS) maps (Argyllshire, Sheet CLXXXIII, Publication date: 1868; Argyllshire, Sheet CLXXXIII, Publication date: 1869; Argyllshire, Sheet CLXXXIV, Publication date: 1869 and Argyllshire, Sheet CLXXXIV, Publication date: 1869) depict the Site as being within undeveloped upland moorland that is criss-crossed by minor watercourses that feed in to the Glenkin Burn to the west of the Site, which itself winds northwards to Little Eachaig River. The northern area within the Site is annotated as 'Strone Saul' whilst the areas in the southern part of the Site are annotated as 'Big Knap' and 'Eilligan'. This map shows the complexes of buildings annotated as 'Stronsaul' (Asset 1), 'Glenkiln' (Asset 2), 'Leac a' Ghaill' (Asset 3) and the annotated cairn of 'Bodach Bochd' (Asset 4) that are located to the west and south-west of the Site.
- 7.2.8 Aerial photographs held by NCAP dating to 1970 (Sortie: MER/080/70, Frame: 0138) and 1988 (Sortie: ASS/51588, Frame: 0035) shows that the Site is undeveloped moorland with areas of managed plantation woodland to its immediate west, east and north. Satellite imagery (Google 2023) indicates that there has been no subsequent development within the Site.

Designated Heritage Assets

- 7.2.9 No designated heritage assets are recorded within 1 km of the Site.
- 7.2.10 Twenty Scheduled Monuments are situated within 10km of the Site. These Scheduled Monuments are listed in Table 7.1 below with details of whether they appear to have any intervisibility in a bare earth ZTV that has been produced for the scheme.

Table 7.1 – Scheduled Monuments within 10km of the Site

DESIGNATION REFERENCE	NAME	Distance to Site	INTERVISIBILITY WITH BARE EARTH ZTV
SM3894	DUNLOSKIN WOOD, PLATFORMS AND CHARCOAL PRODUCTION AREA	1.18km	Yes
SM3235	ARDNADAM, SETTLEMENT, CHAPEL AND ENCLOSURE 215M W OF THE LARCHES	1.4km	Yes
SM6552	ADAM'S CAVE, CHAMBERED CAIRN, ARDNADAM	1.5km	Yes
SM13683	ARDHALLOW BATTERY AND DEFENCES	3.3km	Yes
SM5260	KILMUN COLLEGIATE CHURCH, TOWER AND BURIAL GROUND	3.18km	Yes
SM5450	DUNOON CASTLE	3.36km	Yes
SM12802	CLOCH LIGHTHOUSE, ANTI-SUBMARINE TETHERING POINTS 15M N AND 10M SW OF	6.17km	Yes
SM5398	CREAG BHREAC, CAIRN 100M ESE OF	6.24km	No
SM12803	CLOCH LIGHTHOUSE, COAST BATTERY 295M SSE OF	6.41km	Yes
SM4617	KNOCKAMILLIE CASTLE	6.76km	No
SM12855	MOORFOOT PRIMARY SCHOOL, CUP-MARKED STONE 345M SSW OF	8.5km	Yes
SM3333	ARDTARAIG, CHAPEL AND ENCLOSURE 155M W OF	8.51km	No
SM12814	KIRKBRAE HOUSE, BURIAL VAULT 65M ENE OF	9km	Yes
SM1651	KEMPOCK STONE, INVERKIP	9.34km	Yes
SM3234	FEARNOCH, CHAPEL, ENCLOSURE AND HOLY WELL 400M E OF	9.53km	No
SM5431	TOLLARD HOUSE, ROCK CARVINGS 60M SSE OF	9.70km	No
SM3244	LOCH THOM-OVERTON, WATER CUT	9.85km	Yes
SM300	TOWARD CASTLE	9.86km	No
SM9190	DUN DARAICH, FORT, GLEN FINART, COWAL	9.99km	No
SM12826	LARKFIELD BATTERY, ANTI-AIRCRAFT BATTERY 175M ESE OF 1 HILLTOP ROAD	10.01km	Yes

- 7.2.11 Ten Category A Listed Buildings are located within 10km of the Site. Thirty-four Category B Listed Buildings and 22 Category C Listed Buildings are also located within 5 km of the Site.
- 7.2.12 These Listed Buildings outlined are listed in Table 7.2 below; of these only the Category B Listed Garrochan House (LB11887) and Inverchaolain Old Manse (LB11885) appear to have no intervisibility with the proposed development according to the bare earth ZTV..

Table 7.2 – Selected Listed Buildings within 10km of the Site

DESIGNATION REFERENCE	NAME	LISTED BUILDING CATEGORY
LB5075	STRONE, DUNSELMA INCLUDING OUTBUILDING, BOUNDARY WALLS, GATES AND GATEPIERS	A
LB6438	BENMORE BOTANIC GARDEN, BENMORE HOUSE, GOLDEN GATES	A
LB6582	KILMUN, OLD KILMUN HOUSE, INCLUDING BOUNDARY WALLS	A
LB26440	ST. JOHN'S CHURCH OF SCOTLAND. HANOVER STREET AND ARGYLL STREET	A
LB26450	DUNOON PIER WITH WAITING ROOMS AND PIER MASTER'S OFFICE, SIGNAL TOWER AND ADJOINING TEAROOM, TICKET LODGE, PIER RAILINGS	A
LB5073	ST MUNN'S PARISH CHURCH (CHURCH OF SCOTLAND) INCLUDING ARGYLL AND DOUGLAS MAUSOLEA, ASSOCIATED BUILDINGS AND GRAVEYARD AND EXCLUDING SCHEDULED MONUMENT SM5260, KILMUN	A
LB12480	ARDGOWAN HOUSE	A
LB43442	GLEN EDEN VILLA	A
LB43452	KNOCKDERRY CASTLE	A
LB43472	CRAIG AILEY VILLA	A
LB85	KILMUN PIER AND ASSOCIATED BUILDINGS	B
LB5067	KILMUN, K6 TELEPHONE KIOSK AT KILMUN PIER	B
LB5071	HAFTON HOUSE	B
LB5074	HAFTON HOUSE DRYBRIDGE OVER REAR RAILWAY	B
LB6436	BENMORE BOTANIC GARDEN, BENMORE HOUSE, FERNERY	B
LB26429	DUNOON HIGH KIRK (OLD PARISH CHURCH), KIRK STREET, CHURCH OF SCOTLAND.	B
LB26430	'BALLOCHYLE HOUSE' KIRK STREET.	B
LB26431	CORNER HOUSE, 2 CASTLE STREET AND 44 KIRK STREET AND ADJOINING WALL TO NORTH	B
LB26432	4, 6, 8 CASTLE STREET	B
LB26433	KIRK STREET, BOUNDARY WALL OF CASTLE GARDENS	B
LB26434	CASTLE HOUSE, CASTLE GARDENS.	B
LB26435	GATE-LODGE TO CASTLE HOUSE WITH GATE-PIERS AND SCREEN WALLS, PIER ESPLANADE.	B
LB26437	STATUE OF "HIGHLAND MARY"	B
LB26438	ARGYLL HOTEL, ARGYLL STREET	B
LB26439	ARGYLL STREET, BURGH HALL BUILDING	B
LB26442	CLYDE COTTAGE, ALEXANDRA PARADE	B
LB26444	HUNTER'S QUAY, CAMMES REINACH	B
LB26445	'BEACH HOUSE' CORNER OF JANE STREET AND CLYDE STREET.	B
LB26446	AUCHAMORE FARMHOUSE AND STEADING WITH BOUNDARY WALL, AUCHAMORE ROAD.	B
LB26448	HOLY TRINITY CHURCH, KILBRIDE HILL (EPISCOPAL)	B
LB26449	KIRN CHURCH OF SCOTLAND, KIRN BRAE	B
LB26451	MILTON HOUSE (DISTRICT COUNCIL OFFICES)	B
LB43020	BENMORE VIEW, SHORE ROAD, SANDBANK	B
LB44182	34 ARGYLL ROAD, EDGEMONT	B
LB46551	ROYAL MARINE HOTEL (INCLUDING LODGE, FORMER POST OFFICE, WALL POST BOX, BOUNDARY WALLS AND GATEPIERS) HUNTER'S QUAY, DUNOON	B
LB50432	INVERECK (CHURCH OF SCOTLAND EVENTIDE HOME) INCLUDING OUTBUILDINGS, BOUNDARY WALLS AND GATEPIERS	B
LB50433	KILMUN, EACHAIG BRIDGE INCLUDING STONE PARAPETS	B
LB50440	STRONE, CHOILLE BHEAG INCLUDING OUTBUILDINGS, BOUNDARY WALLS, GATEPIERS AND GATES	B
LB50446	STRONE, SHORE ROAD, CRAIGIELEE INCLUDING FOUNTAIN, BOUNDARY WALLS AND GATEPIERS	B
LB50447	STRONE, SHORE ROAD, DUNSELMA LODGE, INCLUDING BOUNDARY WALLS, GATES AND GATEPIERS	B
LB50809	HILLFOOT STREET, DUNOON PRIMARY SCHOOL AND JANITOR'S HOUSE	B
LB11887	GARROCHAN HOUSE	B
LB11885	INVERCHAOLAIN OLD MANSE, CLACHAN OF INVERCHAOLAIN	B

DESIGNATION REFERENCE	NAME	LISTED BUILDING CATEGORY
LB5065	KILMUN, SHORE ROAD, ANCHORAGE, ARDMUN, FOUNTAIN VILLA, HEATHBANK, LOCHVIEW AND WOODBURN (THE TEA CADDIES) INCLUDING OUTBUILDINGS, BOUNDARY WALLS, GATEPIERS AND GATES	C
LB5080	STRONE, ST COLUMBA'S CHURCH OF SCOTLAND INCLUDING HALLS, BOUNDARY WALLS AND GATEPIERS	C
LB26441	CORNER TENEMENT MOIR PLACE AND CHURCH STREET	C
LB26443	GEORGE HOTEL, GEORGE STREET.	C
LB26447	KILBRIDE BRIDGE, OVER BALGIE BURN	C
LB43021	KILMUN, SHORE ROAD, YOUNGER HALL INCLUDING BOUNDARY WALL, RAILINGS, GATEPIERS AND GATES	C
LB44187	KIRN, THE QUEEN'S HOTEL	C
LB50413	BENMORE BOTANIC GARDEN, FOOTBRIDGE OVER THE EACHAIG RIVER	C
LB50434	KILMUN, GRAHAM'S POINT, CAST IRON BUS SHELTER	C
LB50435	KILMUN, GRAHAM'S POINT, MEMORIAL TO JAMES DUNCAN	C
LB50436	KILMUN, SHORE ROAD, CASHLIE, INCLUDING BOUNDARY WALLS	C
LB50437	KILMUN, SHORE ROAD, FINNART INCLUDING BOUNDARY WALLS, ANCILLARY BUILDINGS AND SUNDIAL	C
LB50439	STRONE, 1, 2, 3, 4, 5, 6 HIGH COTTAGES	C
LB50441	STRONE, DUNSELMA STABLES INCLUDING BOUNDARY WALLS	C
LB50442	STRONE HOUSE INCLUDING BOUNDARY WALLS, GATEPIERS AND GATES	C
LB50443	STRONE, MIDGE LAKE, RHUBEG GROTTTO	C
LB50445	STRONE, SHORE ROAD, THE BOATHOUSE (FORMER DUNSELMA BOATHOUSE) INCLUDING BOUNDARY WALLS, GATES AND GATEPIERS AND JETTY	C
LB50448	STRONE, SHORE ROAD, TYNESHANDON	C
LB50810	HUNTERS QUAY, MARINE PARADE, HUNTERS QUAY HOTEL	C
LB50828	SANDBANK PARISH CHURCH	C
LB52359	DUNOON SHERIFF COURT AND JUSTICE OF THE PEACE COURT, GEORGE STREET, DUNOON	C
LB50444	ROCKBANK INCLUDING COACH HOUSE AND BOUNDARY WALLS, MIDGE LANE, STRONE	C

7.2.13 There is one Inventory Gardens and Designed Landscapes (GDL), the Benmore (Younger Botanic Garden) (GDL00056), situated c.4.55km north of the Site. There are also two Conservation Areas located within 5km of the Site; the Clachaig Conservation Area (CA489), situated 1.77km north-west of the Site and the Dunoon Conservation Area (CA464), situated 2.85km south-east of the Site.

7.2.14 A further three Inventory GDLs are recorded within 10km of the Site:

- Ardgowan (GDL0021), situated 6.4km south-east of the Site,
- Linn Botanic Gardens (GDL00401), situated 8.2km north-east of the Site, and
- Castle Toward GDL00097, situated 8.7km south of the Site (which is located outside the bare earth ZTV).

7.2.15 The West of Scotland Archaeological Service (WoSAS) may record further non-designated assets which it considers to be of national importance within 10km of the Site.

7.2.16 There are no World Heritage Sites or Inventory Battlefields within 10 km of the Site.

7.3 Potential Sources of Impact

Direct Impacts

7.3.1 Direct physical impacts to assets occur when the fabric of known or undiscovered assets are removed or damaged as a result of development. This will be permanent and generally occurs during the construction phase.

7.3.2 Indirect physical effects occur as an indirect consequence of the development such as increased/decreased erosion or damage from vibration of piling again, such impacts are likely to be permanent.

7.3.3 No heritage assets have been identified within the Site and historic mapping indicates that the Site has not been intensively used.

7.3.4 There is the potential for hitherto unknown archaeological and paleoenvironmental deposits and remains to survive on the Site. As such the Proposed Development may have the potential to directly impact hitherto unknown archaeological remains.

7.3.5 The archaeological baseline for the Site within the EIA Report will be informed by aerial photography assessment and a walkover survey. Any identified heritage assets would be preserved in situ, wherever possible, and thus direct impacts would be avoided by design. If heritage assets cannot be avoided by design, a robust programme of mitigation would be required.

Settings Impacts

7.3.6 The Proposed Development has the potential to impact upon the settings of heritage assets with which it is intervisible or where it can be seen in key views towards assets across the landscape. There is also a potential for cumulative impacts on the settings of heritage assets. The assessment will consider the identified heritage assets in the outlined study areas which could be subject to potential impacts upon setting. The EIA Report will be supported by detailed Zones of Theoretical Visibility (ZTV) which will be used to identify assets intervisible with the Proposed Development. It is envisaged that visualisations (either wireframes or photomontages) will be produced for some assets to aid in assessment of settings impacts.

7.3.7 The viewpoints required will be agreed in consultation with HES, WoSAS, and the Landscape and Visual consultants. Based on a rapid review of the types of designated heritage assets within the study areas it is anticipated that cumulative visualisations (photomontages or wirelines) will be provided for the following assets:

- SM5450 – Dunoon Castle – specifically views along or across the Firth from the south and east (potential viewpoint location from reachable coastal areas of GDL00021 Ardgowan);
- GDL00021 – Ardgowan and LB12480 – Category A Listed Ardgowan House (as noted above may also cover view including Dunoon Castle);
- SM6552 - Adam's Cave, chambered cairn, Ardnadam;
- SM3235 - Ardnadam, settlement, chapel and enclosure 215m W of The Larches;
- SM5260, Kilmun and LB5073 – Category A Listed St Munn's Parish Church (Church of Scotland) including Argyll and Douglas Mausolea, associated buildings and graveyard;
- LB6582 - Category A Listed Kilmun, Old Kilmun House, including boundary walls;
- LB26440 – Category A Listed St. John's Church of Scotland. Hanover Street and Argyll Street;
- LB5075 - Category A Listed Strone, Dunselma including outbuilding, boundary walls, gates and gatepiers;
- LB43442 - Category A Listed Glen Eden, Shore Road, Cove And Kilcreggan;
- LB43452 - Category A Listed Knockderry Castle, Cove And Kilcreggan;
- LB26449 – Category B Listed Kirn Parish Church; and
- CA489 – The Clachaig Conservation Area (no appraisal exists – sensitivity change in its wider setting to be informed by consultation with Argyll and Bute Council and WoSAS).

