Altnabreac Wind Farm Limited

ALTNABREAC WIND FARM

EIA Scoping Report

FINAL
NOVEMBER 2024

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EXECUTIVE SUMMARY

PURPOSE OF THIS REPORT

Altnabreac Wind Farm (the "Proposed Development") will consist of up to 17 wind turbines with tip heights reaching up to 200 meters (m), battery storage facility (circa. 100MW) and associated infrastructure. It is proposed to have an installed capacity of approximately 130 megawatts (MW).

The Proposed Development is situated approximately 7km to the south-west of the village of Halkirk, with Thurso around 24km to the north. The Development Site is wholly within The Highland Council area boundary. An overview of the Proposed Development is set out within **Appendix 1, Figures 1-1 and 1-2.**

Altnabreac Wind Farm Ltd ("the Applicant") is intending to apply for consent for the Proposed Development under Section 36 of the Electricity Act (Scotland) 1989. This document produced by WSP UK Ltd (the Scoping Report) formally requests a Scoping Opinion from the Scottish Ministers under Regulation 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

The Scoping Report outlines the proposed scope of the Environmental Impact Assessment (EIA) for the Proposed Development, the full assessment of which will be presented in an EIA Report. This scoping request is intended to inform the EIA of an upcoming application under Section 36 of the Electricity Act 1989 (as amended) for consent and a deemed planning permission to construct and operate the Proposed Development.

SUMMARY OF FINDINGS OF THE SCOPING REPORT

The EIA will focus on any significant effects that may arise during the construction and operation of the Proposed Development. This Scoping Report utilises currently available baseline information to identify where significant effects are likely to occur as a result of the Proposed Development and thereby determine which aspects should be "scoped in" or "scoped out". The following environmental topic areas are proposed to be included in the EIA:

- Chapter 5: Terrestrial Ecology (including forestry).
- Chapter 6: Ornithology.
- Chapter 7: Landscape and Visual.
- Chapter 8: Cultural Heritage.
- Chapter 9: Hydrology, Hydrogeology and Peat.
- Chapter 10: Traffic, Transport and Access.
- Chapter 11: Acoustics.
- Chapter 12: Shadow Flicker.
- Chapter 13: Climate Change.
- Chapter 14: Aviation, Telecommunications and Other Issues.
- Chapter 15: Socio-Economics, Tourism and Recreation.

GLOSSARY

Abbreviation / Description	Definition
AEECoW	Association of Environmental and Ecological Clerk of Works
AIL	Abnormal Indivisible Load
AoI	Area of Influence
Applicant	Altnabreac Wind Farm Limited
AST	Above-ground Storage Tank
BAP	Biodiversity Action Plan
BGS	British Geological Society
CAR	Controlled Activities Regulations
CaSPlan	Caithness and Sutherland Local Development Plan
CDSFB	Caithness District Salmon Fisheries Board
CEMP	Construction Environmental Management Plan
CIfA	Chartered Institute for Archaeologists
CSL	Construction Site Licence
Development Site	The site area within the redline boundary
DWPA	Drinking Water Protection Area
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EZoI	Ecological Zone of Influence
FEP	Flood Evacuation Plan
GPG	Good Practise Guidance
GWDTE	Groundwater Dependant Terrestrial Ecosystems
HCHET	Highland Council Historic Environment Team
HER	Historic Environment Records
HES	Historic Environment Scotland

Abbreviation / Description	Definition
HGV	Heavy Goods Vehicle
HHER	Highlands Historic Environment Records
HMP	Habitat Management Plan
HNBAP	Highland Nature Biodiversity Action Plan
HWLDP	Highland-Wide Local Development Plan
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
IoA	Institute of Acoustics
IPA	Important Plant Area
LGV	Light Goods Vehicle
LNCS	Local Nature Conservation Site
MW	Megawatt
MSS	Marine Sciences Scotland
NATS	National Air Traffic Services
NNR	National Nature Reserve
NPF4	National Planning Framework 4
NS	NatureScot
NVC	National Vegetation Classification
NVZ	Nitrate Vulnerable Zone
OFCOM	Office of Communications – government-approved regulatory and competition authority for broadcasting, telecommunications and postal industries in the UK.
OHL	Overhead Transmission Line
OS	Ordnance Survey
OWSG	Onshore Wind Supplementary Guidance
PAN	Planning Advice Note
PIRP	Pollution Incident Response Procedures
PMP	Peat Management Plan

Abbreviation / Description	Definition
PPP	Pollution Prevention Plan
Proposed Development	The wind farm, battery storage facility and associated infrastructure
PWS	Private Water Supply
RSPB	Royal Society for the Protection of Birds
S36	Section 36 application
SAC	Special Area of Conservation
SAS	Specific Advice Sheets
SEPA	Scottish Environment Protection Agency
SGt	Scottish Government
SNRHE	Scottish National Record for Historic Environment
SR	Scottish Renewables
SSSI	Site of Special Scientific Interest
SWT	Scottish Wildlife Trust
THC	The Highland Council
TMP	Traffic Management Plan
WFD	Water Framework Directive
WHS	World Heritage Site
WMP	Water Management Plan
ZTV	Zone of Theoretical Visibility

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APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

1.1.1. Altnabreac Wind Farm Ltd (hereinafter referred to as the "Applicant") is seeking to develop a wind farm and battery storage facility to enhance the capacity and uninterrupted supply of onshore wind power in Scotland.

1.1.2. The proposed site (the "Development Site") of Altnabreac Wind Farm (the "Proposed Development") is located in Caithness, southeast of Altnabreac railway station. The village of Halkirk is located approximately 7km to the north-west and the town of Thurso is around 24km to the north. The Development Site is centred at coordinates 58°23′05″N, 003°40′31″W and is located wholly within The Highland Council (THC) area boundary.

1.1.3. It is anticipated that access will be from the A9, leaving at Mybster and following the B870 onto an unclassified road and following the timber extraction route into the Development Site.

1.1.4. The site area predominantly consists of commercial forestry and peatlands. **Figure 1-1** in **Appendix 1** shows the Development Site location plan in the wider landscape, and **Figure 1-2** in **Appendix 1** illustrates the turbine locations.

1.1.5. The Applicant is proposing to submit an application to the Scottish Government under Section 36 (S36) of the Electricity Act 1989[1], seeking consent to construct and operate the Proposed Development, currently anticipated to comprise up to 17 wind turbines, with a generating capacity up to 130 megawatts (MW) of electricity and a battery storage facility (approximately 100MW) along with associated infrastructure including, access tracks, crane hardstandings, control building / substation, electrical cabling between turbines and the substation and a temporary construction compound. An initial site layout has been developed to inform the preliminary environmental assessments and, for the purpose of identifying the scope of the EIA, a maximum tip height of 200 meters (m) has been assumed.

HISTORY OF THE PROJECT

1.1.6. The Applicant engaged with THC through the Major Pre-Application Advice Service on 25 November 2020 (Ref: 20/04174/PREMAJ) and a written response was received on 22 December 2020. A number of discussion points were raised by THC which the Applicant seek to address through the design evolution process.

[1] UK Government. (1989). 'Section 36 Electricity Act 1989'. Available at: https://www.legislation.gov.uk/ukpga/1989/29/section/36

1.1.7. Ornithology surveys have been ongoing since 2017 in line with NatureScot guidance (or other published survey methodologies where applicable) and include Walkover surveys (raptors/waders); Vantage Point surveys; Greenshank Surveys; and other sensitive protected species surveys which have informed the design of the Proposed Development to date.