7.3.8 No visualisations are proposed for the Category B and C Listed Buildings along the southern coast of the Holy Loch within Sandbank and Hunters Quay as they would likely be caught in the same field of view as the proposed visualisations from SM5260, Kilmun and LB5073 – St Munn's Parish Church, LB6582 - Kilmun and LB5075 – Strone. Thus those visualisations would be illustrative of visibility from Sandbank and Hunters Quay and of southward views across those settlements.

7.3.9 No visualisations are proposed for the Dunoon Conservation Area and its associated Category B and C Listed Buildings as it is anticipated that the visualisations for the LB26440 – St. John's Church of Scotland and for the SM5450 – Dunoon Castle would be illustrative of both the visibility from within Dunoon and of westward views across the settlement.

7.3.10 No visualisations are proposed for the Inventory Gardens and Designed Landscapes of Benmore (Younger Botanic Garden) (GDL00056) and Linn Botanic Gardens (GDL00401) as these assets are assessed as not having much sensitivity to changes in their wider setting.

7.3.11 The exact location and type of cultural heritage visualisations will be subject to site visits and further consultation with key Consultees.

7.3.12 A full assessment of the impact of the Proposed Development on the setting of designated heritage assets will be informed by detailed site visits, visualisations and the magnitude of impact and level of effect will be dependent upon the final design.

Cumulative Impacts

- 7.3.13 Cumulative impact primarily relate to impacts upon the settings of heritage assets. Whilst there can, in some rare cases be direct cumulative impacts upon heritage receptors none are anticipated here.

7.4 Method of Assessment and Reporting

- 7.4.1 The EIA Report will be prepared in accordance with relevant national and local legislation, policy, and guidance on the historic environment:

Legislation and Policy

- Ancient Monuments and Archaeological Areas Act 1979 (as amended) (UK Government 1979);
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 (as amended) (UK Government 1997);
- Planning etc. (Scotland) Act 2006 (UK Government 2006);
- Historic Environment (Amendment) (Scotland) Act 2011 (Scottish Government 2011a);
- Historic Environment (Scotland) Act 2014 (Scottish Government 2014b);
- Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (UK Government 2017);
- National Planning Framework 4 (NPF4) (Scottish Government, 2023);
- Historic Environment Policy for Scotland (Historic Environment Scotland (HES) 2019), including Designation Policy and Selection Guidance (HES 2019; Updated 2020); and
- Argyll and Bute Local Development Plan (LDP) (ABC, 2016)

- 7.4.2 A Report of Examination relating to the Argyll and Bute Proposed Local Development Plan 2 (LDP2) was published on 13/06/2023 by the Scottish Government's Planning and Environmental Appeals Division (DPEA). Argyll and Bute Council are reviewing the Report of Examination and will prepare an adoption plan and associated documentation in due course. Once adopted it is anticipated that the policies outlined in the LDP2, and its associated supplementary planning guidance, will supersede those policies laid out in the currently adopted LDP.

Technical Guidance

- 7.4.3 The following guidance documents will be consulted during the assessment to assist in the determination of potential effects on heritage assets:
- Planning Advice Note 2/2011: Planning and archaeology (Scottish Government 2011b);
 - Managing Change in the Historic Environment: Setting (HES 2020);
 - Environmental Impact Assessment Handbook v5 (SNH & HES 2018);
 - The Chartered Institute for Archaeologists (ClfA) Code of Conduct: professional ethics in archaeology (2014; Revised 2019; 2020 & 2021);
 - ClfA Regulations for professional conduct (2019; Revised 2021);
 - ClfA Standard and guidance for historic environment desk-based assessment (2014a – updated 2020); and
 - ClfA Standard and guidance for commissioning work or providing advice on archaeology and the historic environment (2014b – updated 2020); and
 - Conservation Area Appraisals as Supplementary Planning Guidance Documents.

Study Areas

- 7.4.4 In order to assess the potential for direct impacts on cultural heritage assets resulting from the Proposed Development, the following study areas have been identified:
- A core study area, which includes all land within the Site, which will be subject to assessment for potential direct effects. This study area will be subject to detailed walkover survey and cultural heritage assets which may be directly impacted by the Proposed Development will be identified.
 - A 1 km study area from the Site for the identification of all known heritage assets and known previous archaeological interventions in order to help predict whether any similar hitherto unknown

archaeological remains are likely to survive within the site and thus be impacted by the Proposed Development.

- A 5 km study area for the assessment of potential effects on the settings of all designated heritage assets including Scheduled Monuments, all Listed Buildings, GDLs, Inventory Battlefields, Conservation Areas, and non-designated heritage assets deemed to be of National Significance by WoSAS.
- A 10 km study area for the assessment of potential effects on the setting of all nationally important heritage assets including Scheduled Monuments, Category A Listed Buildings, GDLs and non-designated heritage assets deemed to be of National Significance by WoSAS.

7.4.5 There are no Inventory Battlefields or World Heritage Sites located within 10km of the proposed wind farm.

Assessment Methodology

7.4.6 The assessment will establish the historic baseline for the Site. Baseline data will be collated from the following sources:

- The National Record for the Historic Environment (NRHE) as held by HES;
- The Historic Environment Record (HER) as supplied by WoSAS;
- National Library of Scotland for published historic and Ordnance Survey maps;
- National Collection of Aerial Photography (NCAP) as held by HES for vertical and oblique aerial photographs;
- Published archival sources;
- Scottish Palaeoecological Archive Database (SPAD) for information regarding the palaeoecological and paleoenvironmental potential of the Site and surrounding landscape;
- Historic Land-Use Assessment Data for Scotland (HLAMap);
- Available client supplied data about the Site;
- LiDAR data and imagery as held by the Scottish Remote Sensing Portal;
- A walkover survey of the Site; and
- Setting assessment visits to designated assets within the ZTV with the potential to be impacted by the Proposed Development.

Impact Assessment

7.4.7 The assessment will distinguish between the term 'impact' and 'effect'. An impact is defined as a physical change to a heritage asset or its setting, whereas an effect refers to the significance of this impact. The first stage of the assessment will involve establishing the importance of the heritage asset and assessing the sensitivity of the asset to change (impact). An assessment of the impact magnitude will be made and a judgement regarding the level and significance of effect will be arrived at.

7.4.8 The setting assessment will be undertaken with reference to HES' Managing Change Guidance on setting and will aim to establish the current setting of the identified heritage assets, how that setting contributes to the understanding, appreciation and experience of those assets and how the Proposed Development could impact upon this.

7.4.9 Cumulative effects will also be considered. The assessment of cumulative effects on heritage assets will be based upon consideration of the effects of the Proposed Development on the settings of heritage assets, in addition to the likely effects of other operational/under construction, consented and proposed (at the application stage) wind farm schemes. Cumulative effects will be considered for designated assets as identified in the 5 km and 10 km study areas.

7.4.10 The assessment will take into account the relative scale (i.e. size and number of turbines) of the identified developments, their distance from the affected assets, and the potential degree of visibility of the various developments from the assets. Cumulative wirelines from those assets most likely to experience significant cumulative impacts on their settings will be provided, if appropriate.

7.4.11 The schemes to be included in the cumulative impact assessment will be those agreed with the planning authority via consultation and will be undertaken according to the guidance in NatureScot's Assessing the Cumulative Impact of Onshore Wind Energy Developments and Historic Environment Scotland's Environmental Impact Assessment Handbook.

7.4.12 NPF4 indicates that development proposals that could affect the setting of a Listed Building 'should preserve its character, and its special architectural or historic interest' (NPF4, Policy 7c) and that

development proposals in or affecting Conservation Areas will only be supported where *'the character and appearance of the conservation area and its setting is preserved or enhanced'* (NPF4, Policy 7d).

- 7.4.13 NPF4 also indicates that development proposals affecting Scheduled Monuments will only be supported where *'significant adverse impacts on the integrity of setting of a scheduled monument are avoided'* (NPF4, Policy 7h) and that development proposals affecting *'nationally important Gardens and Designed Landscapes'* (GDLs) *'will be supported where they protect, preserve or enhance their cultural significance, character and integrity and where proposals will not significantly impact on important views to, from and within the site, or its setting'* (NPF4, Policy 7i).
- 7.4.14 Significant adverse impacts on integrity of setting are judged here to relate to whether a change would adversely affect the asset's key attributes or elements of setting which contribute to an asset's significance. It is considered that a significant impact upon the integrity of the setting of an asset will only occur where the degree of change that will be represented by the Proposed Development would adversely alter those factors of the monument's setting that contribute to cultural significance such that the understanding, appreciation and experience of an asset are not adequately retained.
- 7.4.15 In terms of effects upon the setting of heritage assets, it is considered that only those effects identified as *'significant'* in EIA terms will have the potential to significantly adversely impact upon integrity of setting. Where no EIA significant effect is found it is considered that there would be no significant impact upon the integrity of an asset's setting. This is because for many assets, setting may make a limited contribution to their significance and as such changes would not significantly impact the integrity of their settings.
- 7.4.16 Where EIA significant effects are found, a detailed assessment of adverse impacts upon integrity of setting will be made. Whilst non-significant effects are unlikely to significantly impact integrity of setting, the reverse is not always true. That is, the assessment of an effect as being *'significant'* in EIA terms does not necessarily mean that the adverse effect to the asset's setting will significantly impact its integrity. The assessment of adverse impact upon the integrity of an asset's setting, where required, is a qualitative one, and largely depends upon whether the impact predicted would result in a major impediment to the ability to understand or appreciate the heritage asset.

7.5 Consultation

- 7.5.1 This document forms the start of the consultation process. Following receipt of the Scoping Opinion, detailed follow-up consultation will be undertaken with relevant consultees to further agree the scope of the assessment, as required.
- 7.5.2 Key consultees are HES and the WoSAS. WoSAS will initially be consulted as part of the process of ordering the Historic Environment Record (HER) which will inform the baseline of the EIA Report.
- 7.5.3 Following receipt of the Scoping Responses, further consultation with key consultees will take place to agree on the number and locations of visualisations. Consultation will also be undertaken in regard to potential direct and settings impacts mitigation strategies, if required.

7.6 Matters Scoped Out

- 7.6.1 Direct impacts on cultural heritage assets outwith the Site boundary will be scoped out of the assessment.
- 7.6.2 Impacts on the settings of non-designated cultural heritage assets and features, with the exception of those considered to potentially be of national importance by WoSAS, will be scoped out of the assessment as these assets are generally considered less sensitive to changes in their settings and are judged to be unlikely to be subject to significant settings effects. This will be confirmed with consultees.
- 7.6.3 An initial review of assets outwith a bare earth ZTV (and therefore assessed to reflect a worst case intervisibility scenario for the revised smaller area proposal) has been undertaken to identify designated assets with key views towards them which may feature the Wind Development. It is assessed that the Proposed Development has the potential to appear in the backdrop of key views of Dunoon Castle Scheduled Monument (SM5450); along with its associated Category A (LB26433) and Category B Listed Buildings (LB26434, LB26435, LB26437, and LB26450).
- 7.6.4 It is proposed that the designated assets falling outwith the ZTV will be scoped out of further assessment. This will be confirmed by a site visit and with consultees.
- 7.6.5 Impacts on the settings of heritage assets beyond 10 km from the Site will be scoped out, as most assets beyond that distance are located are too distant to have their settings significantly adversely affected by the Proposed Development. This will be confirmed with consultees.

7.7 Questions to Consultees

- Q7/1:** Is the proposed assessment methodology, including proposed study areas, accepted?
- Q7/2:** Are the receptors and impacts scoped out of the assessment accepted?
- Q7/3:** Are there any assets beyond the proposed study areas that consultees would like to see scoped into the assessment?
- Q7/4:** Do the consultees agree that the proposed visualisations will be sufficient to support or inform the assessment?
- Q7/5:** Are there any additional assets that consultees would like visualisations to be considered for?

7.8 References and Standard Guidance

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https://www.legislation.gov.uk/ukpga/1997/8/pdfs/ukpga_19970008_en.pdf

8. Noise

8.1 Introduction

- 8.1.1 The Proposed Development would consist of up to 9 wind turbines, each with a maximum tip height of 200m and a rated power output of up to 7.2MW each. The project is located in Argyll and Bute and would be approximately 3.1km north-west of Dunoon on the northeastern side of Bishop's Seat and Giant Knowe.
- 8.1.2 Noise impacts could potentially arise during the construction, operation, and decommissioning phases of the Proposed Development. The following information is provided to enable the scope of the EIA to be tailored to the Proposed Development.
- 8.1.3 For the purposes of this assessment, the Vestas V162, with a maximum tip height of 200m and rated power output of 7.2MW has been chosen as the candidate turbine to assess worst case conditions.
- 8.1.4 Should the final selection of candidate turbine differ from the current one, the following information is provided to enable the scope of any future noise assessment to be tailored to the Proposed Development.

8.2 Assessment Methodology

Construction phase

- 8.2.1 The assessment of noise impacts from construction activities includes the installation of ancillary infrastructure as well as the turbines themselves.
- 8.2.2 The factors influencing the impact of plant noise are:
- The number and character of noise sources
 - The duration of activity and hours of work
 - Separation distance between source and receptor
 - Reduction of noise by absorption or screening
- 8.2.3 Although BS 5228-1 does not specify absolute noise limits relating to construction activities, it does provide detailed guidance on the steps that can be taken to minimise potential noise effects.
- 8.2.4 During the construction phase of the project, it is expected that noise levels in the area will be greater due to the operation and movement of plant. In BS 5228-1, the ABC method outlined in E3 sets out the following for classifying the significance of the construction noise:
- 8.2.5 *"Noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq, Period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact."*
- 8.2.6 Works and operation of plant on this site are expected to be limited to the daytime periods: Monday to Friday (07.00–19.00) and Saturdays (07.00–13.00). As a result, the cut off value for significant construction noise impact is deemed to be 65dB(A) $L_{Aeq,T}$. It is possible that, due to weather constraints (e.g., the impact of weather on the crane operation), the erection of the turbines could occur outside of the working hours defined above. For this or any other activity that extends beyond daytime periods, the lower cut-off limits of 55dB(A) and 45dB(A) would apply dependent on time of day.
- 8.2.7 The methodology for determining the levels of the construction noise involves calculating the total sound pressure level at the nearest sensitive receptor for a construction task, $L_{Aeq(12hr)}$, [equation 1], by summing the total potential sound power level for a given construction phase [equation 2] and subtracting a correction for its distance from the nearest property, K_s [equation 3]. These three equations are shown below:
- [1] $L_{Aeq,T} = LWA - K_S$
 - [2] $LWA = 10\log\{10(L_{activity1}/10) + 10(L_{activity2}/10)\dots\}$
 - [3] $K_S = 25\log(R)+1$ [for $R > 25m$]
- 8.2.8 The calculations assume by default that each activity lasts for the full daytime period at 100% intensity.

Operational phase

- 8.2.9 The assessment of operational noise impacts arising from the proposed Wind Farm will take the form of an ETSU-R-97 assessment following the loA GPG.
- 8.2.10 Noise impacts from the operation of the Proposed Development will initially be assessed as a singular project; the potential for cumulative effects would then be considered.
- 8.2.11 Predicted sound immission levels at the nearest receptors resulting from the propagation model will be compared to the applicable noise limits to determine whether those limits would be met. If it is shown that the limits would be met, then the noise impact would be considered acceptable. Should the assessment show exceedance of noise limits, a scheme of mitigation would be proposed that would allow the project to operate in compliance with noise limits, thereby reducing potential impacts to acceptable levels.

Noise Sensitive Receptors (NSRs)

- 8.2.12 Noise Assessment Locations (NALs) will be positioned at Noise Sensitive Receptors (NSRs), 15m from a dwelling façade in the direction of the turbines or as far in that direction as the curtilage will allow, if less than 15m. Where NSRs are located adjacent to each other or readily form a grouping, a single NAL will be selected representing the closest of the adjacent receptors to the proposed turbines.
- 8.2.13 This approach follows the ETSU-R-97 principle of assessing nearest receptors; focussing on the highest impacts allows for a more concise assessment.

Noise Limits

- 8.2.14 The ETSU guidelines recommend that wind turbine noise should be limited to an absolute lower limit between 35 and 40dB(A) [LA90,10min] for quiet daytime periods and 43dB(A) for night-time periods (defined below), or 5dB(A) above the background noise levels, whichever the greater. For locations where the resident has a demonstrable financial involvement in the project, a lower fixed limit of 45dB(A) is applicable, or 5dB(A) above the background noise levels, whichever is the greater.

Table 8.1 - ETSU assessment periods

The quiet daytime periods (amenity hours) are:	
18:00 - 23:00	Monday to Friday
13:00 - 23:00	Saturdays
07:00 - 23:00	Sundays
Night-time periods are: 23:00 – 07:00 every day	

- 8.2.15 For a project whose immission levels are not expected to exceed 35dB(A) at the closest Noise Sensitive Receptors (NSRs), a simplified approach may be taken that allows the project to be approved with a single fixed 35dB(A) noise limit applicable at all times or 45dB(A) where a resident has financial involvement. Where the Proposed Development noise levels exceed 35dB(A), an ETSU-R-97 noise assessment should be undertaken with reference to noise limits derived from measured background noise levels. Full ETSU-R-97 limits will also be required where cumulative turbine noise exceeds applicable lower fixed limits.

Defining the Study Area

- 8.2.16 An initial sound prediction was carried out to assess the required operational noise study area for the project alone. As the lowest possible ETSU-R-97 operational noise limits are 35dB(A), the study area was defined by a 35dB(A) LA90 contour. Three NSRs were found to be located within the 35dB(A) noise contour associated with the Proposed Development, and therefore have the potential for significant operational noise impacts. The resulting study area is shown in **Figure 8.1**.
- 8.2.17 When considering cumulative impact from two or more wind developments at a given NSR, the loA Good Practice Guide states:
- 8.2.18 "If the proposed wind farm produces noise levels within 10dB of any existing wind farm/s at the same location, then a cumulative noise impact assessment is necessary."
- 8.2.19 Although no fixed criteria are given within ETSU-R-97, a search area radius of 3km from any of the proposed turbines is considered a suitable distance within which to assess immission contributions from third-party projects, beyond which potential impacts on receptors would be negligible.
- 8.2.20 Cumulative immission from all third-party wind projects deemed to lie within the cumulative search area plus the Proposed Development should be limited to a level that does not exceed the limits set out in ETSU-R-97.

Significant Presented Headroom

- 8.2.21 The test for available headroom for further development, described at 5.4.11 on p26 of the Good Practice Guide, is 'where there would be no realistic prospect of the existing wind farm producing noise levels up to the total ETSU-R-97 limits'. The suggestion is to look for margins of e.g. 5dB to 10dB.
- 8.2.22 Where a significant margin exists, it is within the capacity of the LPA to agree "a suitable predicted noise level (including an appropriate margin to cover factors such as potential increases in noise) ["X"] from the existing wind farm to be used to inform the available headroom for the cumulative assessment without the need for negotiation or cumulative conditioning."
- 8.2.23 Once presented headroom has been established and a margin "X" applied to the predicted levels for the existing wind farm; what headroom remains is then available to the proposed project. This approach is aimed at resolving the issue where an existing project, consented with limits pegged to background levels, absorbs more operational noise headroom than it credibly requires, preventing further development in the area.

Candidate Turbine Acoustic Data

- 8.2.24 The candidate wind turbine for the Proposed Development is currently the Vestas V162 with a maximum output of 7.2MW, hub height of 119m and tip height of 200m. If selected, all turbine rotors would be fitted with Trailing Edge Serration (TES), a technology that reduces noise emissions. These reductions are reflected in the sound power values obtained from the manufacturer's sound power report ⁵dated 2022-07-01 as given in **Table 8.2** overleaf.

⁵ DMS no.: 0114-3777 V03

Table 8.2 - Sound Power Levels of Vestas V162 7.2MW (TES)

Octave Band (Hz)	V_{10} wind speed (ms^{-1})								
	4	5	6	7	8	9	10	11	12
	Sound Power Level [L_{WA}] for a hub height of 119m [dB(A)]								
63	78.7	82.7	86.6	88.2	88.3	88.6	88.7	88.5	88.5
125	85.2	89.8	94.2	95.8	95.9	96.2	96.5	96.4	96.4
250	88.2	92.8	97.4	99.0	99.1	99.4	99.7	99.8	99.8
500	89.5	93.5	97.6	99.2	99.3	99.6	100.0	100.2	100.2
1000	88.3	92.1	95.9	97.5	97.6	98.0	98.5	98.7	98.7
2000	84.2	87.6	91.3	92.9	93.0	93.5	94.0	94.2	94.2
4000	77.1	80.1	83.7	85.3	85.4	86.0	86.5	86.6	86.6
8000	67.2	69.6	72.9	74.5	74.7	75.4	75.9	75.9	75.9
Total	94.7	98.8	103.0	104.6	104.7	105.0	105.4	105.5	105.5
Uncertainty	2	2	2	2	2	2	2	2	2
IOA Total	96.7	100.8	105.0	106.6	106.7	107.0	107.4	107.5	107.5

- 8.2.25 Information regarding tonality and impulsivity were not included in the manufacturer's sound power report therefore it is proposed that the provision of manufacturer warranties regarding the absence of tonality and impulsivity are included within suitable planning conditions.

Propagation Model

- 8.2.26 The International Standard ISO 9613, 'Acoustics – Attenuation of Sound During Propagation Outdoors - Part 2', sound propagation model will be used for the turbine immission calculations. L_{Aeq} sound propagation will be modelled using WindFarm v5.0.1.2 by ReSoft. Predicted wind turbine immission levels will be calculated, inclusive of appropriate allowance for measurement uncertainties.
- 8.2.27 LA90 levels should be derived by subtracting two decibels from the L_{Aeq} values as per the ETSU-R-97 guidance and subsequent IOA GPG. The input parameters shown in **Table 8.3** will be used and are consistent with the IOA Good Practice Guide.

Table 8.3 - Propagation input parameters

Atmospheric Attenuation Assumptions	
Temperature (°C)	10
Humidity (%)	70
Ground Attenuation Assumptions	
Attenuation factor, G (all regions)	0.5 (semi-soft ground)
Receptor height (m)	4.0

- 8.2.28 The attenuation of sound as it travels through the air varies with frequency. The atmospheric attenuation coefficients to be used in the assessment, corresponding to the assumptions in **Table 8.3**, are tabulated in **Table 8.4**.

Table 8.4 - Attenuation coefficients used for the noise propagation model

Octave Band (Hz)	63	125	250	500	1000	2000	4000	8000
Attenuation Coefficient (dB/km)	0.12	0.41	1.04	1.93	3.66	9.66	32.77	116.88

Barrier effect

- 8.2.29 Line of sight visibility will be checked between the proposed turbines and each receptor's assessment position at 4m height. Where a turbine is not visible from any particular assessment position (at 4m height) a -2dB adjustment to the predicted level from the screened turbine(s) is applicable. Any adjustments will be reported.

Valley effect

- 8.2.30 Certain topographic characteristics have the potential to reinforce the propagation of sound between two locations. The GPG refers to these characteristics as a 'valley' to describe a concave topographic profile. Where this criterion is met, these instances will be reported.

Directivity

- 8.2.31 Where turbine sound propagates from opposing directions relative to an NSR, the result will be a reduction in predicted noise, as the receptor will not experience simultaneous downwind conditions

from both directions. Example reductions are given in the GPG at 4.4. Any adjustments for directivity will be reported.

Noise Impact Assessment

- 8.2.32 Predicted turbine sound levels at the nearest receptors resulting from the propagation model will be compared to the applicable noise limits to determine whether those limits would be met. If it is shown that the limits would be met, then the noise impact would be considered acceptable. Should the assessment show exceedance of noise limits, a scheme of mitigation would be proposed that would allow the Proposed Development to operate in compliance with the noise limits, thereby reducing potential impacts to acceptable levels.

8.3 Environmental Baseline

Study Area

- 8.3.1 The Site is located in Argyll and Bute and is approximately 2.1km north-west of Dunoon on the northeastern side of Bishop's Seat and Giant's Knowe.
- 8.3.2 An indicative layout with turbine positions and nearest noise sensitive properties is shown in **Figure 8.1**.
- 8.3.3 **Table 8.5** lists the names, GPS coordinates of each assessment location and the minimum distance to the proposed turbines for each location.

Table 8.5 - Details of noise assessment locations

Location	Name	X	Y	Approximate Distance to nearest turbine (m)
NAL 1	Ardnadam Farm	215948	680010	1406
NAL 2	Stronsaul	213077	679848	706
NAL 3	Glenkin	212870	679923	935

- 8.3.4 The predicted immission levels shown in **Table 8.6** were calculated using Windfarm v.5.0.1.2. for the Proposed Development at the three nearest receptors.

Table 8.6 - Predicted immission levels of Vestas V162 at NALs

Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
NAL1	25.0	29.6	33.9	34.9	35.0	35.3	35.6	35.7	35.7
NAL2	29.5	34.1	38.3	39.3	39.5	39.8	40.1	40.2	40.2
NAL3	27.4	32.0	36.2	37.2	37.4	37.7	38.0	38.1	38.1

Noise Limits

- 8.3.5 Project specific sound levels are expected to exceed the simplified 35dB(A) limits at three receptors. It is proposed that project limits reference the ETSU-R-97 absolute lower limit of 35dB(A) for quiet daytime periods and 43dB(A) for night-time periods, or 5dB(A) above the background noise levels, whichever the greater.
- 8.3.6 A background noise survey would be conducted in consultation with Argyll and Bute Council Environmental Health. It is suggested that monitoring be conducted at two locations, which would be representative of the closest identified noise sensitive receptors within the study area. A survey would typically involve logging LA90,10min noise levels for a period such that a representative sample of prevailing conditions was observed. This usually takes 2 to 3 weeks. Concurrent wind speed measurements would log speed and direction averaged over consecutive 10-minute periods. This data would be collected and analysed in line with the IoA GPG recommendations. The resulting trends, showing variation of background noise level with wind speed, would inform the ETSU-R-97 noise limit criteria. The predicted turbine noise would subsequently be tested against these criteria.

8.4 Potential Effects and Mitigation

- 8.4.1 Noise arising during the construction phase will be for a limited duration and can be suitably controlled by a planning condition specifying standard noise limits.
- 8.4.2 ETSU-R-97 guidelines provide threshold criteria for acceptability, balancing residential amenity with the benefits of wind energy. Provided such limits can be met, it can be concluded that the development

would be acceptable in noise terms. Therefore, an unacceptable impact would be noise levels exceeding these threshold limits.

- 8.4.3 Iterative layout design is expected to result in a project that does not require operational mitigation to meet the proposed ETSU-R-97 limits and will consider different turbine models, turbine positions and hub heights.
- 8.4.4 As is now standard for most commercial wind turbines of large size, the selected turbine model will be sufficiently flexible to allow operation in alternative 'modes' that reduce operational emission levels, if required to meet approved noise limit criteria.

8.5 Summary of Predicted Impacts and Effects

Construction phase

- 8.5.1 There are no particular features of the site that indicate that construction noise could not be kept to recommended noise limits, as controlled by a suitable planning condition. The nearest third-party receptor has a set back distance of approximately 700m to construction activities. As such, it is recommended that the construction phase noise assessment is **scoped out**.

Operational phase

- 8.5.2 Initial predicted levels for the Proposed Wind Farm exceed a simplified 35dB(A) criterion at three NALs. Therefore, an operational assessment based on the IoA GPG against ETSU-R-97 limits will be **scoped in**.
- 8.5.3 No third-party wind developments have been identified within 3km of the Proposed Development. For as long as this remains the case, a cumulative impact assessment can be **scoped out**.
- 8.5.4 The provision of turbine manufacturer's documentation confirming that the tonality associated with the final turbine selection for the site is below the threshold of audibility should be a pre-commencement condition.

8.6 Policy and Legislation

- 8.6.1 The following sources provide guidance on the assessment of wind turbine noise:
- Scottish Government (2022): Onshore Wind Policy Statement;
 - Scottish Government - Onshore wind turbines: Planning Advice;
 - Planning Advice Note 1/2011 (PAN1/2011): Planning and Noise;
- 8.6.2 For the assessment of operational wind turbine noise, Planning advice endorses the use of ETSU-R-97 and the Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'.
- Guidance - Construction phase**
- 8.6.3 Guidance for assessing construction phase noise is given in:
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites.
- 8.6.4 The standard provides calculation methodology and indicative sound power data for a wide range of construction plant. Assessment of the significance of impacts can be made through comparison of predicted immission levels with criteria that the standard defines.
- Guidance - Operational Phase**
- 8.6.5 Guidance for assessing operational noise from wind farms is given in the Institute of Acoustics Good Practice Guide. This guidance was developed to standardise the approach to noise assessment of wind farms in the UK. The guidance also provides advice on the form of planning conditions that should be adopted for wind farm projects. The GPG does not address the question of what noise limits should be applied as this has been determined by government.
- 8.6.6 The basis for operational wind farm noise limits that have been adopted in the UK is given in: 'ETSU-R-97: The Assessment and Rating of Noise from Wind Farms (1997)'; the Department of Trade and Industry (usually referred to as the Noise Working Group Recommendations). National planning guidance is clear that the IoA GPG and ETSU-R-97 should be followed in the assessment of operational noise from wind farms.

Relevant Standards

- 8.6.7 The International Standard ISO 9613, 'Acoustics – Attenuation of Sound During Propagation Outdoors - Part 2', noise propagation model will be used for the turbine immission calculations.
- 8.6.8 IEC/TS 61400-14:2005 - Declaration of apparent sound power level and tonality values is a standard providing a method to derive appropriate sound power level values from several independent sources to improve robustness.

Low Frequency Noise

- 8.6.9 The current planning guidance is clear; that there are no grounds to suppose that infrasound or low frequency noise (LFN) is an issue at receptor distances from a wind farm and refers to the 2006 study carried out by Hayes McKenzie on behalf of the Department of Trade and Industry (DTI). The report investigates the potential impact of infrasound or low frequency noise arising from wind turbines. The study concluded that infrasound or low frequency noise arising from the operation of wind turbines did not result in adverse health impacts.
- 8.6.10 A further research study in 2016 stated the level of infrasound due to wind turbines is low in comparison to other technical and natural sources. The findings concluded *'that adverse effects relating to infrasound from wind turbines cannot be expected on the basis of the evidence at hand.'*

Vibration

- 8.6.11 In 2005, the Applied and Environmental Geophysics Research Group at Keele University conducted an extensive study titled 'Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Windfarms'. The study was requested by the MOD, the DTI and the British Wind Energy Association with the aim of establishing an acceptable limit that would not interfere with the detection capabilities of the seismic monitoring site located in Eskdalemuir, Scotland. The results of the investigation found that low levels of vibration and infrasound could be detected, with measurement apparatus, at large distances from the wind turbines included in the survey. The report concluded that a 10km buffer zone could be adopted at Eskdalemuir to protect the site from the interference due to wind turbines.
- 8.6.12 The outcome of this study has since been misinterpreted as the potential for adverse effects at residential receptors. The authors of the paper have clarified that:
"The levels of vibration from wind turbines are so small that only the most sophisticated instrumentation and data processing can reveal their presence, and they are almost impossible to detect."
- 8.6.13 They also confirmed that the level of vibration measured was not unique to wind turbines:
"Vibrations at this level and in this frequency range will be available from all kinds of sources such as traffic and background noise - they are not confined to wind turbines."
- 8.6.14 A more recent study on the human perception of vibration from wind turbines was published in 2020. The paper presents vibration measurements from inside properties at varying distances from a wind farm. The study compares the results against criteria given in AS 2670-1 (1990) and BS 6472-1 (2008) and suggests there is a low probability of adverse impact.
- 8.6.15 Therefore, as current research continues to conclude that vibration due to wind farms is very unlikely to disturb residential amenity, an assessment of vibration would not be included within the scope of the NIA.