1.2 THE APPLICANT

1.2.1. The Applicant is Altnabreac Wind Farm Limited, a subsidiary of EDP Renewables (EDPR). Altnabreac Wind Farm is being developed by Wind2 on behalf of EDPR.

1.2.2. Wind2 is a specialist onshore wind farm developer founded in 2016. The company has staff based in the Highlands, Perth, Edinburgh, as well as Wales and in various locations throughout England, with significant expertise in renewable energy and a track record of successfully developing onshore wind farms throughout the UK. Wind2 is working on the development of a number of renewable energy projects and is committed to investing in the Highlands and Islands of Scotland. Further information on Wind2 can be found on its corporate website at https://wind2.co.uk.

1.2.3. EDPR is a global leader in the renewable energy sector and the world's fourth-largest renewable energy producer. EDPR is currently present in the UK and internationally in another 28 markets. EDPR has personnel based in Edinburgh and through its joint venture with ENGIE (Ocean Winds), recently completed construction on the 950MW Moray East Offshore Wind Farm, which has the capability of supplying 40% of Scotland's electricity demand. Further information on EDPR can be found on its corporate website at https://www.edpr.com/en.

1.3 THE AGENT

1.3.1. WSP UK Ltd (WSP) has been commissioned to prepare this Scoping Report. As a multidisciplinary firm, WSP provides a comprehensive "one company" solution, leveraging over 25 years of experience in preparing EIA for onshore wind farm developments across the UK. WSP employs a proven approach to assessing environmental effects, which reduces consenting risk by actively involving key stakeholders through meaningful consultation and engagement throughout the EIA process. The WSP EIA methodology is recognised by the Institute of Environmental Management and Assessment (IEMA).

1.4 DEFINITION OF AN ENVIRONMENTAL IMPACT ASSESSMENT

1.4.1. The term 'Environmental Impact Assessment' ('EIA') describes a procedure that must be followed for certain types of projects before it can be given 'consent'. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for avoiding, preventing, reducing or, if possible, offsetting them are properly understood by the public and the authority granting consent (the 'determining authority') before it makes its decision.

1.5 REQUIREMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT

1.5.1. The Applicant is proposing to submit an application under S36 of the Electricity Act 1989 [1], seeking consent to construct and operate the Proposed Development, currently anticipated to comprise 17 wind turbines with a generating capacity of up to 130MW and a battery storage facility (circa. 100MW) together with associated infrastructure including access tracks, crane hardstandings, control building/electricity substation, a temporary construction compound and potential borrow pit(s). A meteorological mast will also be located at the Development Site however this will be subject to a separate planning application to THC.

1.5.2. The development falls under Schedule 2 of The Electricity Works (Environmental Impact Assessment) (Scotland)[2] Regulations 2017 (hereinafter referred to as the "EIA Regulations") as a generating station (Schedule 2(1)). A Schedule 2 development constitutes EIA development if the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location as set out in Section 3 of the EIA Regulations[2]. Due to the scale and nature of the Proposed Development, the Applicant will undertake an EIA to assess the potential significant effects.

1.6 PURPOSE OF THE SCOPING REPORT

1.6.1. This report sets out the proposed scope of the EIA, which is to be submitted to the Scottish Ministers as a formal request for a Scoping Opinion. A Scoping Opinion is defined under the EIA Regulations[2] as "an opinion adopted by the Scottish Ministers as to the scope and level of detail to be provided in the EIA Report".

1.6.2. The purpose of this EIA Scoping Report is to ensure that the subsequent EIA is focused on the key impacts likely to give rise to significant effects and to obtain agreement on the EIA approach and scope. As well as identifying elements to be considered necessary to assess further.

1.6.3. This report establishes the overall framework for the EIA of the Proposed Development. It identifies the environmental impacts and associated effects to be considered in the EIA Report. The EIA Scoping Report, along with the Scoping Opinion received from relevant authorities, will inform the scope for the EIA. The scope of the EIA may also be further refined as the project progresses and will for example take account of:

- Ongoing design evolution of the Proposed Development;
- Baseline data collection, such as field surveys; and
- Consultation with stakeholders.

[2] UK Government. (2017). 'The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017'. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents

Any adjustments to the EIA scope due to new information will be clearly explained in the EIA Report. This will include confirmation of whether the changes have been agreed upon with relevant consultees.

1.7 STRUCTURE OF THE EIA SCOPING REPORT

1.7.1. The structure of this Scoping Report includes the following:

- A plan showing the location of the Proposed Development (**Figure 1-1: Development Site Location Plan and Figure 1-2: Turbine Locations,** see **Appendix 1**)
- A description of the Proposed Development being considered (**Chapter 2: Site Context and Proposed Development**);
- A description of the relevant legislation and planning policy (**Chapter 3: Legislation and Planning Policy**);
- A description of the consenting and EIA requirements in relation to the Proposed Development (**Chapter 4: Approach to EIA**); and
- A description of potentially significant effects as a result of the Proposed Development and the methodologies that will be used to assess potential impacts (**Chapter 5: Terrestrial Ecology** to **Chapter 14: Socioeconomics, Tourism and Recreation**).

2 SITE CONTEXT AND PROPOSED DEVELOPMENT

2.1 PURPOSE OF THE DEVELOPMENT

2.1.1. The Scottish Government supports this objective with an ambitious energy strategy. By 2030, Scotland aims to source 50% of its total energy consumption from renewable sources[3]. This is a significant step up from previous goals and reflects Scotland's commitment to transitioning to a low-carbon energy system[4]. These targets are part of the broader strategy to decarbonize the energy sector, including electricity, heat, and transport. Additionally, the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[5] commits Scotland to achieving 'net zero' emissions by 2045.

2.1.2. Onshore wind farm developments are pivotal in meeting the UK Government's renewable energy goals and reducing carbon emissions in accordance with current targets. The necessity for such development is underscored by the UK Government's plans to limit the use of coal-fired power stations with a complete phasing-out by October 2024. The UK's climate change goals, among the most ambitious in Europe, aim for an 80% reduction in carbon dioxide emissions by 2050[6].

2.1.3. The UK Energy Roadmap[7] and The UK Low Carbon Transition Plan[8] both highlight onshore wind as essential for reaching the UK Government's renewable energy targets and transitioning to a low-carbon energy system. In December 2022, the Scottish Government established its ambition of deploying 20GW of onshore wind by 2030 as part of its effort to achieve net-zero.

[3] Scottish Government (2017) Scotland's Route to 2050: Targets, Priorities and Actions – The future of energy in Scotland: Scottish energy strategy

[4] Scottish Government. (2023). 'Scotland's Energy Strategy and Just Transition Plan: Ministerial statement'. Available at: https://www.gov.scot/publications/scotlands-energy-strategy-transition-plan-ministerial-statement/

[5] UK Government. (2019). 'Climate Change (Emissions Reduction Targets) (Scotland) Act 2019'. Available at: https://www.legislation.gov.uk/asp/2019/15

[6] UK Parliament. (2023). "The UK's plans and progress to reach net zero by 2050'. Available at: https://commonslibrary.parliament.uk/research-briefings/cbp-9888/

[7] UK Government. (2013). 'The UK Renewable Energy Roadmap'. Available at: https://www.gov.uk/government/collections/uk-renewable-energy-roadmap.

[8] UK Government. (2009). 'The UK Low Carbon Transition Plan'. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228752/9780108508394.pdf.