Amplitude Modulation

- 8.6.16 Amplitude Modulation (AM) as an element of turbine noise has been the subject of considerable research in recent years. The University of Salford conducted a study on behalf of the Department for Business, Enterprise and Regulatory Reform to investigate whether noise complaints arising from wind farms were due to the presence of AM. The report found that complaints were highly likely to be caused by AM in 4 out of the 27 wind farms included in the study. However, it concluded, 'that the causes of AM are not fully understood, and that AM cannot be fully predicted at current state of the art.' The findings of the investigation were reconfirmed in 2013 in an updated research report by Renewable UK.
- 8.6.17 In 2016 the IoA produced 'A Method for Rating Amplitude Modulation in Wind Turbine Noise', in which amplitude modulation is defined as the following:
"Wind turbine amplitude modulation is defined as periodic fluctuations in the level of audible noise from a wind turbine (or wind turbines), the frequency of the fluctuations being related to the blade passing frequency of the turbine rotor(s)."
- 8.6.18 The report acknowledges that certain levels and/or characteristics of amplitude modulation may lead to disturbance and noise complaints. The guidance does not aim to define the level at which AM could

pose an issue but outlines a proposed methodology to assess and rate AM arising from operational wind farms.

- 8.6.19 Currently, there is no method of assessment for amplitude modulation pre-construction. As such, the assessment can only be conducted after the wind farm is operational.

Tonality

- 8.6.20 Mechanical or electrical noise may be emitted by a wind turbine. These noise types are generally tonal in nature. Mechanical noise sources might include gearboxes, motors or generators, while electrical noise could be emitted by transformers and associated equipment located within the tower. Tonality is assessed at source following IEC 61400-11 techniques or similar.
- 8.6.21 Tonal noise is a characteristic that has largely been designed out of wind turbines over many years of research and development. A statement on tonality is expected to accompany other data from the manufacturer such as sound power warranties that would be submitted post consent as directed through a suitable planning condition.

8.7 Key Questions for Council and Consultees

Q8/1: Do the consultees agree that construction noise can be constrained to recommended limits via a suitable planning condition; and therefore, scoped out?

Q8/2: Do the consultees agree with the proposed methodology to determine ETSU-R-97 limits?

Q8/3: Do the consultees agree with the cumulative search area of 3km from the Proposed Development to confirm whether cumulative wind farm noise should be scoped in or not?

Q8/4: Do the consultees agree that the provision of information regarding tonality can be requested via a suitable planning condition?

8.8 References and Standard Guidance

BS 5228-1 'Code of practice for noise and vibration control on construction and open sites', p119

A Good Practice Guide to the Application of ETSU-R-97 For the Assessment and Rating of Wind Turbine Noise, May 2013, page 23, 5.1.4

A Good Practice Guide to the Application of ETSU-R-97 For the Assessment and Rating of Wind Turbine Noise, May 2013, page 21, 4.4

Re: IEC-61400-11, ALa,k of 2dB

Scottish Government (2022), 'Onshore Wind Policy Statement'.

Scottish Government (2014), 'Onshore wind turbines: Planning Advice'.

Scottish Government (2011), 'Planning Advice Note 1/2011'.

Institute of Acoustics (2013), 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'

Scottish Government (2014), 'Onshore wind turbines: Planning Advice'.

Hayes McKenzie (2006), 'The measurement of low frequency noise at three UK wind farms'.

Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (2016), 'Low-frequency noise incl. infrasound from wind turbines and other sources'.

Styles P, Stimpson I, Toon S, et al. (2005), 'Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Windfarms'. Available at: <https://docs.wind-watch.org/AEG-Eskdalemuir.pdf>

Renewable UK (2010), 'Low Frequency Noise and Wind Turbines'. Available at:
<https://archive.is/d3WB#selection-241.0-241.175>

Nguyen D, Hansen K, Branko Z (2020), 'Human Perception of Wind Farm Vibration'. DOI:
<https://doi.org/10.1177/1461348419837115>

Australian Standards (1990), 'AS 2670-1:1990 Evaluation of human exposure to whole-body vibration'.

British Standards (2008), 'BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings'.

University of Salford, The Department for Business, Enterprise and Regulatory Reform, URN 07/1235, (2007), 'Research into aerodynamic modulation of wind turbine noise'.

Renewable UK (2013), 'Wind Turbine Amplitude Modulation: Research to improve understanding as to its Cause and effects'.

Institute of Acoustics (2016), 'A Method for Rating Amplitude Modulation in Wind Turbine Noise'.

International Electrotechnical Commission (2018), 'IEC 61400-11 Wind turbines - Part 11: Acoustic noise measurement techniques'.

9. Geology, Hydrology, Hydrogeology and Peat

9.1 Introduction

- 9.1.1 This assessment will present the impact of potential effects of the construction, operation, and decommissioning of the Proposed Development on hydrology and hydrogeology.
- 9.1.2 Understanding surface and groundwater environments is critically important to designing a successful project. Surface water includes watercourses, water bodies, and runoff. It provides an important resource for: potable and other uses; amenity; aesthetic value; conservation; ecological environments; and for recharge to groundwater systems. Groundwater is also an important resource. It provides more than a third of the potable water supply in the UK and includes all water stored in permeable underground strata (or aquifers). In addition, it provides essential baseflow to rivers and wetland areas, often supporting important ecological systems.

Guidance

- 9.1.3 Guidance for assessing the potential impact of the Proposed Development on the hydrological and hydrogeological features of the development site will be based on the following statutory, general, and national guidance. Any appropriate local policy and guidance will also be considered.

Table 9.1 – Legislation, Policy, & Guidance

Retained European Legislation	<ul style="list-style-type: none"> • Freshwater Fish Directive 2006/44/EC • Water Framework Directive (WFD) 2000/60/EC • Dangerous Substances Directive 76/464/EEC
Scottish Government Policy, Advice and Legislation Documents	<ul style="list-style-type: none"> • The Housing Scotland (Act) 1987 (Sect 86) • PAN 79: Water and Drainage, 2006 • Planning Advice Note (PAN) 61: Planning and SUDS, 2001 • Scottish Government (2017) Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments • Scottish Planning Policy (SPP) 2014 • Water Environment and Water Services (Scotland) Act 2003 • The Flood Risk Management (Scotland) Act 2009 • The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations, 2017 • The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017 • The Pollution Prevention and Control (Scotland) Regulations, 2000

<p>SEPA Guidance Documents</p>	<ul style="list-style-type: none"> • GPP1 'Understanding your environmental responsibilities – good environmental practices' • GPP 2 Above Ground Oil Storage Tanks • PPG 3 Use and design of oil separators in surface water drainage systems • GPP 4 Treatment and disposal of wastewater where there is no connection to the public foul sewer • GPP 5 Works and maintenance in or near water • PPG 6 Working at Construction and Demolition Sites • GPP 8 Safe Storage and Disposal of Used Oils • GPP 13 Vehicle washing and cleaning • GPP 21 Pollution Incident Response Planning • Managing River Habitats for Fisheries, 2002 • Special Requirements for Civil Engineering Contracts for the Prevention of Pollution, Version 2, SEPA, 2006 • Culverting of Watercourses, WAT-PS-06-02, 2015 • Natural Flood Management Handbook, 2015 • Indicative River & Coastal Flood Map (Scotland) • Planning advice on wastewater drainage, 2011 • Temporary Construction Methods, WAT-SG-29, 2009 • SEPA Flood Risk and Planning Briefing Note, 2009 • Groundwater Protection Policy for Scotland, v3, 2009 • SEPA Position Statement 'The role of SEPA in Natural Flood Management', 2012 • Technical flood risk guidance for stakeholders, SS-NFR-P-002, 2015 • SEPA Regulatory Position Statement – Developments on peat, 2010 • Engineering in the water environment: good practice guide - River crossings, 2010 • Environmental Standards for River Morphology, WAT-SG-21, 2012 • The Water Environment (Controlled Activities) (Scotland) Regulations 2011 - A practical guide, Version 8.3 February 2019 • Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, 2017 • Land Use Planning System SEPA Guidance Note 4: Planning guidance on onshore windfarm developments, 2017 • SEPA Water quality classification interactive database (2019 data)
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Other Guidance Documents	<ul style="list-style-type: none"> • CIRIA C515 Groundwater Control - Design and Practice • CIRIA C532 Control of Water Pollution from Construction Sites • CIRIA C648 Control of Water Pollution from Linear Construction Projects • CIRIA C689 Culvert Design and Operation Guide • CIRIA C741 Environmental Good Practice on Site • CIRIA C753 SUDS Manual • A handbook on environmental impact assessment - Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland. NatureScot, 2018 • River Crossings and Migratory Fish: Design Guidance, A Consultation Paper, The Scottish Executive • Good Practice During Windfarm Construction, 2019 (4th Edition), Scottish Renewables (SR), NatureScot, SEPA, Forestry Commission Scotland (FCS), Historic Environment Scotland and Marine Scotland Science • Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only • Forestry & Water Scotland (2018) Protecting Private Water Supplies During Forestry Activities
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9.2 Environmental Baseline

9.2.1 A conservative study area of 1.2km is proposed around the proposed turbine locations for identifying hydrological and hydrogeological baseline. The criteria for defining the Study Area have been established based on professional judgement, experience regarding expected working areas, relevant SEPA guidance, and other relevant guidance on hydrological assessment.

Site Overview

9.2.2 The Proposed Development is located on and around the hills surrounding Eilligan (469m AOD) and Strone Saul (314m AOD) and, at its nearest point, is situated c1.5km to the south-west of Sandbank and c2.1km north-west of Dunoon, on the Cowal Peninsula of Argyll & Bute. The study area is largely comprised of shrub heathland with rough grassland and blanket bog habitat, spread across the upper slopes of a mountainous ridge. The outer edges of the study area and the wider setting are predominantly comprised of dense stands of coniferous forestry, which are intersected by a number of forestry tracks and watercourses. The Glenkin Burn flows through the forestry to the north-west, cutting through the raised landscape to form the Glen Kin valley. To the east of the study area, an inlet of water from the Firth of Clyde forms the Holy Loch.

9.2.3 The topography within the study area is varied and characterised by several peaks, which is illustrated in **Figure 9.1 – Hydrological Context Map**. Within the study area, elevations range from 150-560m AOD, with summits including: Giants Knowe (446m AOD); Bishop's Seat (504m AOD); Big Knap (452m AOD); Strone Saul (314m AOD); Eilligan (469m AOD); and Finbracken Hill (198m AOD).

9.2.4 The Proposed Development is discussed in further detail within **Chapter 2 – Proposed Development**.

Hydrology

9.2.5 The study area is fully located within the watershed of Cowal / Clyde Sealochs Coastal catchment of the Scotland River Basin District.

9.2.6 The peaks of raised terrain within the study area enable surface water to flow in several directions, as illustrated in **Figure 9.1 – Hydrological Context Map**. The study area spans a mountainous ridge that runs in a predominantly south-west to north-east direction, which results in numerous drains and small burns that flow downhill perpendicular to the raised terrain. This forms a series of unnamed drains, along with the Spout Burn and Allt na Criche, that stem from the flanks of the hills and drain the coniferous forestry, before dispelling into the Glenkin Burn as it flows through the north-western section of the study area. This watercourse continues to flow in a northern direction along the Glen Kin before

it empties into the Little Eachaig River c.0.2km downstream of the study area. This watercourse then travels east for a further 3.7km and then discharges into the Holy Loch.

- 9.2.7 Within the north-eastern portion of the study area, a network of small drains and unnamed burns flow through the surrounding stands of forestry and underneath the A885 road, before discharging into the Holy Loch, located c0.7km to the east of the study area at its closest point.
- 9.2.8 A network of small drains within the western section of the study area merge to form a single burn that then feeds into Loch Loskin c.1.1km downstream of the study area. The fresh water lochan is a popular location for recreational fishing and is occasionally stocked with Brown Trout and Sea Trout. The outfall from Loch Loskin then flows through the town of Dunoon and empties into the Firth of Clyde at the East Bay at Dunoon.
- 9.2.9 The area to the south of Bishops Seat and Eilligan, located within the south-eastern portion of the study area, also has several unnamed burns stemming from the southern flanks and running in a south-eastwards direction. These unnamed watercourses then empty into the Balgaidh Burn as it flows directly south of the study area. This burn follows the Bishop's Glen and feeds Dunoon Reservoir, which is also known as Bishop's Glen Reservoir and is a stocked fishery. The outflow from this waterbody then dispels into the Firth of Clyde at the West Bay at Dunoon c.2.6km downstream of the study area.
- 9.2.10 SEPA have classified the surface water quality of all significant waterbodies in Scotland under the Water Framework Directive (WFD) (2020). The nearest classified waterbody is the 'Little Eachaig River/Cruach Neuran Burn' (SEPA ID: 10202), which is located c.0.2km to the north of the study area at its nearest point.
- 9.2.11 The 'Little Eachaig River/Cruach Neuran Burn' was classified as having an overall status of "Moderate Ecological Potential" in 2020 on the SEPA Water Classification Hub, and a 'Moderate' status for its overall ecology and its pre-heavily modified waterbody status. It is noted that the watercourse has undergone significant modifications and physical alterations that cannot be mitigated without resulting in impacts on its use as water storage for hydro electricity generation.
- 9.2.12 SEPA's Flood Hazard and Risk Map illustrates the indicative flood extents of high likelihood (1 in 10-year probability), medium likelihood (1 in 200-year probability), or low likelihood (1 in 1000-year probability) of coastal, surface, and river floods.
- 9.2.13 Within the study area, SEPA's Map identified the Glen Kin Burn to have a high risk of river flooding, and a high likelihood of surface water flooding at intermittent locations. It is important to note, however, that these flood extents are largely confined to the watercourse channel. Several other drains and areas within the forestry which surround the development site are also marked as having a high likelihood of surface water flooding, these appear to be periodic pools associated with areas of lower topography.
- 9.2.14 The eastern section of the study area is located within a 'Potentially Vulnerable Area', which indicates an area of nationally significant flood risk that could potentially impact on vulnerable areas of people, properties, community services, and specific environmental sites.

Geology

- 9.2.15 The British Geological Survey (BGS) 1:50,000 map indicates that the northern region of the study area is underlain predominantly by the Beinn Bheula Schist Formation. The metamorphic bedrock is mostly comprised of psammite, pelite, and semipelite along with metaconglomerate, mica schist, schist, siltstone, and wacke that were formed in the Neoproterozoic Era.
- 9.2.16 The southern section of the study area is predominantly underlain with both psammite and Metavolcaniclastic sedimentary bedrocks of the Loch Katrine Volcaniclastic Formation that were formed during the Ediacaran Period. This formation is comprised of mixed-grained sandstone rock that is interbedded with semipelite and pelite and generally features a pale to dark grey green colouring.
- 9.2.17 These sedimentary bedrocks are intersected by several strips of igneous bedrock situated throughout the study area, which are formed of Microgabbro and Metabasalt.
- 9.2.18 The superficial geology information within the study area was also obtained from the 1:50,000 BGS mapping. This information indicates that the majority of the study area presents near to the surface although, there are some pockets of peat deposits and Diamicton of Devensian Till scattered throughout the study area. There are also some strips of Alluvium and River Terrace Deposits associated with the Glenkin Burn.
- 9.2.19 The National Soil Map of Scotland identified the main soil type within the study area as peaty gleys, with strips of peaty podzols throughout the centre and an area of brown soils located in the north-eastern portion.

- 9.2.20 A review of the Carbon and Peatland Map 2016 identified that there is one pocket of Class 1 Peat within the study area that is encompassed by a larger span of Class 2 peat, as shown in **Figure 9.1 – Hydrological Context Map**. Class 1 and Class 2 Peat are nationally important carbon-rich soils that are likely to be of high conservation value. The study area is also underlain with a combination of Class 3 Peat (Predominantly peaty soil with some peat soil), Class 4 peat (predominantly mineral soil with some peat soil), Class 5 peat (no peatland vegetation), and mineral soils.

Hydrogeology

- 9.2.21 The BGS Aquifer Classification Dataset for Scotland classifies the potential for bedrock to supply groundwater and describes the potential groundwater flow mechanism. The various bedrock underlying the study area can be grouped into a low productivity aquifer classification, with small amounts of groundwater in near surface weathered zone and secondary fractures.
- 9.2.22 SEPA have classified the quality of all groundwater bodies in Scotland under the Water Framework Directive (WFD). This map informs that the entire study area is located upon the Cowal and Lomond groundwater unit. SEPA classified this groundwater unit as having a "Good" overall status in 2020 with no limiting parameters.

Designated Sites

- 9.2.23 There are no known ecological or geological designations located within the study area. The nearest designation is the Holy Loch Local Nature Reserve (LNR) that is situated c.0.8km to the north-east of the study area at its closest point and holds a variety of habitats that support local wildlife, such as ungrazed saltmarsh, wildflower meadow, woodland, reedbed, and bog habitats.