2.2 THE DEVELOPMENT SITE

2.2.1. The Development Site (centred at coordinates 58°23′05″N, 003°40′31″W and shown in **Figure 1-1** in **Appendix 1**) covers an area of approximately 2,000 hectares (ha) within the Highland Council area. The Proposed Development is located within the Strathmore and Altnabreac forest with the primary use of the Development Site being commercial forestry. The forest largely consists of Sitka spruce and Lodgepole pine with an insignificant amount of Larch, and the remaining less than 1% is broadleaf woodland. **Appendix 5** provides further details regarding forestry on the Development Site.

2.2.2. The Proposed Development is situated southeast of Altnabreac railway station, around 7km south-west of the village of Halkirk and approximately 24km south of Thurso, along the Far North Railway Line. Access to the site is anticipated from the A9 trunk road. This will involve exiting the A9 at Mybster and following the B870 onto an unclassified road leading to the Development Site. Existing forestry tracks within the Development Site will be utilised wherever practical, subject to any necessary upgrades to accommodate construction traffic.

2.2.3. The surrounding area is characterised by rolling hills, peatlands and open heather dominated moorland. Scattered commercial coniferous forests are present, with other land uses including recreational hunting and fishing. A number of other wind farms are present in the surrounding area including Achlachan, Causeymire, Bad a Cheò and Halsary wind farms.

2.3 PROPOSED DEVELOPMENT

2.3.1. The Proposed Development would comprise the following main elements:

- Up to 17 wind turbines with tip heights up to 200m;
- Access tracks connecting infrastructure elements;
- Hard standing areas e.g. crane pads;
- Potential borrow pit(s);
- A battery storage facility area;
- Temporary construction compound; and
- Control building / substation and electrical cabling between these and the turbines.

A temporary meteorological (met) mast will also be installed on the Development Site however this will be subject to a separate planning application to THC.

2.3.2. For the purposes of the EIA, a candidate turbine will be selected for use during the assessment. The final selection of turbine model and specification will be influenced by the results of the EIA, the wind monitoring campaign and a competitive tendering process.

2.3.3. The locations of the turbines are, whilst indicative, represent the likely maximum extent of the Proposed Development. The battery storage facility is likely to be located close to the substation however its location will be identified through a design iteration process considering relevant environmental and technical constraints.

2.3.4. A micrositing allowance will be set out in the EIA Report. Micrositing refers to the precise locating of wind farm infrastructure following more detailed ground investigations that would be carried out post consent. This allows the location of infrastructure to be revised within a specified distance in response to the findings of the more detailed ground investigations that are carried out as part of the preparations for construction.

2.3.5. As set out in Figure 1-2, smaller parcels of land within the redline boundary are included to the east of the main Development Site area. It is proposed that these areas of land will be set aside for aspects such as habitat management, access and other necessary infrastructure for construction of the Proposed Development (such as borrow pits).

2.3.6. The indicative turbine locations are shown in **Table 2-1** and **Figure 1-2**.

Table 2-1 – Indicative Turbine Locations

Component	Maximum Height (m)	Location (X, Y)
Turbine 1 (ALT-01)	200	301186.00, 945010.00
Turbine 2 (ALT-02)	200	301492.00, 945285.00
Turbine 3 (ALT-03)	200	302073.00, 946047.00
Turbine 4 (ALT-04)	200	303135.00, 946142.00
Turbine 5 (ALT-05)	200	302969.00, 945517.00
Turbine 6 (ALT-06)	200	302645.00, 945175.00
Turbine 7 (ALT-07)	200	302633.00, 944623.00
Turbine 8 (ALT-08)	200	302633.00, 944623.00
Turbine 9 (ALT-09)	200	302018.00, 943951.00
Turbine 10 (ALT-010)	200	303539.00, 943096.00
Turbine 11 (ALT-011)	200	303343.00, 942739.00
Turbine 12 (ALT-012)	200	303231.00, 942345.00
Turbine 13 (ALT-013)	200	303193.00, 941937.00
Turbine 14 (ALT-014)	200	304575.00, 942870.00
Turbine 15 (ALT-015)	200	304739.00, 943361.00
Turbine 16 (ALT-016)	200	304813.00, 943768.00
Turbine 17 (ALT-017)	200	304873.00, 944177.00

2.3.7. The locations for associated infrastructure and the battery storage facility will be determined following an iterative design process to determine the most suitable locations, taking into account environmental constraints and ground conditions. The battery storage facility is likely to be located close to the substation.

2.3.8. The options for connection of the Proposed Development to the National Grid are currently being developed and therefore, at this stage, the extent of any connection / associated overhead transmission line (OHL) is not known at present. The grid connection will be subject to a separate application and is therefore outside the scope of this EIA.

2.4 EMBEDDED MITIGATION

2.4.1. Embedded mitigation refers to the measures integrated into the design of the Proposed Development. Throughout the iterative design process, environmental constraints will be a key factor shaping the layout of the Proposed Development. As baseline information is collected and potential impacts are identified, these considerations will be integrated into the design through workshops, alongside other engineering and technical constraints. Consequently, mitigation measures aimed at avoiding or reducing environmental impacts will be inherent from the outset of the project.

2.5 HISTORIC AND CURRENT DEVELOPMENT SITE USES

2.5.1. The Development Site is managed by Scottish Woodlands on behalf of the landowner. Land use mainly comprises commercial forestry with other activities in the wider area including deer stalking and fishing on the lochs.

2.5.2. The area consists of Altnabreac Railway Station and the former Altnabreac School. The school was closed in 1986 and converted into a private residence. The former gamekeeper's house sits adjacent to the school and station.

2.5.3. During the 1980s, peat banks were worked to provide fuel for residents who used to be cut off from Thurso during the winter months[9].

2.5.4. Scotland's Historic Land-use Assessment project (HLA) mapping[10] shows the Development Site area was predominantly used for rough grazing through prehistoric, roman and medieval times; with associated medieval/post-medieval Shielings (huts), before more recently from 19th Century to present being primarily used as a forestry plantation.

[9] Far North Line CRP (n.d.) 'Altnabreac (Allt nam Breac) Railway Station'. Available at: Altnabrec Railway Station - The Far North Line Community Rail Partnership

[10] Historic Land-Use Assessment project (HLA) mapping service. Available at: HLAmap

2.6 CONSTRUCTION

2.6.1. It is expected that the construction period of the Proposed Development will be up to 24 months. The commencement date for construction will largely be dependent on the date that consent is granted and the grid connection date. Felling and site clearance will be required initially around the location of infrastructure.

2.6.2. Following construction, temporary construction compound(s) and associated facilities will be removed and fully re-instated with vegetation/peat displaced from elsewhere on the Development site and landscaped taking account of local topography.

2.7 OPERATION AND MAINTENANCE

2.7.1. The Proposed Development is expected to have an operational period of 40 years. A Supervisory Control and Data Acquisition (SCADA) system will be implemented to obtain information from each turbine on its performance and allow for control of the turbines remotely.

2.7.2. Typically, routine maintenance or servicing of turbines and battery storage facility is likely carried out twice a year with a main service at 12-monthly intervals and a minor service at six months. The turbine requiring maintenance is switched off during the duration of the service. It takes two people (on average) one day to service each turbine.

2.8 DECOMMISSIONING

2.8.1. At the end of the Proposed Development's operational life, there are two options available:

- To re-power the Development Site with new turbines, which would require a new application and environmental assessment; or
- Removal of the wind turbines and control building/substation and reinstate the Development Site to its former condition in agreement with the controlling bodies such as THC.

2.8.2. The latter option of decommissioning at the end of the Proposed Development's life is assumed and will inform the EIA. It is proposed that above ground structures would be removed (as per any condition relating to this topic on the grant of consent) and the hardstanding areas re-instated where appropriate. Sub-surface infrastructure and access tracks will likely remain in situ in agreement with the landowner.