Potential Sensitive Receptors

- 9.2.24 Several watercourses are susceptible to runoff from the site and could potentially be at risk of adverse impacts to water quality, ecology, or geomorphology. The proximity of new impermeable structures could also elevate the baseline flood risk of these watercourses. In addition, the Cowal/Clyde Sealochs Coastal catchment as a whole is known to support salmonid species. As such, the watercourses within the study area will be treated as sensitive receptors and form a focus of the hydrological assessment.
- 9.2.25 Areas of Class 1 and Class 2 peat have been identified within the study area, these are of national importance and conservation value. Peat has the potential to be degraded during construction activities and therefore will be included in the hydrological assessment as a sensitive receptor.
- 9.2.26 The study area is entirely encompassed by the Cowal and Lomond groundwater unit, and the various bedrock underlying the site can be grouped as a low productivity aquifer (2C). There is limited potential for contaminated groundwater movement and, as such, the groundwater unit will be included as a sensitive receptor to assess any unmitigated impacts within the vicinity of the Proposed Development.
- 9.2.27 There are no known ecological or geological designated sites located within the study area. The Holy Loch LNR is found 0.8km to the north-east of the study area and is separated from the proposed development by commercial forestry, residential properties, and the A885 Road. As such, it is considered that the Proposed Development will not have an adverse impact on the designated site and therefore, the Holy Loch LNR will not be included as a sensitive receptor.
- 9.2.28 Should the ecological surveys identify any groundwater dependent terrestrial ecosystems (GWDTE) on the site, these will be treated as sensitive receptors in the EIA Report.
- 9.2.29 It is not currently confirmed whether there are any private water supplies (PWS) located within the proposed 1.2km study area. However, an initial look at the previous Cruach Mhor Wind Farm Environmental Statement (01/01553/DET) suggested that there are several properties within the wider area of the Proposed Development where there were previously, and may still, be serviced by a PWS. Should any PWS be identified and confirmed, they will be classed as a sensitive receptor in the EIA Report.

9.3 Potential Sources of Impact

- 9.3.1 The potential impacts this development may have on the water environment of the site and the surrounding area are likely to include:
- Increase in run-off;
 - Sedimentation, erosion, and silt-laden runoff;
 - Chemical pollution of watercourses or groundwater;
 - Disruption to the surface and subsurface runoff and watercourses;
 - Increased flood risk to areas downstream; and

- Drop in the water table

9.4 Method of Assessment and Reporting

9.4.1 The assessment of the potential impact of the proposal on hydrology and hydrogeology will be carried out by the general method described in the following Sub-Sections.

Desk Study Assessment Methodology

9.4.2 It is important to establish the baseline conditions so that an accurate hydrological context map can be developed for the site. This will be done by identifying any features within a 1.2km search radius around the proposed infrastructure locations that have potential to be impacted by the proposals. This baseline can then be used to inform the site design.

9.4.3 The following sources of information will be consulted as part of the desk study:

- Draft layout of the Proposed Development including all associated infrastructure;
- Surface and groundwater information, including local water quality and any relevant groundwater level data, will be obtained from SEPA;
- Ground conditions will be initially determined using published geology maps and site-specific geology information will be obtained from the British Geological Survey (BGS);
- Hydrogeological information will be obtained from the BGS;
- Information relating to private water supplies will be obtained from Argyll & Bute Council;
- Public water supply information and infrastructure will be obtained from Scottish Water; and
- NatureScot's Carbon and Peatland 2016 mapping.

9.4.4 The desk study will also include a review of relevant historical maps, soil maps, and aerial photographs.

Field Survey Methodology

9.4.5 Following the desk study and initial concept of the site, a site visit will be undertaken across the study area and the following actions carried out:

- Verification of any information collected during the desk study;
- Establishment of a first-hand understanding of the study area, including watercourses and ground conditions, to assess the relative location of all the components of the Proposed Development; and
- Identification of potential constraints to the Proposed Development from topography and ground conditions.

9.4.6 A National Vegetation Classification (NVC) survey for the study area will be used to screen for the potential presence of Ground Water Dependent Terrestrial Ecosystems (GWDTEs). Areas of potential High and Moderate GWDTE will be investigated to assess whether they are sustained by groundwater as part of the field work.

Assessment Criteria

9.4.7 The criteria set out in the Tables below will be used in the assessment of any potential effects of the Proposed Development on hydrology and hydrogeology.

9.4.8 With the baseline established, sensitive receptors can be determined. **Table 9.2** outlines the various factors taken into account when assessing the sensitivity of a variety of receptors.

Table 9.2 - Sensitivity Table

Sensitivity	Definition
High	Receptor of high quality, rarity of a regional or national scale, and limited potential for substitution or replacement. This includes:

Sensitivity	Definition
	<ul style="list-style-type: none"> • Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) or Special Area of Conservation (SAC) • SEPA Water Quality defined as High • Abstraction for public • Private water supplies - 0 to 100m from construction activities • Designated salmonid fishery and/or salmonid spawning grounds present • Watercourse widely used for recreation, directly related to watercourse quality (e.g., swimming, salmon fishery) <1.2km downstream of development • Active flood plain area (important in relation to flood defence) • Groundwater - public drinking water supply • Groundwater aquifer productivity classed 1A or 2A in the BGS 1:625000 Hydrogeology Map • Geology that is rare or of national importance as defined by SSSI or Regional Important Geological Site (RIGS) • Groundwater dependent terrestrial ecosystems (GWDTE) defined as Class 1, and/or defined as 'High Conservation Value' by Ecologist • Peat defined as Class 1 and Class 2 • Peat Slide Risk likelihood of 'probable' or 'almost certain'
Medium	<p>Receptor of medium quality, rarity of a local, regional, or national scale, and limited potential for substitution/replacement. This includes:</p> <ul style="list-style-type: none"> • SEPA Water Quality defined as Good • Surface water abstractions for private water supply for more than fifteen people • Private Water Supplies - Surface water abstractions within 100-600m of construction activities, groundwater spring abstractions within 100-400m of construction activities, and groundwater borehole abstractions within 0- 200m of construction activities • Designated salmonid fishery and/or cyprinid fishery • Watercourse widely used for recreation, directly related to watercourse quality (e.g., swimming, salmon fishery) >1.2km downstream of development • Groundwater aquifer productivity classed as 1B or 2B in the BGS 1:625000 Hydrogeology Map • Groundwater dependent terrestrial ecosystems (GWDTE) defined as Class 2, and/or defined as 'Medium Conservation Value' by Ecologist • Peat Slide Risk of 'Likely'
Low	<p>Receptor of low quality, rarity of a local, regional, or national scale, and limited potential for substitution/replacement. This includes:</p> <ul style="list-style-type: none"> • SEPA Water Quality defined as Moderate or Poor • Occasional or local recreation (e.g., local angling clubs) • Conveyance of flow and material, main river <10 m wide or ordinary watercourse >5 m wide • Existing flood defences • Private Water Supplies - Surface water abstractions >600m from construction activities, groundwater spring abstractions within 400-800m of construction

Sensitivity	Definition
	<p>activities, and groundwater borehole abstractions within 200-600 m of construction activities</p> <ul style="list-style-type: none"> • May be subject to improvement plans by SEPA • Designated cyprinid fishery, salmonid species may be present and catchment locally important for fisheries • Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality • Groundwater aquifer productivity classed as 1C or 2C in the BGS 1:625000 Hydrogeology Map • Groundwater dependent terrestrial ecosystems (GWDTE) defined as Class 3, and/or defined as 'Local Conservation Value' by Ecologist • Peat Slide Risk of 'Unlikely'
Negligible	<p>Receptor of low quality, rarity of a local scale, and limited potential for substitution/replacement. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character. This includes:</p> <ul style="list-style-type: none"> • SEPA water quality defined as Bad • Fish sporadically present or restricted, no designated features • Receptors not used for recreation, e.g., no clubs or access route associated with watercourse • Watercourse <5 m wide - flow conveyance capacity of watercourse low - very limited floodplain as defined by topography, historical information and SEPA flood map • Private Water Supplies - groundwater spring abstraction >800 m from construction activities, and groundwater borehole abstractions >600 m from construction activities • No public drinking water supplies • Groundwater aquifer productivity classed as 3 in the BGS 1:625000 Hydrogeology Map • Receptor heavily engineered or artificially modified and may dry up during summer months • Geology not designated under a SSSI or RIGS or protected by specific guidance • Peat defined as Classes 3, 4 and 5 • Peat Slide Risk of 'Negligible'

9.4.9 The significance of each impact on a receptor is based on its magnitude. The magnitude of impact includes the timing, scale, size and duration of the potential impact. For the purposes of this assessment the magnitude criteria are defined as follows.

Table 9.3 - Magnitude of Impact Table

Magnitude	Criteria	Description and Example
Large	Results in loss of attribute	<ul style="list-style-type: none"> • Fundamental (long term or permanent) changes to geology, hydrology, water quality and hydrogeology • Loss of designated Salmonid Fishery • Loss of national level designated species/habitats • Changes in WFD water quality status of river reach • Loss flood storage/increased flood risk • Pollution of potable source of abstraction compared to pre-development conditions

Magnitude	Criteria	Description and Example
Medium	Results in impact on integrity of attribute or loss of part of attribute	<ul style="list-style-type: none"> Material but non-fundamental and short to medium term changes to the geology, hydrology, water quality and hydrogeology Loss in productivity of a fishery Contribution of a significant proportion of the discharges in the receiving water, but insignificant enough to change its water quality status
Small	Results in minor impact on attribute	<ul style="list-style-type: none"> Detectable but non-material and transitory changes to the geology, hydrology, water quality and hydrogeology
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	<ul style="list-style-type: none"> No perceptible changes to the geology, hydrology, water quality and hydrogeology Discharges to watercourse but no loss in quality, fishery productivity or biodiversity No significant impact on the economic value of the receptor No increase in flood risk

9.4.10 The sensitivity of the receptor together with the magnitude of impact defines the significance of the impact.

Table 9.4 - Significance of Impact Matrix

		MAGNITUDE			
		LARGE	MEDIUM	SMALL	NEGLIGIBLE
SENSITIVITY	HIGH	Major	Major	Moderate	Negligible
	MEDIUM	Major	Moderate	Minor	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	NEGLIGIBLE	Negligible	Negligible	Negligible	Negligible

Assessment of Effects

- 9.4.11 Potential impacts on the water and ground environment, including environmental receptors dependent upon these resources, will be identified.
- 9.4.12 A qualitative risk assessment will be used to assess potential impacts on the identified receptors whereby the probability of an effect occurring and the magnitude of the effect, if it were to occur, is considered. This approach provides an established process for identifying the areas where mitigation measures are required.
- 9.4.13 Mitigation measures required to address these impacts will be proposed in accordance with best practice guidance.
- 9.4.14 The assessment will consider the construction, operational, and decommissioning stages of the Proposed Development.

Mitigation

- 9.4.15 Mitigation measures, where required, will be identified and based on best practice techniques appropriate to site conditions. It is foreseen that the following types of measures could be relevant:
 - Avoidance of sensitive areas;
 - Appropriate location of proposed infrastructure;
 - The implementation of general pollution prevention measures to protect the water quality of the surrounding waterbodies and groundwater; and
 - Suitable surface water management and appropriate design of drainage features.

9.5 Consultation

9.5.1 Consultation will be carried out with:

- SEPA;
- NatureScot;
- Argyll Fisheries Trust;
- Eachaig District Salmon Fisheries Board;
- Argyll & Bute Council; and
- Scottish Water.

9.6 Matters Scoped Out

- 9.6.1 Given the presence of sensitive watercourses, Class 1 and Class 2 peat, a low productive aquifer, and the potential for GWDTEs and PWS there is potential for significant hydrological effects to occur during the construction, operational, and decommissioning phases of the development.
- 9.6.2 As such, these receptors will be scoped in to inform the EIAR.
- 9.6.3 Given the information set out in **Section 9.2**, the Holy Loch LNR will be scoped out of the hydrological assessment undertaken to inform the EIAR.

9.7 Questions to Consultees

Q9/1: Do the Consultees agree with the proposed methodology?

Q9/2: Do the Consultees agree with the proposed study area?

Q9/3: Do the Consultees have any further information that would assist in the preparation of the assessments?

Q9/4: Are the Consultees aware of any further guidance or policy documents not mentioned within the report that are relevant to the assessment?

Q9/5: Do the Consultees agree with scoping in sensitive watercourses, Class 1 and Class 2 peat, a low productive aquifer, and potential GWDTEs and PWS?

Q9/6: Do the Consultees agree with scoping out the Holy Loch LNR?

9.8 References and Guidance

Dunoon and District Angling Club. Loch Loskin. Available at: <https://dunoonangling.com/loch-loskin/>

Dunoon and District Angling Club. Dunoon Reservoir. Available at: <https://dunoonangling.com/reservoir/>

Scottish Environment Protection Agency. Flood Risk and Hazard Map . Available at: <https://map.sepa.org.uk/floodmap/map.htm>

British Geological Survey. Map Viewers. Available at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

Scotland Environment Soil Map. Available at: https://map.environment.gov.scot/Soil_maps/?layer=1

British Geological Survey. GeoIndex Onshore. Available at: <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>

Scottish Environment Protection Agency. Water Classification Hub. Available at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>

NatureScot. Site Link Holy Loch Local Nature Reserve. Available at: <https://sitelink.nature.scot/site/10403>

SpangleFish. Holy Loch Local Nature Reserve. Available at: <http://www.spanglefish.com/holylochlocalnaturereserve/>

10. Traffic and Transport

10.1 Introduction

- 10.1.1 This assessment will identify the preferred route for access and will consider the potential effects of traffic generated during construction and operation of the works, including identification of possible measures to minimise any disruption to the local and strategic road network.
- 10.1.2 This chapter will draw on the various policy, guidance and legislation detailed below to ensure best practice and alignment with national, regional, and local frameworks including;
- Argyll and Bute Local Development Plan (2015)
 - National Planning Framework 4 (2023) Policy 11 (Energy)
 - The Transport Assessment Guidance. Transport Scotland (2012)

10.2 Environmental Baseline

- 10.2.1 The Proposed Development is located approximately c2.1km north-west of Dunoon, within the Argyll and Bute Council area.
- 10.2.2 It is anticipated that turbine loads will arrive at KGV Dock in Glasgow and would be transported to The Site via the trunk road networks of the M8, M73, M74, M898, and main roads A82, A83 and A815. This is shown in **Figure 2.3**.
- 10.2.3 However, the transport route for turbine loads travelling to the Site has not been selected and travel routes associated with construction activities will vary. Therefore, the Study Area for the Traffic and Transport chapter has been defined as the public road network in the vicinity of the Proposed Development, which vehicles will use to access the Site in relation to the construction activities.
- 10.2.4 It is proposed that the following sections will form the Study area:
- A83 westbound up to the junction with the A815;
 - A815 southbound towards the Site;
 - A885 southbound towards Dunoon.

10.3 Potential Sources of Impact

- 10.3.1 The majority of potential effects would arise during the construction and decommissioning phases of the development.
- 10.3.2 During operation, traffic movements would be minimal and given the location of the site next to a main arterial roadway, and these are considered to be negligible.

Construction

- 10.3.3 During the construction phase of the Proposed Development, there would be an increase in the number of vehicles accessing the site. The majority of these vehicles will be standard road vehicles, including HGVs.
- 10.3.4 The transportation of turbine components will utilise specialist HGV trailers, which will require liaison with the roads department and Police Scotland as the use of a convoy system will be required to ensure the safety of road users and the delivery vehicles. During the transportation of these larger components, there is the potential for slow-moving traffic between the point of origin and the site. There may be a requirement for temporary widening works on the public highway to enable the transportation of abnormal loads.
- 10.3.5 There may be pinch points where non-motorised users are not segregated from vehicular traffic. This is a common scenario in rural locations due to the increases in HGV traffic. Temporary measures will be implemented to ensure public safety.

Operation

- 10.3.6 It is not considered that there will be a noticeable increase in traffic volumes during the operational phase of the Development and as such there is no requirement for any further mitigation to be investigated at this time.