2.8.3. It is noted that changes as a result of decommissioning are expected to be of a lesser magnitude compared to those during the construction phase and as stated in Section 4.2, is proposed to be scoped out of the EIA.

2.9 ENVIRONMENTAL MANAGEMENT

2.9.1. The EIA Report will identify potential impacts and outline measures to avoid, prevent, reduce, or, where necessary, offset significant adverse effects. Where appropriate, these measures will be supported by monitoring commitments to ensure their effectiveness.

2.9.2. An outline Construction Environmental Management Plan (CEMP) will be submitted with the Section 36 application and will be further developed prior to construction. This will set out responsibilities for compliance with legislation and implement mitigation and monitoring measures set out in the EIA in order to avoid, minimise and mitigate against any construction effects on the environment. The report and the outline CEMP will be informed by the guidance document 'Good Practice during Windfarm Construction, 2019'[11].

[11] SNH. (2019). 'Good Practice during Windfarm Construction'. Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction.

3 LEGISLATION AND PLANNING POLICY

3.1 INTRODUCTION

3.1.1. The EIA will be conducted in accordance with all relevant legislation, policies, and guidelines. This chapter of the EIA Scoping Report outlines the planning policy framework and provides an overview of additional legislation, policies, and guidance pertinent to the Proposed Development.

3.1.2. The S36 application will be accompanied by a Planning Statement, which will detail the planning justification for the Proposed Development in relation to national and local policies, as well as other material considerations.

3.2 LEGISLATIVE CONTEXT

3.2.1. The application for the Proposed Development would be made pursuant to S36 of the Electricity Act 1989[12] and deemed planning permission under section 57 of the TCP(S)A 1997, as a generating station with a capacity exceeding 50 MW.

3.2.2. The EIA Regulations[13] provide the requirements for undertaking EIAs for developments to be consented under the Electricity Act 1989 (as amended)[12]. The EIA Report would be prepared in accordance with Schedule 4 of the Regulations.

3.3 SCOTTISH PLANNING POLICY AND GUIDANCE

3.3.1. There is policy and advice documents which would be material considerations in the determination of the S36 application for the Proposed Development, including those noted in the following sections:

[12] UK Government. (1989). 'Section 36 Electricity Act 1989'. Available at: https://www.legislation.gov.uk/ukpga/1989/29/section/36

[13] UK Government. (2017). 'The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017'. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents

NATIONAL PLANNING FRAMEWORK 4 (NPF4)

3.3.2. NPF4[14] serves as a comprehensive strategic document guiding Scotland's spatial development and planning policies. It integrates land use and planning directives to address key national priorities, including sustainable development, climate change mitigation, and the promotion of economic growth. NPF4 emphasises the importance of a place-based approach, encouraging developments that contribute positively to communities, enhance environmental quality, and support infrastructure resilience. By setting out a clear vision for the future development of Scotland, NPF4 aims to balance economic, social, and environmental objectives, ensuring a coordinated and sustainable approach to national and regional planning efforts. The Proposed Development will be classified as both a national development and essential infrastructure under NPF4.

NATIONAL PLANNING ADVICE, CIRCULARS AND ADVICE SHEETS

3.3.3. National planning policy[15] is supported by Planning Circulars, Planning Advice Notes (PANs) and Specific Advice Sheets and Ministerial/ Chief Planning Letters to Planning Authorities, which set out detailed advice from the Scottish Government in relation to a number of planning issues. The PANS and Specific Advice Sheets considered relevant to the Proposed Development include:

- PAN 1/2011 Planning and Noise, March 2011[16];
- PAN 2/2011 Planning and Archaeology, July 2011[17];
- PAN 3/2010 Community Engagement, August 2010[18];
- PAN 51 Planning, Environmental Protection and Regulation, October 2006[19];
- PAN 60 Natural Heritage, January 2000[20];
- PAN 61 Sustainable Urban Drainage Systems, July 2011[21];

[14] Scottish Government. (2023). 'National Planning Framework 4'. Available at: https://www.gov.scot/publications/national-planning-framework-4/

[15] UK Government. (2012). 'National Planning Policy Framework'. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[16] Scottish Government. (2011). 'Planning Advice Note 1/2011: planning and noise'. Available at: https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/

[17] Scottish Government. (2011). 'Planning Advice Note 2/2011: Planning and archaeology. Available at: https://www.gov.scot/publications/pan-2-2011-planning-archaeology/

[18] Scottish Government. (2010). 'Planning Advice Note 1/3010: Community and engagement. Available at: https://www.gov.scot/publications/pan-3-2010-community-engagement/

[19] Scottish Government. (2006). Planning Advice Note 51: planning, environmental protection and regulation. Available at: https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/

[20] Scottish Government. (2000). 'Planning Advice Note 60: natural heritage. Available at: https://www.gov.scot/publications/pan-60-natural-heritage/

[21] Scottish Government. (2001). 'Planning Advice Note 61: Sustainable urban drainage systems. Available at: https://www.gov.scot/publications/pan-61-sustainable-urban-drainage-systems/

- PAN 75 Planning for Transport, August 2005[22];
- PAN 79 Water and Drainage, September 2006[23];
- Wind Farm Developments on Peat Land, May 2013;[24]
- Specific Advice Sheet: Guidance on Developments on Peat Land: Peatland Survey, 2017[25];
- Energy Storage (updated December 2013)[26];
- Draft Peatland and Energy Policy Statement, 2016[27];
- Specific Advice Sheet (updated 28 May 2014); Onshore Wind Turbines[28];
- Spatial Planning for Onshore Wind Turbines – Natural Heritage Considerations, June 2015[29];
- Onshore Wind Sector Deal (2023)[30],
- Onshore Wind Policy Statement (2022)[31],

[22] Scottish Government. (2005). 'Planning Advice Not: PAN – PLANNING FOR TRANSPORT. Available at: https://www.gov.scot/publications/planning-advice-note-pan-75-planning-transport/

[23] Scottish Government. (2001). 'Planning Advice Note 79: water and drainage. Available at: https://www.gov.scot/publications/planning-advice-note-pan-79-water-drainage/

[24] Scottish Government. (2011). 'Wind farm developments on peat land'. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2013/05/wind-farm-developments-on-peat-land-planning-advice/documents/wind-farm-developments-peat-land_online-renewables-advice-pdf/wind-farm-developments-peat-land_online-renewables-advice-pdf/govscot%3Adocument/Wind%2BFarm%2BDevelopments%2BOn%2BPeat%2BLand_online%2Brenewables%2Badvice.pdf

[25] Scottish Government, Scottish Natural Heritage, SEPA. (2017). Peatland Survey. *Guidance on Developments on Peatland'.* Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot%3Adocument

[26] Scottish Government. 2013. Energy Storage: Planning Advice (2013) https://www.gov.scot/publications/energy-storage-planning-advice/

[27] Scottish Government. 2016. 'Draft Peatland and Energy Policy Statement (2016-21)'. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2018/11/peatland-and-energy-draft-policy-statement/documents/draft-peatland-and-energy-policy-statement/draft-peatland-and-energy-policy-statement/govscot%3Adocument/Draft%2Bpeatland%2Band%2Benergy%2Bpolicy%2Bstatement.pdf

[28] Scottish Government. (2014). 'Onshore wind turbines: planning advice. Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/

[29] Scottish Natural Heritage. (2015). 'Spatial Planning for Onshore Wind Turbines – natural heritage considerations'. Available at: https://www.kintradwell-windfarm.co.uk/media/2641818/cd007011-spatial-planning-for-onshore-wind-turbines-natural-heritage-consideration-june-2015.pdf

[30] Scottish Government (2023) Onshore wind sector deal - gov.scot

[31] Scottish Government (2022) Onshore wind: policy statement 2022 - gov.scot

- Chief Planner Letter regarding Battery Storage Consents, 2020[32]and
- Chief Planner Letter regarding Energy Targets and Scottish Planning Policy, 2015[33].

3.4 LOCAL PLANNING POLICY

3.4.1. In considering the overall legal framework within the Proposed Development would be assessed, the development plan should be a key consideration. However, Section 25 of the Town and Country Planning (Scotland) Act 1997[34] is not engaged for applications pursuant to Section 36 of the Electricity Act 1989[12] (i.e. the development plan does not take primacy in the determination process).

3.4.2. Where a Local Plan policy is incompatible with NPF4 then the most recent policy will apply (s.24A TCP(S)A1997).

HIGHLAND-WIDE LOCAL DEVELOPMENT PLAN

3.4.3. The Highland-Wide Local Development Plan 2012 (HWLDP)[35] provides a strategic framework for sustainable development within the Highland Council area. It is considered the applicable policies of the HWLDP are:

- Policy 28 – Sustainable Design
- Policy 52 – Development in Woodland
- Policy 55 – Peat and Soils
- Policy 57 – Natural, Built, and Cultural Heritage
- Policy 58 – Protected Species
- Policy 59 – Other Important Species
- Policy 60 – Other important habitats and Article 10 Features
- Policy 61 – Landscape
- Policy 63 – Water Environment
- Policy 67 – Renewable Energy Developments
- Policy 72 – Pollution

[32]Scottish Government (2020) Battery storage consents: Chief Planner letter August 2020 - gov.scot

[33] Scottish Government. (2015). 'Energy targets and Scottish planning policy: Chief Planner letter'. Available at: https://www.gov.scot/publications/energy-targets-and-scottish-planning-policy-chief-planner-letter/

[34] UK Government. (1997). 'Town and Country Planning (Scotland) Act 1997'. Available at: https://www.legislation.gov.uk/ukpga/1997/8/section/25

[35] The Highland Council. (2016). 'Highland-wide Local Development Plan'. Available at: https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan

3.4.4. There are supplementary guidance documents on Supplementary Guidance for Onshore Wind Energy, which has been adopted as part of the Development Plan for Highland, adopted in November 2016 and 2017[36].

CAITHNESS AND SUTHERLAND LOCAL DEVELOPMENT PLAN AND ASSOCIATED SUPPLEMENTARY GUIDANCE

3.4.5. The Caithness and Sutherland Local Development Plan (CaSPlan)[37] sets the strategic direction for sustainable development within the Caithness and Sutherland regions. It is considered the applicable components of the CaSPlan are:

- A Vision for Caithness and Sutherland in 2035 Vision Outcomes:
  - Employment: *'A strong, diverse and sustainable economy characterised as being an internationally renowned centre for renewable energy, world class engineering, land management and sea-based industries and a tourist industry that combines culture, history, adventure and wildlife.'*
  - Connectivity and Transport: *'Enhanced communications, utilities and transport infrastructure that support communities and economic growth, with development anchored to existing or planned provision.'*
- Climate Change - *The Council is committed to working with communities, businesses and partners to mitigate our impact on climate change by reducing greenhouse gas emissions, maximising renewable energy contributions, taking steps to adapt to the unavoidable impacts of a changing climate and to working with communities to respond to climate change.*

  The area also has a substantial renewable energy resource, with onshore wind and hydro energy sectors well established and offshore and marine energy developments currently emerging.

[36] The Highland Council. (2017). 'Onshore wind energy: supplementary guidance'. Available at: https://www.highland.gov.uk/downloads/file/18793/onshore_wind_energy_supplementary_guidance_november_2016

[37] The Highland Council. (2018). Caithness and Sutherland Local Development Plan. Available at: https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/283/caithness_and_sutherland_local_development_plan

4 APPROACH TO EIA

4.1 EIA OVERVIEW

4.1.1. EIA is a systematic process required for certain categories of development before they can receive development consent, the focus of which is on environmental effects that are likely to be significant. As part of this process, environmental effects that are likely to be significant are identified and are set out in an EIA Scoping Report for agreement with key stakeholders, and the environmental impact of a Proposed Development assessed thereafter and described in an EIA Report. This ensures that the significance of the predicted effects as a result of a Proposed Development, and the potential for mitigation measures to reduce them, are well understood by key stakeholders before a decision is made; in this case by the Scottish Ministers.

4.1.2. The EIA process is iterative and, typically, multiple design iterations occur in response to environmental constraints identified during the EIA process before the final design is determined.

4.1.3. The assessment adheres to recognised best practices and guidelines specific to each technical area, identifying the likely significant environmental effects of a proposed development. Consultees are encouraged to confirm agreement with the proposed scope, including what is included and excluded in the assessment, the methodology used, and the receptors identified.

4.1.4. The preparation of the EIA Report is one of the key stages in the EIA process, as it brings together information about any potentially significant environmental effects, which the Scottish Ministers in this instance, will use to inform a decision about whether the Proposed Development should be allowed to proceed.

4.2 EIA TERMINOLOGY

IMPACTS AND EFFECTS

4.2.1. The EIA focuses on identifying likely significant effects on the environment. The terms “impact” and “effect” however are often used interchangeably, which can lead to confusion. To maintain clarity, this assessment adopts the convention of using “impacts” specifically within the context of the EIA process, which encompasses everything from scoping and EIA Report preparation to subsequent monitoring and other related activities. In contrast, the term “effects” is used throughout this document to describe the environmental consequences of the Proposed Development. For instance, these effects may result from the following:

- Physical activities that should take place if the Proposed Development were to proceed (e.g. vehicle movements during construction operations); and
- Environmental changes that are predicted to occur because of these activities (e.g. loss of vegetation prior to the start of construction work or an increase in noise levels). In some cases, one change causes another change, which in turn results in an environmental effect.

4.2.2. The predicted environmental effects refer to the consequences of environmental changes on specific receptors. For example, in the case of bats, the loss of roosting sites or foraging areas could impact their population size. Similarly, for people, an increase in noise levels could reduce overall amenity.

4.2.3. This assessment focuses on evaluating the significance of the environmental effects resulting from the Proposed Development, rather than the activities or changes that cause these effects. However, understanding these activities and identifying the resulting changes are crucial, often requiring predictive assessment work.

TYPE OF EFFECT

4.2.4. The EIA Regulations (Schedule 4, Part 5)[38] require consideration of various types of effects, including direct and indirect, secondary, cumulative, positive and negative, as well as short-term, medium-term, long-term, permanent, and temporary effects. In the forthcoming EIA Report, which will build on this Scoping Report, these effects will be assessed based on their origin, nature (i.e., whether they are positive or negative), and duration. Each effect will have a source originating from the Proposed Development, a pathway, and a receptor, and may fall into one or more of the following categories:

- **Direct effects** are readily identified because of the physical connection between some element of a development and an affected receptor;
- **Indirect effects** require some additional pathway for the effect to arise. For example, a listed building may not be directly affected by any elements of a development, but its setting may be if the development is visible in views from it or when looking towards it; in which case there would be an indirect effect;
- **Secondary effects** would typically require further pathway connections, for example, an effect on a receptor population (A) could have a secondary effect on receptor population (B), if B was itself dependent on A in some way, as, for example, a food source; and
- **Cumulative effects** arise when the receptors affected by one development are affected by other developments resulting in the aggregation of environmental effects or the interaction of impacts., The subsequent EIA will consider potential cumulative effects from other wind farm developments that are operational, have received consent, or are the subject of a live and validated application. This consideration is subject to a cut-off point, typically around 12 weeks before the submission of the application, to allow for assessments to be completed.