Decommissioning

- 10.3.7 The decommissioning of the site will follow a similar pattern to that of the construction phase. The turbines will be disassembled and transported from the Site. It is the current intention that these component parts may be reconditioned and sold as second-hand machines.
- 10.3.8 The remainder of the site will be reinstated using a standard plant, delivered to the site either under their engine power or delivered via flatbed HGVs.
- 10.3.9 Again, during this phase, there may be the need for minimal traffic management to facilitate the removal of the turbines from the site area. Out with this, the traffic volume increase is considered negligible. It is expected that decommissioning-related traffic will be conditioned.

10.4 Method of Assessment and Reporting

- 10.4.1 The assessment will be undertaken in line with the Environmental Assessment guidance (Institute of Environmental Assessment (IEA), 1993), and best practices, concerning policy, guidance and legislation referenced in section 5610.1. The assessment will reference any other suitable reports or documents outlined during the scoping process.
- 10.4.2 The assessment will focus on the potential impacts on local roads and local road users and identify sections of roads that have an increase in traffic higher than 30% and identify mitigation. A finalised route will be subject to an investigation into the suitability to accommodate the turbines under consideration for the Proposed Development. Traffic count data will be sourced from the Local Authority to inform the assessment if available.
- 10.4.3 The significance of the effects on receptors will be evaluated against the IEA guidance and where possible, in line with the criteria used for the other environmental topic areas covered in the EIA Report.
- 10.4.4 To assess the traffic impacts during the construction phase, estimated vehicle movements for all major construction vehicle trip generators will be calculated. Where information is available, these will be based on site-specific information and turbine manufacturers' construction guidelines.
- 10.4.5 Daily vehicle movements during the peak period of the construction phase will be assessed against the baseline conditions. Any changes in traffic levels on the study network links during the construction phase will be assessed in terms of percentage change and compared against the maximum vehicle capacity of the link.

10.5 Consultation

- 10.5.1 To date, no consultation has been undertaken in relation to Traffic and Transport. It is anticipated that the following consultees will be contacted but this list is not exhaustive:
- Argyll and Bute Council
 - Transport Scotland

10.6 Matters Scoped Out

- 10.6.1 Operational Traffic Assessment has been scoped out.

10.7 Questions to Consultees

Q10/1: Are the consultees satisfied with the proposed methodology and scope of the traffic and transport assessments?

Q10/2: Are consultees content to scope out operational traffic from further assessment?

Q10/3: Are the Argyll and Bute Council aware of 'committed' developments deemed relevant to be included within the base traffic flow data?

10.8 References and Standard Guidance

Argyll and Bute Council. Local Development Plan (2015). [Local Development Plan | Argyll and Bute Council \(argyll-bute.gov.uk\)](http://www.argyll-bute.gov.uk)

11. Socio-Economics, Tourism and Recreation

11.1 Introduction

11.1.1 This section of the Environmental Impact Assessment Report (EIA Report) evaluates the potential socio-economic, tourism and recreational impacts associated with the Proposed Development. The specific effects considered within this assessment are those affecting:

- The economy;
- Tourism; and
- Recreational facilities.

11.2 Environmental Baseline

Socio-economic

11.2.1 The EIA Report will use tourism statistics from the Argyll and Bute council area. This desk-based study will determine how Argyll and Bute Council perform with population trends and sectors in which residents are employed. This will be compared to the Scottish averages.

- The nearest settlements to the Site are:
- Dunoon (approximately 3km east)
- Hunters Quay (approximately 3.5km east)
- Kilm (approximately 3.4km east)
- Sandbank (approximately 1.8km east)
- Ardnadam (approximately 2.7km east)
- Toward (approximately 8.5km south)

Tourism

11.2.2 Tourism statistics for Argyll and Bute are collected as part of the Argyll and Isles area of Scotland's west coast.

11.2.3 In 2019, Argyll and the Isles experienced notable growth in both day and overnight tourism. There was an increase in domestic and international visitors which resulted in rises in expenditure and nights. There was a total of 5.5 million day-visit tourists, a 14% increase since 2018. The average spend associated with day visits was £182 million for 2019. International overnight trips to the region grew by a fifth in 2019 compared to 2018 figures, with 150,000 international visits. During the 2019 period, Argyll and the Isles accounted for 4.3% of all international trips and 3.5% of the total overseas spending in Scotland.

11.2.4 In 2019, domestic visitors stayed overnight in the Argyll and Isles area mainly for a holiday (70%), visiting friends or relatives (18%), business (10%) and other trip purposes (2%). For international visitors, a holiday was the key driver for visiting the area (83%), visiting family and relatives was second (14%) and less visits for business (2%) were made by international visitors.

11.2.5 The list below highlights the five free, top-rated tourist attractions within the Argyll and Isles region (with visitor numbers) for 2019:

- Argyll Forest Park (151,538);
- Staffa National Nature Reserve (107,725);
- Oban War and Peace Museum (33,310);
- Iona (29,808); and
- Aros Park (19,710).

11.2.6 In 2019, the five paid, top-rated tourist attractions in the Argyll and Isles region (with visitor numbers) were:

- Inveraray Castle (125,462);
- Iona Abbey & St Columba Centre (Mull) (63,884);
- Oban Distillery Visitor Centre (57,031);

- Benmore Botanic Garden (53,318); and
- Mount Stuart (42,809).

11.2.7 Tourist attractions identified within 10km of the Site include:

- Castle House Museum (approximately 3km east of the Proposed Development)
- Castle Toward (approximately 9.5km south of the Proposed Development)
- Lamont Castle (approximately 9.8km south of the Proposed Development)
- Sea Kayak Argyll and Bute (approximately 9.2km south of the Proposed Development)
- Walkers Garden Centre (approximately 2.4km east of the Proposed Development)
- Gourock Outdoor Pool (approximately 9.2km east of the Proposed Development)
- Studio Cinema Dunoon (approximately 3.5km east of the Proposed Development)
- Ardgowan House, Castle and Gardens (approximately 7km south-east of the Proposed Development)
- Benmore Botanic Gardens (approximately 8.1km north of the Proposed Development)
- Benmore Outdoor Centre (approximately 8km north of the Proposed Development)

Recreation

11.2.8 An initial study identified that there are no core paths within the Site. Twelve core paths and one cycle route are situated within 5km of the Site;

11.2.9 Further desk-based studies will identify if there are any additional recreation facilities within the Site and the sensitivity of these.

- C223 (Dunans loop to Inverreck)
- C211 (Ardnadam heritage trail)
- C488 (Dunloskin Wood)
- C225 (Dunoon to Sandbank)
- C226 (Bird Garden to Ardnadam)
- C207 (Sandbank to Toward)
- C229 (Berry Burn to Bishops Glen)
- C210 (Dunoon to Bishops Glen)
- C228 (Corlarach loop to Bishops Glen)
- C207 (Sandbank to Toward)
- C227 (Alexander Street path)
- C212 (Port Lamont to Ardtariag)
- Sustrans Cycle Route: Dunoon to Portavadie

11.2.10 These core paths and cycle routes have the potential to be sensitive receptors given their proximity to the Proposed Development.

11.2.11 A further eleven recreation receptors within 10km of the Site have been identified below.

- Innellan Golf Club (approximately 6km south of the Proposed Development)
- Cowal Golf Club (approximately 2.8km east of the Proposed Development)
- Dunoon Angling Club (approximately 2.3km east of the Proposed Development)
- Kirn and Hunter's Quay Bowling Club (approximately 3.2km east of the Proposed Development)
- Bogleha Bowling Club (approximately 3km east of the Proposed Development)
- Riverside Leisure Centre (approximately 3.6km east of the Proposed Development)
- Dunoon Argyll Bowling Club (approximately 2km east of the Proposed Development)
- Bishops Seat (within the Site)

- Kilbride Hill (approximately 2km south of the Proposed Development)
- Brackley Point (approximately 2km west of the Proposed Development)
- Puck's Glen (approximately 6.8km north of the Proposed Development)
- Toward Seaports Club (approximately 10km south of the Proposed Development)

11.2.12 Further desk-based studies as well as feedback from consultees will identify if there are any additional recreation facilities within the Study area that should be considered in the EIA.

11.3 Mitigation

Socio-economic

11.3.1 Depending on the magnitude of effect determined in the EIA Report, some of the following mitigation measures may be put forward for the Proposed Development. As noted within this chapter a socio-economic assessment will consider the potential direct and indirect effects of the proposed development, during both construction and operational phases. The assessment will include identifying the potential value created (Gross Value Added) and the number of jobs at a local and national level, during the construction and operation.

Construction

11.3.2 An on-site borrow pit will reduce construction traffic on the road network and therefore reduce the impact upon tourist routes and facilities;

11.3.3 Transportation of abnormal loads would be programmed to avoid peak hours on the road network, where possible, thus reducing delays and disruption. Deliveries would also be scheduled to avoid clashing with any events planned in the area;

11.3.4 The Applicant engages with the local community and stakeholders early and regularly throughout the development period and encourages local suppliers to sign up to their supplier register, so there is potential to benefit from future business opportunities, should the project be consented.

11.3.5 Contractors shall aim to provide ongoing safe access to all designated cycling and walking routes or provide alternatives where feasible should this not be possible during periods of construction.

Operation and Maintenance

11.3.6 It is expected that the Proposed Development would create a beneficial effect through employment opportunities created during construction, operation and decommissioning. The Applicant seeks to promote relationships with local businesses. Local businesses are encouraged throughout the development period to register as a supplier to hear about and benefit from future opportunities.

11.3.7 The Applicant is committed to investing in the local community and will be undertaking engagement throughout the planning process to understand local needs and identify opportunities for how the Proposed Development could benefit those in the local area.

11.3.8 The applicant is committed to providing a Community Benefit Fund to be used to help deliver local community priorities during the operational period of the wind farm. The fund will be worth £5k per MW of installed capacity, in line with the Scottish Government Good Practice principles for Community Benefits. In addition, we will offer shared ownership of the project, should there be interest within the local community.

Tourism and Recreation

11.3.9 Public notices would be issued prior to the commencement of construction to inform local residents, recreational users and businesses of the dates and duration of works. It is anticipated that there may be a need for temporary diversions and/or closures on the road network and recreational paths as a result of construction traffic and activities, and some maintenance activities during operation.

11.4 Potential Sources of Impact

11.4.1 The Proposed Development has the potential to have both beneficial and adverse impacts on socio-economics, tourism, and recreation.

Socio-economic

11.4.2 There is the potential for benefits to the local and regional economy during the construction and operation of the Proposed Development. This will be in the form of jobs, gross value added (GVA) contributions and increased use of local facilities during construction and operation.

Tourism

- 11.4.3 There is potential for temporary adverse effects on tourist facilities during the construction and operational phase of the Proposed Development. The construction of the Proposed Development could affect the accessibility and amenity of tourist attractions and the availability of tourist accommodation. Improved access arrangements for tourist attractions will be considered as part of the Proposed Development, which may result in a beneficial effect. The possibility and suitability for incorporating such arrangements will be explored throughout the EIA process.

Recreation

- 11.4.4 There is the potential for temporary adverse effects on access to recreational facilities during the construction and operational maintenance phases of the Proposed Development. This would be due to temporary restrictions on the surrounding area. Access to recreational facilities may be also restricted by construction traffic and activities. During the construction and operational maintenance phases, the amenity of recreational facilities and activities may be affected which may cause an adverse impact on user experience. Improved access arrangements for recreational facilities and activities may be considered as part of the Proposed Development. The possibility, and suitability, for incorporating such arrangements will be explored throughout the EIA process.

11.5 Method of Assessment and Reporting

- 11.5.1 There are no recognised standards or methodology for assessing the socio-economic, tourism and recreation effects of wind farm developments. The methodology used to inform this assessment will be previous experience, established EIA best practice, and professional judgement.
- 11.5.2 Socio-economic impacts will be considered at the regional (Argyll and Bute) level, with impacts at the national level also considered where applicable. The potential impacts of the Proposed Development upon tourist/recreational activity will be considered within a 10km study area.
- 11.5.3 The assessment will include:
- Consultation with the relevant statutory and non-statutory bodies;
 - Completion of baseline conditions describing the economic baseline and identifying tourist and recreational activities and facilities within the study area;
 - An assessment of the impact of the Proposed Development on the socio-economic, tourism and recreational receptors in the study area; and
 - Identification of possible measures to avoid and mitigate against any potential adverse effects resulting from the Proposed Development.
- 11.5.4 Other environmental topics have relevance to aspects considered in this chapter such as traffic and transport, noise, cultural heritage and landscape and visual amenity. The potential impacts of these will be provided elsewhere in the EIA Report as separate chapters and will not be reassessed in this chapter.

Socio-economic

- 11.5.5 Regional employment statistics will be reviewed, and settlements will be identified and described using sources such as the National Online Manpower Information System (NOMIS), National Records of Scotland and the Scottish Index of Multiple Deprivation (SIMD). Socio-economic impacts will be assessed at the regional (Argyll and Bute) level and at a national (Scotland) level to understand how the Argyll and Bute regions' socio-economic data compares to the national average.
- 11.5.6 The assessment will aim to provide the likely employment opportunities, gross value added (GVA) contribution and job creation of the Proposed Development. This assessment will be undertaken based on the largest anticipated MW output from the Proposed Development to create a 'best case' scenario using the 2014, Renewable UK study 'Onshore Wind: Economic Benefits in 2014'.
- 11.5.7 It will also refer to BVG Associates' study 'Economic Benefits from Onshore Wind Farms (2017)' to understand how the output per MW installed capacity compares with the one generated from the Renewable UK study.

Tourism

- 11.5.8 A review of national and regional tourism strategies, as well as visitor statistics will be undertaken. Accommodation and tourist attractions within 10km of the Site will be identified using public sources such as VisitScotland and input from consultation. A qualitative assessment will be undertaken based

on the changes in availability, accessibility, and amenity on tourist receptors during the construction and operational maintenance phases.

Recreation

- 11.5.9 This section of the assessment will assess the significance of effects on recreation. Any recreational facilities within 10km of the Site will be identified and assessed for any potential effects. These will be based on any estimated changes to recreational facilities in the local area. This includes changes in accessibility and amenity of recreational receptors, which will include core paths, cycle routes and other recreational activities.

Assessment

- 11.5.10 The sensitivity and magnitude of effect on each receptor will be assessed to determine the magnitude of effect. A description of the different significance levels is noted below. A moderate or major effect is considered significant within the scope of this chapter.
- Major – The value of the receptor and the magnitude of effects are predicted to give rise to major, detectable impacts and may be fundamental in the decision-making process.
 - Moderate – The value of the receptor and the magnitude of effects are predicted to give rise to moderate, detectable impacts but alone will not be fundamental in the decision-making process.
 - Minor – The value of the receptor and the magnitude of effects are predicted to give rise to minor, detectable impacts but will not be fundamental in the decision-making process.
 - Not significant – The value of the receptor and the magnitude of effects are not predicted to give rise to any discernable or detectable impacts outside the norm of typical variation.

11.6 Consultation

- 11.6.1 To date, no consultation has been undertaken in relation to socio-economics, tourism, or recreation. It is anticipated that the following consultees will be contacted but this list is not exhaustive:

- Scottish Rights of Ways & Access Society (ScotWays)
- Argyll and Bute Council
- Local Community Councils including;
 - Dunoon
 - Kilmun
 - Sandbank
 - Hunter's Quay
 - South Cowal
 - Cove and Kilcreggan
 - Helensburgh
 - Cardross
 - Inverkip and Wemyss Bay
 - Skelmorlie
 - Gourock
- Visit Scotland;
- Mountaineering Scotland; and
- Other local groups which will be identified via community consultation such as the Dunoon Project and the Dunoon Area Alliance.

11.7 Matters Scoped Out

- 11.7.1 No issues have been scoped out of the EIA Report assessment.

11.8 Questions to Consultees

Q11/1: Do you agree with the proposed approach for the chapter 'Socio-economics, Tourism and Recreation?'

Q11/2: Are there any other receptors that should be included within the scope of the assessment?

Q11/3: Are there any other consultees that should be consulted for the purpose of these assessments?