4.2.5. Most predicted effects will be clearly positive or negative and will be described accordingly. However, in some cases, the interpretation of a change may be subjective and informed by professional judgement.

[38] UK Government. (2017). 'The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017'. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents

TEMPORAL AND SPATIAL SCOPE

4.2.6. In its broadest sense, the spatial scope refers to the area over which environmental changes would occur as a result of a development.

4.2.7. The spatial scope varies depending on the environmental topic. For example, the impact of a development on landscape resources and visual amenity is typically assessed within a zone extending up to 45 km from the wind turbines (and potentially up to 60 km for cumulative effects). In contrast, noise effects are evaluated within a much smaller area, focusing on representative properties close to the Development Site.

4.2.8. The temporal scope is stated where known and effects are typically described as:

- Temporary – likely to be related to a particular activity and would cease when the activity finishes. The terms 'short-term' and 'long-term' may also be used to provide a further indication of how long the effect would be experienced for.
- Permanent – this typically means an unrecoverable change

4.2.9. Effects are generally considered in relation to the following key stages of a Proposed Development:

- **Construction effects** may arise from the construction activities themselves, or from the temporary occupation of land. Effects are often of limited duration although there is potential for permanent effects. Where construction activities create permanent change, the effects would continue into the operational period;
- **Operational effects** may be permanent, or they may be temporary, intermittent, or limited to the life of the Proposed Development until decommissioning (as in the case of wind power developments which gain planning permission for a defined and finite number of years); and
- **Decommissioning effects** may arise from the decommissioning activities themselves, or from the temporary occupation of land. The effects would generally be temporary and of limited duration, with changes as a result of decommissioning activities typically of a lesser magnitude than those during construction. Additional permanent change would normally be unlikely unless associated with restoration. Given this, decommissioning is proposed to be scoped out of the EIA.

DEFINING SIGNIFICANCE

4.2.10. Development proposals affect various environmental elements to differing degrees, and not all of resulting effects are significant enough to warrant detailed investigation or assessment within the EIA process. The EIA Regulations identify environmental resources that merit investigation as those "likely to be significantly affected by the development" (Schedule 4(4)).

4.2.11. The EIA Regulations do not explicitly define "significance," making it necessary to explain how this term is applied in the context of the EIA. Determinations of significance are based on available information about the nature of the development proposal, the characteristics of the environmental receptors (or 'receiving environment'), and predictions about the potential changes the Proposed Development may cause.

4.2.12. For each environmental topic considered, professional judgment, combined with relevant guidelines, is used to assess the interaction between a receptor's 'sensitivity' (which may be defined in terms of importance, value, rarity, or quality) and the predicted magnitude of change to determine the level of effect. **Table 4-1** provides a general framework for how receptor sensitivity and magnitude of change can be combined to establish the level of effect.

4.2.13. While there may be variation depending on the technical topic being considered, significance evaluation generally involves combining information about the sensitivity, importance or value of a receptor, and the magnitude and other characteristics of the changes that affect the receptor. The approach to using this information for significance evaluation is outlined below.

Receptor Sensitivity, Importance, or Value

4.2.14. The sensitivity or value of a receptor is largely determined by its importance, as informed by legislation, policy, and professional judgment. For example, receptors related to landscape, biodiversity, or the historic environment may be classified as being of international or national importance. Receptors of lower value may be considered sensitive or important at a county or district level.

4.2.15. The use of a location or physical element, which may represent receptors (e.g., people), also contributes to its classification in terms of sensitivity, importance, or value. For instance, when considering effects on the amenity of people, a location used for recreational purposes may be deemed more sensitive to change or valued more highly than a workplace.

4.2.16. The sensitivity, importance, or value of receptors that may be affected by the Proposed Development would be assessed on a scale from very low to very high. For each environmental topic, a detailed rationale must be provided to explain how the categories of sensitivity, importance, or value outlined in **Table 4-1** have been applied.

Magnitude of Change

4.2.17. The magnitude of change affecting a receptor as a result of the Proposed Development would be assessed on a scale from very low to very high. As with receptor sensitivity and value, each topic chapter provides a rationale explaining how the categories of environmental change are defined. For certain topics, the magnitude of change may relate to guidance on acceptable levels of change (e.g., for noise) and be based on numerical parameters. For other changes, the magnitude will be determined using descriptive terms, relying on professional judgment as outlined in **Table 4-1**.

Determination of Significance

4.2.18. The significance of effects is determined by considering the nature of the development, the receptors that could be affected, their sensitivity, importance, or value, and the magnitude of environmental changes likely to occur.

4.2.19. The evaluation of the significance of the Proposed Development's effects for many environmental topics can be guided by matrices that combine sensitivity, importance, or value with the magnitude of environmental changes, as demonstrated in **Table 4-1**. Additionally, professional judgment is applied, especially in cases where the distinctions between sensitivities or magnitudes of change are not clearly defined, and the assessment conclusions require further clarification. It should be noted that, as directed by topic-specific guidelines from relevant institutions, some environmental topics may avoid the use of matrices to assess significance.

Table 4-1 - Guide to Establishing the Level of Effect

Sensitivity/importance/value	Magnitude of Change				
	Very High	**High**	**Medium**	**Low**	**Very Low**
Very High	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Likely significant)
High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Likely significant)	Minor (Not significant)
Medium	Major (Significant)	Major (Significant)	Moderate (Likely significant)	Minor (Not significant)	Minor (Not significant)
Low	Major (Significant)	Moderate (Likely significant)	Minor (Not significant)	Minor (Not significant)	Minor (Not significant)
Very Low	Moderate (Likely significant)	Minor (Not significant)	Minor (Not significant)	Minor (Not significant)	Minor (Not significant)

4.2.20. Within the matrix commonly used in significance evaluation exercises, the following distinctions are made:

- Major effects, which are always considered significant in EIA terms;
- Moderate effects, which are likely to be significant, although there may be circumstances where such effects are deemed not significant based on professional judgment; and
- Minor or negligible effects, which are always considered not significant.

4.2.21. Any variations to this approach that may be applicable to specific environmental topics will be detailed in the relevant 'assessment methodology' subsection within each environmental topic chapter.

4.2.22. Once a level of effect has been defined, professional judgment, in combination with guidance and standards, is applied to determine which levels of effect are considered significant under the EIA Regulations. For some of the topics assessed in the EIA Report that follows this Scoping Report, published guidance on significance evaluation exists and will be used to inform the development of significance evaluation methodologies. For other topics, effects classified as substantial or moderate/substantial are typically of most importance to the decision-maker and are therefore considered significant under the EIA Regulations. Effects considered moderate or less are generally not deemed significant. However, depending on the receptor, some moderate effects may be judged as significant, and in such cases, the rationale for this conclusion will be provided in the technical assessments.

4.3 EIA SCOPING

4.3.1. Schedule 4(4) of the EIA Regulations[39] specifies that the EIA Report should describe:

"… the factors… likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydro morphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape."

4.3.2. Regulation 4(2) of the EIA Regulations requires the interaction between these factors to be considered. In addition, Regulation 4(4) requires EIA Reports to consider:

"… the expected effects deriving from the vulnerability of the development to risks, so far as relevant to the development, of major accidents and disasters."

4.3.3. Establishing which aspects of the environment are likely to be significantly affected by a particular project is a key objective of the EIA scoping process. This process aims to identify the environmental aspects and associated issues that must be considered when assessing the potential effects of a proposed development. It also recognises that there may be certain environmental elements for which the project is unlikely to have a significant effect, thereby eliminating the need for further investigation as part of the EIA.

4.3.4. The proposed scope of the EIA for this Proposed Development with respect to the relevant environmental topics is set out in **Chapters 5** to **14** of this Report and comprises:

- Chapter 5: Terrestrial Ecology (including forestry);
- Chapter 6: Ornithology;
- Chapter 7: Landscape and Visual;
- Chapter 8: Cultural Heritage;
- Chapter 9: Hydrology, Hydrogeology and Peat;
- Chapter 10: Traffic, Transport and Access;
- Chapter 11: Acoustics;
- Chapter 12: Climate Change;
- Chapter 13: Aviation, Telecommunications and Shadow Flicker; and
- Chapter 14: Socio-economics, Tourism and Recreation.

[39] UK Government. (2017). 'The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017'. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents

4.3.5. The scope and assessment methodologies set out in this Scoping Report are based on recognised best practices and guidelines specific to each topic area. Baseline conditions have been established through desk-based studies and survey work conducted to date. The environmental topic chapters identify where significant effects are anticipated as a result of the Proposed Development, considering the following:

- The baseline data;
- The current description of the Proposed Development; and
- Relevant guidance on assessment methodologies.

4.3.6. It is proposed that the decommissioning phase of the Project will be scoped out of the EIA. Impacts during decommissioning are considered to be similar to that of construction. The effects on any sensitive receptors are similar in nature, but likely of lower magnitude than those during the construction phase.

4.4 CUMULATIVE EFFECTS

4.4.1. Cumulative effects can arise from the interaction between a proposed development and other developments already built or proposed. In line with standard practice, for the purpose of the EIA, other wind farm developments which are operational, subject to planning approval or subject to a full and validated planning application will be included in the consideration of potential cumulative effects (subject to a cut-off point to allow assessments to be undertaken). It should be noted that not all of the cumulative developments would necessarily have a cumulative effect in respect of any particular environmental topic.

4.4.2. In total, 46 wind energy development are identified within a 45km Study Area as listed in **Chapter 7, Table 7-2** and illustrated in **Figure 8.6**. As of the 12 September 2024, this includes 27 existing wind farms, 11 consented developments, six applications and two scoping developments[40] within the Study Area.

4.5 CONSULTATION

Consultation is a regulatory and essential element of the EIA process and would be reported within the EIA Report and within supporting documentation as necessary.

4.5.1. The Applicant engaged with THC through the Major Pre-Application Advice Service on 25 November 2020 (Ref: 20/04174/PREMAJ) and a written response was received on 22 December 2020.The response has been utilised to assist in the design process and inform this Scoping Report. Pre-application information is set out in Appendix 4.

4.5.2. The Applicant is committed to promoting dialogue with statutory and non-statutory consultees and the local community, seeking to engage with all those with an interest in the Proposed Development to provide transparency during the process.

[40] Assumed to be at application stage at the time of cut-off for the Proposed Development's EIA.

4.5.3. For many key stakeholders, the publication of the Scoping Report will be the first notification of the Proposed Development, and it is expected that ECU will request a response from a wide range of organisations prior to issuing its formal Scoping Response, including:

- Local Authorities in the area: THC;
- Government Agencies: Scottish Environmental Protection Agency (SEPA), NatureScot, Historic Environment Scotland, Scottish Forestry, Marine Scotland, Transport Scotland and Scottish Government Energy Division;
- Community and Local Groups: Caithness West Community Council, Latheron, Lybster and Clyth Community Council, Halkirk Community Council, Melvich Community Council, Berriedale and Dunbeath Community Council and Helmsdale Community Council.
- Environmental and Conservation Organisations: Royal Society for the Protection of Birds (RSPB) Scotland, Scottish Wildlife Trust, Caithness District Salmon Fisheries Board, John Muir Trust, Fisheries Management Scotland, Flow Country Rivers Trust, Mountaineering Scotland, Visit Scotland, Highlands Archaeology Service, Scottish Rights of Way and Access Society (ScotWays), Scottish Wild Land Group (SWLG) and The Flow Country Partnership.
- Other Non-Statutory Consultees: British Horse Society, Crown Estate Scotland, Civil Aviation Authority, Defence Infrastructure Organisation, Highlands and Islands Airport, NATS Safeguarding and Nuclear Safety Directorate.
- Utilities and Infrastructure Providers: Electricity Network Operators, Telecommunications providers, Joint Radio Company, OFCOM and Scottish Water; and
- Regional Members of the Scottish Parliament (MSPs), Constituency MSP and MPs.

4.5.4. In addition to the consultation requirements at the scoping stage, ongoing engagement throughout the EIA process will occur with key consultees who express an interest in the Proposed Development. This engagement will focus on the exchange of information, with the Applicant actively seeking input from consultees to inform the iterative design process and provide technical contributions to relevant topic areas.

4.6 MITIGATION

4.6.1. Some mitigation measures to avoid, reduce, or offset changes resulting from the Proposed Development will be integrated into its design, while others may require adherence to specific construction methodologies or operational constraints. The subsequent EIA will consider these mitigation measures, and the assessment of residual effects will be presented in the EIA Report.

4.6.2. It is likely that the following outline management plans would be submitted as part of the EIA:

- Outline Construction Environmental Management Plan (CEMP) ;
- Outline Habitat Management Plan (HMP); and
- Outline Peat Management Plan (PMP).

4.7 STRUCTURE OF THE EIA REPORT

4.7.1. The EIA Report will outline the assessment methodologies, which are based on recognised best practices and guidelines specific to each relevant environmental topic area where the Proposed Development could lead to significant effects. Generally, the technical studies conducted for each topic area, and the chapters included in the EIA Report accompanying the application, will include the following:

- Collection and collation of existing baseline information about the receiving environment and surveys to fill any gaps in knowledge or to update any historic information, together with identification or any relevant trends in, or evolution of, the baseline;
- Consultation with experts and relevant consultees as necessary;
- Consideration of the potential effects of the Proposed Development on the baseline, followed by identification of any additional mitigation measures to seek to avoid or reduce any predicted adverse effects; and
- Assessment and evaluation of any residual significant effects after mitigation measures have been implemented.

4.7.2. Information from the Scoping Opinion received, will inform details to be included within each specialist chapter.

4.7.3. It is anticipated that the EIA Report will consist of the following structure:

- Chapter 1: Introduction.
- Chapter 2: Project Description.
- Chapter 3: Legislation and Planning Policy.
- Chapter 4: EIA Approach and Methodology.
- Chapter 5: Terrestrial Ecology (including forestry).
- Chapter 6: Ornithology.
- Chapter 7: Landscape and Visual.
- Chapter 8: Cultural Heritage.
- Chapter 9: Hydrology, Hydrogeology and Peat.
- Chapter 10: Traffic, Transport and Access.
- Chapter 11: Acoustics.
- Chapter 12: Shadow Flicker.
- Chapter 13: Climate Change.
- Chapter 14: Aviation, Telecommunications and Other Issues.
- Chapter 15: Socio-Economics, Tourism and Recreation.
- Chapter 16: Summary of Mitigation.

5 TERRESTRIAL ECOLOGY

5.1 INTRODUCTION

5.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Development upon terrestrial ecology. It includes consideration of protected and priority areas, habitats and species (excluding birds and sites designated for these, which are dealt with separately in **Chapter 6: Ornithology**).