11.9 References and Standard Guidance

VisitScotland (2020). Argyll and Isles Factsheet 2019. [Argyll & the Isles – Tourism Statistics & Research | VisitScotland.org](#)

Argyll and Bute. Community Councils. <https://www.argyll-bute.gov.uk/my-community/community-councillors>

12. Aviation and Radar

12.1 Introduction

12.1.1 Wind turbines have the potential to affect civil and military aviation and meteorological forecasting. This section of the report covers the methodology used to undertake the aviation and radar scoping assessment, lists the references used and describes the baseline condition, consultation requirements and mitigations to be applied if required.

12.2 Environmental Baseline and Potential Sources of Impact

12.2.1 The Proposed Development is located 35km to the north-west of Glasgow Airport and just outside the Glasgow Control Zone. It is within Class G unregulated airspace which extends upwards to 5500ft AMSL. Above that is Class E regulated airspace designated L602 which takes air traffic from the Glasgow and Edinburgh area to Tiree and beyond. The next closest airport is Glasgow Prestwick Airport (GPA), located over 55km to the south. In military terms, the closest military airfield is at Leuchars in Fife and the closest military ATC radar is at West Freugh, well over 100km to the south.

12.3 Study Area

12.3.1 The assessment of effects of the proposed turbines will be based upon the guidance laid down in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines Version 6 (February 2016). Consultation criteria for aviation stakeholders is defined in Chapter 4. These distances inform the size of the study area and include:

- airfield with a surveillance radar – 30 km;
- non radar licensed aerodrome with a runway of more than 1.1 km – 17 km;
- non radar licensed aerodrome with a runway of less than 1.1 km – 5 km;
- licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
- unlicensed aerodromes with runways of more than 800 metres – 4 km;
- unlicensed aerodromes with runways of less than 800 metres – 3 km;
- gliding sites – 10 km; and
- other aviation activity such as parachute sites and microlight sites within 3 km – in such instances developers are referred to appropriate organisations.

12.3.2 CAP 764 further states that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. These ranges are intended as a prompt for further discussion between developers and aviation stakeholders and will be reported upon in the EIA Report. For example, Glasgow Airport has stated a requirement to be consulted in relation to wind farms out to 40 km or even further if there is the potential to affect their operations or IFPs.

12.3.3 It is necessary to take into account the aviation and air defence activities of the Ministry of Defence (MOD) as safeguarded by the Defence Infrastructure Organisation (DIO). The types of issues that will be addressed in the EIA Report include:

- Ministry of Defence Airfields, both radar and non-radar equipped;
- Ministry of Defence Air Defence Radars;
- Meteorological Radars; and
- Military Low Flying.

12.3.4 It is necessary to take into account the possible effects of turbines upon the National Air Traffic Services En Route Ltd (NERL) communications, navigation and surveillance (CNS) systems – a network of primary and secondary radars and navigation facilities around the country.

12.3.5 As well as examining the technical impact of turbines on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes to determine whether a Proposed Development will breach obstacle clearance criteria. This will also be reported on in the EIA Report but initial surveys show there are no physical safeguarding issues associated with the Proposed Development.

12.4 Method of Assessment and Reporting

Criteria for the Assessment of Effects

- 12.4.1 There is no agreed definition for assessing significance in an aviation context. This is due to the fact that whilst technical effects on communications, navigation and surveillance (CNS) systems are simple to identify and evaluate, operational and flight safety effects can be subjective and are often challenged by third parties. It is enough in this context to identify any technical effects and then, taking into account the statements in CAP 764 regarding the status of aviation stakeholders, in general to accept the judgement of those stakeholders in assessing the significance of the effects. For example, CAP 764 states:

“Where an ANSP (Air Navigation Service Provider) determines that it is likely that a planned wind turbine development would result in any of the above effects on their CNS infrastructure, this may not, in itself, be sufficient reason to justify grounds for rejection of the planning application. The ANSP must determine whether the effect on the CNS infrastructure has a negative impact on the provision of the ATS. The developer should pay for an assessment of appropriate mitigating actions that could be taken by the ANSP and/or wind energy developer to deal with the negative impact. The position of an ANSP at inquiry would be significantly degraded if they had not considered all potentially appropriate mitigations.”

- 12.4.2 Taking the above into account, it is not considered appropriate for the Applicant to be making an assessment of significance of an effect in relation to aviation interests. It is also the case that different ANSPs can take a different view of the same scenario based on their varying responsibilities. Therefore, this assessment does not make a judgement of significance, but is focused on identifying potential impacts and agreeing mitigation with the relevant aviation stakeholders as required.

12.5 Radar Modelling Methodology

- 12.5.1 The radar calculation results referred to in this section were produced using specialist propagation prediction software (RView Version 5). Developed over a number of years, it has been designed and refined specifically for the task. RView will be used to identify potential aviation effects of the Proposed Development as its design evolves. The results will then be used as a basis for consultation and liaison with relevant aviation bodies, as detailed below.

12.6 Consultation

Licensed Aerodromes

- 12.6.1 **Glasgow Airport** – is 35km to the south-east of the Proposed Development. Initial radar modelling against the Glasgow Primary Surveillance Radar (PSR) and the Terma Scanner 4002 wind farm mitigation radar show that using turbines with a tip height of 200 metres will result in six of the turbines being marginally within radar line of sight, however, these results will be updated when the finalised layout has been promulgated and the results reported in the EIA Report. The applicant will consult with Glasgow Airport and NATS Services Ltd. In addition to any radar effects, the applicant will provide any information required including the provision of an Instrument Flight Procedure (IFP) assessment by a CAA Approved Procedure Design Organisation (APDO) if requested by the airport.
- 12.6.2 **Glasgow Prestwick Airport (GPA)** is 57km to the south of the Proposed Development. Initial radar modelling shows that there is no possibility of the turbines being visible to, or affecting the performance of the radar at GPA. It is also the case that at a distance of 57km, the turbines will be beyond any distance relevant to the consideration of effects on the Instrument Flight Procedures. It is therefore not necessary to consult with GPA.

Unlicensed Aerodromes

- 12.6.3 There are no unlicensed aerodromes, gliding sites, parachute drop zones or microlight sites marked on aviation charts or known to exist within the required consultation distance of the Proposed Development as referred to in paragraph 12.3.1.

Ministry of Defence

- 12.6.4 **MOD ATC Radars** - initial radar modelling and mapping shows there are no MOD ATC radars likely to be affected by the Proposed Development. The closest relevant radar is at Leuchars in Fife and there is no prospect of it being affected due to distance, earth curvature and the intervening terrain.
- 12.6.5 **MOD Air Defence Radars** – the closest air defence radar is at Benbecula in the Outer Hebrides. Radar modelling shows there is no possibility of the radar being affected by the Proposed Development.
- 12.6.6 **MOD Low Flying** - the site is located within an MOD low flying area, however, it is designated as a 'Blue' area, so that a low flying objection is unlikely. There may be an initial concern expressed by the MOD but that will almost certainly be to ensure that Infra-Red lighting is applied. The Applicant will provide an aviation lighting scheme proposal and obtain MOD approval as part of the consultation process and

application for consent. This will be reported in the Aviation Lighting Technical Appendix of the EIA Report.

Met Office Weather Radars

12.6.7 The Met Office safeguards its network of radars using a European methodology known as OPERA (Operational Programme for the Exchange of Weather Radar Information). In general, they will object to any proposed turbine within 5 km in line of sight and will examine the impact of any turbines within 20 km. Where a site is within 20 km, the Met Office will undertake an operational assessment based on three main criteria, having determined if there is a technical effect on the radar. The factors they will consider include:

- proximity to airports;
- river catchment response times; and
- population density.

12.6.8 In this case the closest Met Office radar is at Holehead, over 48 km to the east of the site. There will be no effect on Met Office radars and this issue can therefore be scoped out of the EIA Report.

NATS En Route Ltd (NERL)

12.6.9 An initial assessment has been conducted to determine any effect of the Proposed Development on the NERL CNS infrastructure. The closest long range radars in the system are at Lowther Hill and Tiree, with other radars at Cumbernauld, Glasgow and Edinburgh contributing to the overall coverage in the area. Initial radar modelling shows that most of the turbines will be in radar line of sight of the Lowther Hill radar at a distance of 100km, but no other NERL radar will be affected by the Proposed Development. NERL will confirm this assessment through their response to scoping and the applicant will then engage with them to identify and agree technical mitigation if required. This will be reported in the EIA aviation chapter.

Aviation Obstruction Lighting

12.6.10 A wind farm with tip heights in excess of 150m will need to be illuminated at the hub of selected turbines with medium intensity red aviation obstruction lighting. A lighting layout will be designed which minimises the number of lit turbines whilst fulfilling flight safety requirements and gain approval for the lighting layout from the CAA. This will be reported in the EIA Report within a technical appendix to describe the effect of aviation lighting on the environment and to inform the LVIA. It will also articulate the mitigation techniques available taking into account the extant legislation and guidance.

12.6.11 An infra-red lighting layout to fulfil MOD requirements will also be designed and approval obtained from the MOD and reported in the EIA Report.

12.7 Matters Scoped Out

12.7.1 It is proposed to scope out the following issues:

- Military Air Traffic Control Radars – none affected
- Military Air Defence Radars – none affected
- Met Office Rainfall Radars – none affected

12.8 Questions to Consultees

Q12/1: The MOD are requested to confirm that they agree that military ATC and AD radars can be scoped out of the assessment

Q12/2: The UK Met Office is requested to confirm that Met Office radars can be scoped out of the assessment

12.9 References and Standard Guidance

12.9.1 There are a number of aviation publications relevant to the interaction of turbines and aviation containing guidance and legislation, which cover the complete spectrum of aviation activity in the UK including:

Civil Aviation Authority (CAA) (2016), Policy and Guidance on Wind Turbines, Version 6, CAP764, CAA

Civil Aviation Authority (2019), Licensing of Aerodromes, Version 11, CAP168, CAA

Civil Aviation Authority (2019), ATS Safety Requirements, Version 3, CAP670, CAA

Civil Aviation Authority (2017), UK Flight Information Services, Ed. 3, CAP774, CAA
Civil Aviation Authority (2006) Safeguarding of Aerodromes, Version 2, CAP774 CAA
Civil Aviation Authority (2010), Safe Operating Practices at Unlicensed Aerodromes Ed 1 CAP783, CAA
Civil Aviation Authority (2017), Manual of Air Traffic Services Part 1, Ed. 7.0, CAP493, CAA
Civil Aviation Authority (2020), Parachuting Ed, 5 CAP660, CAA
Ministry of Defence (2022), Military Aviation Authority Regulatory Article 2330 (Low Flying) MOD
Civil Aviation Authority (2017), CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level, CAA

13. Shadow Flicker

13.1 Introduction

- 13.1.1 This section of the report presents the proposed methodology and baseline information that would inform a shadow flicker impact assessment for the Proposed Development located in Argyll and Bute, approximately 3.1km north-west of Dunoon on the northeastern side of Bishop's Seat and Giant's Knowe.
- 13.1.2 Tall structures such as wind turbines cast shadows. The shadows vary in length according to the sun's altitude and azimuthal position. Under certain combinations of geographical position and time of day, the sun may pass behind the rotor of a wind turbine and cast a moving shadow over neighbouring properties. Where this shadow passes over a narrow opening such as a window, the light levels within the room affected will decrease and increase as the blades rotate, hence the shadow causes light levels to 'flicker' - an effect commonly known as 'shadow flicker'.
- 13.1.3 Whilst the moving shadow can occur outside, the shadow flicker effect is only experienced by indoor receptors where the shadow passes over a window opening. The seasonal duration of this effect can be calculated from the geometry of the wind turbine and the latitude of the site. A window in a building is likely to be affected for a few minutes at certain times of the day for limited periods of the year. The likelihood of this occurring and the duration of such an effect depend upon:
- The direction of the residence relative to the turbine(s);
 - The distance from the turbine(s);
 - The turbine hub-height and rotor diameter;
 - The time of year;
 - The proportion of hours in which the turbine operates;
 - The frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon); and
 - The prevailing wind direction.
- 13.1.4 The further the observer is from the turbine the less pronounced the effect will be. There are several reasons for this:
- There are fewer times when the sun is low enough to cast a long shadow;
 - When the sun is low it is more likely to be obscured by either cloud on the horizon or intervening buildings and vegetation; and,
 - The centre of the rotor's shadow passes more quickly over the land reducing the duration of the effect.
 - At a distance, the blades do not cover the sun but only partly mask it, substantially weakening the shadow. This effect occurs first with the shadow from the blade tip, the tips being thinner in section than the rest of the blade. The shadows from the tips extend the furthest, therefore the strength of the effect decreases with distance.

13.2 Methodology

Candidate Turbine

- 13.2.1 For the purposes of conducting a shadow flicker impact assessment the candidate turbine model will be the Vestas V162 with a hub height of 119m and tip height of 200m. This model has been selected to assess the maximum potential impacts.

ReSoft WindFarm software

- 13.2.2 ReSoft Windfarm software will be used to model the shadow flicker effects of the development. The program uses simple geometric considerations: the position of the sun at a given date and time; the size and orientation of the windows that may be affected; and the size of the turbine that may cast the shadows. The model calculates the maximum possible duration of flicker effects by assuming that:
- Turbines are facing the sun at all times of the day;
 - It is always sunny;
 - The turbines are always operating; and

- There is no local screening.

Modelling of Façades

- 13.2.3 Given that the glazed area will not be known at every property, windows will be modelled conservatively with dimensions of 4m x 4m.
- 13.2.4 The orientation of each façade will be included in the model, measured in terms of degrees from north. This means, for example, that if a window faces due south, it is 180 degrees from north.

Modifying Factors

- 13.2.5 The degree of shadow flicker impact that will typically occur in practice is always much less than the theoretical maximum flicker calculated by the model. Modifying factors take into account actual annual hours of sunlight for the area and hours of turbine operation. These factors have been applied to the modelling results in order to reach a more realistic estimate of shadow flicker impact that would typically occur in practice.
- 13.2.6 The modifying factors are derived from the following:
- The average sunlight hours for the local area have been taken as 1,333 hours, based on meteorological data obtained from Rothesay (14.5km south-west of the development). Therefore, on average, it is sunny for ~30% of the daylight hours, though this varies from month to month. The monthly hours are provided below in Table 13.1.
 - The rotor of a modern wind turbine can be expected to turn approximately 90% of the time.
 - No adjustment will be made in regard to wind direction, and it will be assumed that the turbines are always yawed such that flicker is possible.
- 13.2.7 The monthly sunshine hours expected to occur based on nearby Met-Office records are given below:

Table 13.1 - Average monthly sunshine hours

Month	Mean Hour ³⁰	Total hours ⁶	Sun
January	41	239	17%
February	68	267	25%
March	102	366	28%
April	151	424	36%
May	201	504	40%
June	172	524	33%
July	156	525	30%
August	155	468	33%
September	116	385	30%
October	81	325	25%
November	54	251	21%
December	36	221	16%
Annual	1333	4497	30%

Assessment of the Impact

- 13.2.8 There is currently no standard UK Guidance on acceptable levels of shadow flicker. The only guidance that provides suggested levels is Northern Ireland's Best Practice Guidance to Renewable Energy, which recommends that shadow flicker at neighbouring offices and dwellings within 500m should not exceed 30 hours per year. This document also comments that at distances greater than 10 rotor diameters, the potential for shadow flicker is very low. This position is based on research by Predac, a European Union sponsored organisation promoting best practice in energy use and supply which draws on experience from Belgium, Denmark, France, the Netherlands and Germany. In 2017, this research was reviewed by ClimateXChange⁷ and remains an industry standard.

13.3 Environmental Baseline

- 13.3.1 Based on the guidance referenced above, a study area of 1620m around the proposed turbines will be considered. The resulting study area is shown in **Figure 13.1**.

Sensitive Receptors

- 13.3.2 The study area shown in **Figure 13.1** includes properties located to the east and west of Turbines 8 and 9 (T8 & T9). Additionally, a recycling centre to the north of T9, has been identified within the study area however, as it is neither a residential dwelling nor a commercial office, it has not been considered a sensitive receptor. Assuming these properties are confirmed as sensitive receptors, a full shadow flicker impact assessment would be conducted. The location of potential receptors will be informed by both a desktop assessment and information gathered during site visits.

Cumulative Impact

- 13.3.3 No third-party wind developments were found within the vicinity of the proposed turbine locations. As such, the assessment of cumulative shadow flicker impacts can be scoped out.

13.4 Mitigation

- 13.4.1 Where shadow flicker is predicted to occur for short periods of time (less than 30 hours over the course of a year), it is likely that no mitigation will be required as the magnitude any resulting impact will be low.
- 13.4.2 Should shadow flicker prove to be problematic in practice, the turbines can be fitted with a shadow stop system that can be programmed to automatically shut down when environmental conditions are conducive to shadow flicker at affected properties. This means that the turbines would be equipped with a light level sensor, to detect periods when there is sufficient light to generate shadow flicker.
- 13.4.3 Shadow flicker impacts could be managed through a suitable planning condition that would require a mitigation scheme to be submitted to, and approved by, the local Planning Authority in response to a complaint.

⁷ Taken from Forsythe et al. (1995) A model comparison for daylength as a function of latitude and day of year. Ecological Modelling. 80: 87 – 95.

13.5 Summary

- 13.5.1 A shadow flicker study area has been defined that encompasses any property within 10 rotor diameters of the proposed turbines. Properties to the west and east of the project have been identified as potential sensitive receptors. A recycling centre to the north of the northernmost proposed turbine (T9) has also been identified however, has not been considered as a sensitive receptor. A threshold of 30 hours of flicker per year will be used as the benchmark for potential significant impacts within a full shadow flicker impact assessment, which would be carried out as part of any subsequent Environmental Impact Assessment Report.

13.6 Questions to Consultees

Q13/1: Do the Council and consultees agree with the proposed methodology to conduct the shadow flicker impact assessment?

Q13/2: Do the Council and consultees agree that the recycling centre to the north of Turbine 9 is not sensitive to shadow flicker effects?

Q13/3: Do the Council and Consultees agree that 30 hours of flicker is a suitable threshold below which no mitigation is required?

13.7 Guidance

- 13.7.1 Department of Environment and Climate Change (DECC) studies have shown that even in UK latitudes, shadows from wind turbines can only be cast approximately 130 degrees either side of north relative to the turbine due to the orientation of the earth's axis and the positioning of the sun. This equates to a region of 50 degrees either side of due south where a wind turbine will never cast a shadow. Properties within this region will experience no shadow flicker effects, regardless of their distance from the turbine. While DECC has now been replaced by the Department for Business, Energy and Industrial Strategy which does not provide guidance on shadow flicker, these findings are still considered relevant.

13.8 References

<https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcumthbh6> - Last Accessed (28/09/2023)

Taken from Forsythe et al.(1995) A model comparison for daylength as a function of latitude and day of year. Ecological Modelling. 80: 87 - 95

Best Practice Guidance to Planning Policy Statement 18: Renewable Energy, Department of the Environment (Northern Ireland), (2009). https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/Best%20Practice%20Guidance%20to%20PPS%2018%20-%20Renewable%20Energy_0.pdf

ClimateXChange, commissioned by Scottish Government (2017), 'Review of Light and Shadow Effects from Wind Turbines'.

Update of UK Shadow Flicker Evidence Base, by PB Power, commissioned by DECC (2011) <https://assets.publishing.service.gov.uk/media/5a79770bed915d0422068aa3/1416-update-uk-shadow-flicker-evidence-base.pdf>

14. Other Considerations

14.1 Introduction

14.1.1 A number of other environmental issues will be considered in relation to the proposed development, including:

- Infrastructure, telecommunications, television reception;
- climate and carbon balance;
- population and human health;
- risks of major accidents and/or disasters.

14.1.2 These topics, including reference to how they will be assessed or if they are proposed to be scoped out, are discussed in turn in the following text.

14.2 Telecommunications

14.2.1 Wind farms have the potential to interfere with point-to-point microwave links such as fixed link telecommunications infrastructure. This section considers the following potential interference from the Proposed Development:

- Physical obstructions;
- Adverse effects on overall performance of communications;
- Interfere with electro-magnetic signals and potentially affecting television reception and fixed telecommunication links.

Legislation, Policy and Guidance

14.2.2 Guidance for assessing the potential impact of wind turbines on infrastructure is given in:

- Scottish Government (2014) 'Scottish Planning Policy, Subject Policy: Development Management';
- Ofcom (2009) 'Tall Structures and their impact on broadcast and other Wireless Systems';
- BBC & Ofcom (2006) 'The Impact of Large buildings and Structures, including Wind Farms, on Terrestrial Television Reception';
- Health and Safety Executive – GS 6 (2012) 'Avoiding Danger from Underground Services'.

14.2.3 The potential effects of the Proposed Development will be assessed with reference to these documents.

Telecommunications

14.2.4 Wind farms produce electromagnetic radiation which has the potential to interfere with broadcast communications and signals. To determine the potential impact of the Proposed Development, initial consultation will be undertaken with the following consultees:

- Ofcom;
- Joint Radio Company Windfarm Co-ordinations;
- Atkins Global;
- British Telecom;
- Vodafone;
- EE; and
- O2.

14.2.5 The potential for a significant impact on any fixed radio links within the vicinity of the Site will be determined through consultation with these key stakeholders.

Television

14.2.6 Since the digital switchover was completed the potential impacts on television signals from wind farm developments has been significantly reduced as these digital signals are much better at coping with the signal reflections which could cause ghosting effects on an analogue signal.

- 14.2.7 However, if the Proposed Development is found to cause interference to TV signals there are a number of options available to mitigate the effects such as re-aligning the aerial or installing a satellite dish. As potential television reception problems are difficult to predict and identify, assurance that the Applicant will rectify any problems is formally formalised in a planning condition.

Baseline

- 14.2.8 From initial consultation with Ofcom's Spectrum information portal on 28 September 2023 there appear to be no fixed links within the Site of the Proposed Development as demonstrated on Figure 2.1. A check of linesearchbeforeUdig did not identify any underground links. Consultation will be undertaken again following design freeze to confirm that there are no fixed links.

Mitigation

- 14.2.9 In the event that a significant impact on a telecommunications link is identified, the first mitigation will be to seek to avoid any direct impacts by micrositing the wind turbines. Where micrositing does not mitigate the potential impacts a more detailed impact assessment will be undertaken using Fresnel Zone calculations to ascertain the potential for interference on the link resulting from the Proposed Development. In cases where these mitigation proposals are not acceptable to the link operator it may be possible to re-route the link, at the Applicant's expense, to follow a different communications tower, avoiding the impact from the Proposed Development.

14.3 Climate Change and Carbon Balance

Introduction

- 14.3.1 This chapter considers the potential impact of the Proposed Development on climate change. The UK and Scottish Governments have developed ambitious targets for tackling climate change:
- The UK Government, in the 2008 Climate Change Act made a commitment to reduce the UK's emissions of CO₂ by 34% (on 1990 levels) by 2020 and 80% by 2050.
 - The Climate Change (Scotland) Act 2009 set in statute the Government's Economic Strategy target to reduce Scotland's emissions of greenhouse gases by 80% by 2050 (on 1990 levels), with an interim reduction target of at least 42%.
 - With the the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, Scotland has set a target of becoming net zero by 2045. With a new legally binding target for 2030 of a 75% reduction in emissions compared to 1990.
 - The UK Government amended the Climate Change Act of 80% reduction, to 100% reduction by 2050. These targets will be achieved through an investment in energy efficiency and clean technologies such as renewable energy generation.
- 14.3.2 Argyll and Bute Council are working in line with the Climate Change (Scotland) Act to reduce their Greenhouse Gas Emissions across the region. The council's Decarbonisation Plan 2022-2025 sets out actions and commitments which there are working to deliver for a low-carbon and environmentally friendly Argyll and Bute. The Plan sets out an approach which is based on six themes, including Waste, Energy and Water Consumption and Transport emissions.
- 14.3.3 Renewable electricity generated by wind turbines is already considered to be the cheapest form of new electricity generation and as such, has a vital role to play in achieving the ambitious targets set by both the Scottish and UK Governments.
- 14.3.4 The manufacturing, construction, and installation of the wind turbines on site has an associated carbon cost, and carbon losses are also generated by the requirement for extra capacity to back up wind power generation. Carbon losses associated with reduced carbon fixing potential and loss of soil organic matter occurs through the excavation of peat for construction and drainage effects.
- 14.3.5 Turbine blades currently make up approximately 13% of the carbon impact of a wind turbine, and are the hardest section of the turbine to be recycled. However, there are options for recycling or disposal, such as burning the epoxy which generates energy, which can be recovered. The residues from the fibreglass incineration can be used in other secondary applications such as cement production. The carbon cost of the blades is incorporated into the lifecycle emissions of the turbine. Efforts to reuse and recycle turbine blades are additionally driven by a Europe-wide landfill ban on decommissioned wind turbine blades by 2025. The European Wind Industry is also committed not to send decommissioned blades from Europe to other countries for landfilling.

Environmental Baseline

- 14.3.6 The Proposed Development is situated in an area surrounded by commercial forestry so felling may be required for access. The Site is underlain with Class 2 Peat with a small pocket of Class 1 Peat within

the northern Site area. Peat surveys and peat probing will be carried out to determine if carbon rich soils can be avoided during construction.

- 14.3.7 The turbines are anticipated to have a generation capacity of up to 7.2MW and the Proposed Development consists of nine turbines, giving an overall site capacity of up to 64.8MW. This generation will positively contribute to meeting local and national renewable energy targets by producing clean energy to be distributed to the local grid network.

Method of Assessment and Reporting

- 14.3.8 This chapter will encompass two distinct elements:
- Greenhouse Gas (GHG) Impact Assessment: This aspect involves assessing the impact of the Proposed Development on greenhouse gas emissions. The goal is to comprehend how the project might influence the climate.
 - Resilience to Climate Change Consideration: This part involves evaluating how the Proposed Development can withstand and adapt to the effects of climate change. The focus is on understanding how climate change might impact the development itself and identifying strategies to enhance its resilience against these impacts.
- 14.3.9 Firstly, to provide the carbon calculations for the assessment, the Scottish Government's Carbon Calculator Tool V1.7.0 will be used to inform discussion in the chapter.
- 14.3.10 Once a design has been established and the excavation and construction parameters obtained, the Carbon Calculator will present results based on the input variables entered. The data delivered will inform the quantity of tCO₂ equivalent over its lifetime. The following activities will be calculated from the calculator:
- Losses due to turbine life (e.g. manufacture, construction, decommissioning)
 - Losses due to backup
 - Losses due to reduced carbon fixing potential
 - Losses from soil organic matter
 - Losses due to DOC & POC leaching
 - Losses due to felling forestry.
- 14.3.11 Secondly, a comprehensive evaluation of climate change resilience concerning the Proposed Development will be undertaken. This evaluation will encompass the identification of potential climate change impacts, considering their potential severity, the likelihood of occurrence, and their probable effects on the Proposed Development.
- 14.3.12 The evaluation will encompass all infrastructure and assets linked to the Proposed Development. It will address resilience against both gradual climate change and the risks associated with an increased frequency of extreme weather events, aligning with the UK Climate Projections 2018 (UKCP18).

Mitigation

- 14.3.13 The Proposed Development will reduce the CO₂ released by the electricity generation system.
- 14.3.14 The use of peat surveys and peat probing will enable the potential loss and disturbance of peat to be estimated and minimised. The implementation of a Peat Management Plan will reduce the negative impacts associated with works on carbon rich soils.
- 14.3.15 The Applicant will seek to incorporate any additional enhancements at the construction phase with their appointed contractor through the provision of a Construction and Environmental Management Plan (CEMP), to be agreed during the discharging of planning conditions. The document will be produced in line with best practice guidance and appropriate consultation with key stakeholders.

14.4 Population and Human Health

- 14.4.1 The Proposed Development will be designed and maintained in accordance with all relevant industry guidelines, standards and regulations including those pertaining to safeguarding the risk of human health. This includes the design and siting of wind turbines at an appropriate distance from sensitive receptors such as roads, core paths and residences. This will minimise the risk to human health during operation. Risks associated with ice-build-up, lightning strike and structural failure are removed or reduced through the wind turbine manufacture and manufacturer guidance on construction procedures.
- 14.4.2 As the Proposed Development is a non-emitting development, it is considered that it will not present a risk to human health from an emissions perspective. There will be some greenhouse gas and dust emissions during construction and decommissioning, but appropriate air quality and dust management

measures will be put in place via a Construction Environmental Management Plan (CEMP). As a result, emissions are not considered to present a risk to human health.

- 14.4.3 There is potential for impact to the local population in relation to amenity. These will be included as part of the relevant assessment and reported accordingly. This includes the following:
- Visual Impacts (Landscape and Visual Impact Assessment);
 - Residential and Settlements (Landscape and Visual Impact Assessment);
 - Noise;
 - Shadow Flicker;
 - Private Water Supplies (Geology, Hydrology, Hydrogeology and Peat);
 - Traffic and Transportation; and
 - Socio-Economics, Recreation and Tourism
- 14.4.4 Given the absence of potential significant effects on human health from emissions and the capture of other population issues in other technical assessments, a stand-alone Population and Human Health chapter is proposed to be scoped out of the EIA.

14.5 Major Accidents and Disasters

- 14.5.1 The EIA Regulations state that an EIA must identify, describe and assess in an appropriate manner, the expected effects deriving from the vulnerability of the Proposed Development to risks of major accidents and natural disasters, so far as relevant to the Development.
- 14.5.2 Renewable energy development has an exemplary safety record, with stringent best practice guidance to minimise risk during the construction, operation and decommissioning phases of the Proposed Development.
- 14.5.3 Statkraft are members of SafetyOn. The SafetyOn organisation provides leadership in health and safety for the onshore wind industry, ensuring transparency about the industry's Health and Safety performance, as well as assisting industry stakeholders to see that key emerging risks are mitigated through co-operation and shared learning.
- 14.5.4 During the construction phase, the Proposed Development will be under supervision of a suitably qualified team, governed by Health and Safety legislation and best practices. This will include the induction of all staff to the Proposed Development and publication of all appropriate Health & Safety practices applicable to the Proposed Development.
- 14.5.5 Climate change is considered in **Section 14.3** of this Scoping Report. It is considered that the Proposed Development will deliver an overall positive effect on carbon savings and will contribute to the decarbonisation of the electricity sector.
- 14.5.6 Flood risk and any potential for peat slide will be address in the Geology, Hydrology, Hydrogeology and Peat assessment of the EIA Report.
- 14.5.7 Given the Proposed Development is not located in an area that is known to be prone to natural disasters, and climate change, flooding and peat slide risk will be covered in other chapters it is considered that a stand-alone chapter for this topic is not required and is therefore scoped out of the EIA.

14.6 Questions to Consultees

Q14/1: Do consultees agree with the proposed methodologies?

Q14/2: Do the consultees have any further information that would assist in the preparation of assessments?

Q14/3: Are consultees aware of any further guidance or policy documents not mentioned within the report that are relevant to the assessments?

14.7 References

Climate Change and Carbon Balance

Scottish Government. Available at: <https://www.legislation.gov.uk/asp/2019/15/section/1/enacted>

UK Government. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/section/1>

Argyll and Bute Council. Available at: https://www.argyll-bute.gov.uk/sites/default/files/migrated_files/Unknown/decarbonisation_plan_2022_v0.8_.pdf

RenewableUK. Available at: <https://www.renewableuk.com/general/custom.asp?page=WindEnergy>

Scottish Government. Available at: <https://informatics.sepa.org.uk/CarbonCalculator/index.jsp>

Wind Europe. Available at: <https://windeurope.org/newsroom/press-releases/wind-industry-calls-for-europe-wide-ban-on-landfilling-turbine-blades/#:~:text=Today%20WindEurope%20called%20for%20a,for%20blade%20recycling%20and%20recovery.>

LinesearchbeforeUdig. Available at: <https://lsbud.co.uk/>

15. Invitation to Comment

- 15.1.1 You are invited to provide comment on this Scoping Report. Please send all Scoping responses to ECU at:

Energy Consents Unit
5 Atlantic Quay
150 Broomielaw
Glasgow
G2 8LU
Email: Econsents_Admin@gov.scotaddress

- 15.1.2 If you wish to discuss matters contained in this report in greater detail prior to responding to the scoping exercise, please contact:

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