5.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development Description** and with respect to relevant parts of other technical chapters, such as **Chapter 6: Ornithology**. It is also acknowledged that there will be cross-over in assessments from **Chapter 9: Hydrology, Hydrogeology and Peat** (with regards to peatland and Groundwater Dependent Terrestrial Ecosystems (GWDTE)). **Appendix 5** sets out the Forestry Report which is also linked to this Chapter.

5.2 CONSULTATION

5.2.1. Information sourced from The Highland Council (THC) and NatureScot (NS) during the pre-application stage which is relevant to ecology has been summarised in **Table 5-1**. Future consultation will involve engagement with NS regarding the proposed surveys and approach along with other relevant consultees such as the Flow Country Rivers Trust and Caithness District Salmon Fisheries Board.

Table 5-1 – Consultation Undertaken to Date

Body/Organisation	Date of Consultation	Key Outcomes of Discussions
THC	22/12/2020	Pre-application advice relevant to this chapter, with input from NatureScot, is summarised below. <u>Protected areas</u> There would be connectivity with the following protected areas which are designated for ecological (but not exclusively ornithological) interests: - Caithness and Sutherland Peatlands Special Area of Conservation (SAC) and Ramsar site; and - River Thurso SAC. Avoiding impacts to these protected areas should be a key consideration in the design and layout of the Proposed Development. All works within or affecting the SACs will need to be carefully considered and assessed in context of the SACs' conservation objectives. Survey work will be required to assess the potential for impacts to SAC otters. All works affecting the water environment should follow relevant Scottish Environment Protection Agency (SEPA) guidelines and comply with any required authorisations or licences.

Body/Organisation	Date of Consultation	Key Outcomes of Discussions
		Peatland Land within the Site Boundary has potential to support peatland of National Interest and further information will be required to demonstrate that any significant effect on the qualities of these areas can be substantially overcome by siting, design or other mitigation measures. The application should include proposals for peatland restoration in areas which are not to be reforested. Habitats An assessment of the potential impacts to wild deer would be expected with consideration of habitats (as well as deer welfare, neighbours and other interests). A draft Deer Management Statement will be required. Protected species Land within the Site Boundary has potential to support European and nationally protected species including (but not limited to): otter *Lutra lutra*, bats, wildcat *Felis silvestris*, water vole *Arvicola amphibius*, pine marten *Martes martes*. The potential for impacts to protected species will need to be fully assessed, with reference to NatureScot's standing advice. GWDTE A National Vegetation Classification (NVC) survey should be completed for any wetlands identified within 250 m of any proposed excavations >1 m in depth (100 m for <1 m).

5.3 STUDY AREA

5.3.1. An initial desk-based review of existing ecological data on protected and priority areas, habitats and species extended up to 10 km beyond the Site Boundary to help identify potentially Important Ecological Features (IEF) which may occur within the Proposed Development's Ecological Zone of Influence (EZoI). This provisional 10 km study area was adjusted for certain designations, habitats and species based on factors which would contribute to the potential for their presence within the EZoI such as suitable habitat connectivity and a species' typical range. Specifically, the following provisional study areas shown in **Table 5-2** have been applied at this stage.

Table 5-2 – Provisional Study Areas

Study Area	Ecological Feature
Site Boundary and surrounding 10 km area	European and internationally protected areas, e.g., SACs, Wetlands of International Importance (Ramsar), World Heritage Sites (WHS).
Site Boundary and surrounding 5 km area	Records of bats and wildcat.
Site Boundary and surrounding 2 km area	Nationally and locally protected areas, e.g., Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Nature Conservation Sites (LNCS), Biosphere Reserve.

Study Area	Ecological Feature
	Conservation priority areas, e.g., Scottish Wildlife Trust (SWT) reserves, Royal Society of the Protection of Birds (RSPB) reserves, Plantlife Important Plant Areas, Buglife Important Invertebrate Areas and B-Lines, Butterfly Conservation Scottish Priority Landscapes.
Site Boundary and surrounding 2 km area	Records of protected species, conservation priority species (e.g., those listed on the Highland Nature Biodiversity Action Plan[41] (HNBAP)), invasive and non-native species.
Site Boundary and surrounding 250 m area	Ancient Woodland, Priority Peatland, other semi-natural habitats.

5.3.2. The provisional study areas applied to future field surveys will reflect prevailing guidance.

5.4 BASELINE CONDITIONS

DATA SOURCES

Desk Study

5.4.1. The initial desk study has used information available from the following publicly accessible online sources:

- NatureScot SiteLink and Open Data Hub[42];
- National Biodiversity Network (NBN) Atlas[43];
- HNBAP [41];
- Caithness Biodiversity Group resources, species and habitat information[44]; and
- Planning applications for other developments in the region, referenced where relevant.

Field Surveys

5.4.2. In 2022, Atmos Consulting Ltd. undertook an NVC survey of the central section of the Site Boundary. These data have been made available for review.

[41] Highland Nature (2021). Biodiversity Action Plan 2021-2026. Available at: https://www.highlandenvironmentforum.info/biodiversity/action-plan/

[42] NatureScot (online). Data services. Available at: https://www.nature.scot/information-hub/naturescot-data-services

[43] NBN Atlas (online). Available at: https://nbnatlas.org/

[44] Caithness Biodiversity Group (online). Resources, species & habitats. Available at: https://www.caithnessbiodiversity.org.uk/

5.4.3. Throughout the spring-summer-autumn seasons in 2024, bat surveys were undertaken using automated static detectors deployed across land within the Site Boundary (targeted to indicative turbine locations). The survey methods were complied with prevailing guidelines[45].

5.4.4. Additional field surveys to understand the current baseline will be undertaken, including habitat surveys and other surveys for protected species, see Section 5.6, Survey Methodology.

CURRENT AND HISTORICAL BASELINE

5.4.5. A summary of the current baseline, informed by the desk study and any field surveys undertaken to date, is set out in **Table 5-3**. **Figure 5.1** shows the locations of European and internationally protected areas within 10 km of the Site Boundary; **Figure 5.2** shows the locations of nationally and locally protected areas and conservation priority sites within 2 km of the Site Boundary. Forestry baseline is detailed within **Appendix 5**.

Table 5-3 – Current Baseline

Ecological Feature	Connectivity	Additional Information
Protected areas		
Caithness and Sutherland Peatlands SAC	Surrounds the Site Boundary	Designated for supporting the following Annex I habitats (97/62/EC): - acid peat-stained lakes and ponds; - blanket bog; - clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels; - depressions on peat substrates; - very wet mires often identified by an unstable 'quaking' surface; and - wet heathland with cross-leaved heath *Erica tetralix*. Designated for supporting the following Annex II species (97/62/EC): - otter; and - marsh saxifrage *Saxifraga hirculus*.
Caithness and Sutherland Peatlands Ramsar site	Surrounds the Site Boundary	Qualifies under Ramsar Criterion 1 by virtue of it containing a variety of wetland types: - blanket bog; - mire; and

[45] NatureScot (2021). Bats and onshore wind turbines – survey, assessment and mitigation. Available at: https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation

Ecological Feature	Connectivity	Additional Information
		- oligotrophic lochs. Qualifies under Ramsar Criterion 2 by supporting: - nationally scare mosses *Sphagnum lindbergii* and *S. majus*, and a nationally scare bog orchid *Hammarbya paludosa*; - invertebrate fauna including nationally rare water beetle *Oreodytes alpinus*; - otter; and - freshwater pearl mussel *Margaritifera margaritifera* (FWPM). Also qualifies by regularly supporting various bird species.
River Thurso SAC	Extends through centre of Site Boundary (Sleach Water) and further northeast-southwest	Designated for supporting the following Annex II species (97/62/EC): - Atlantic salmon *Salmo salar*. The river drains through a moderately large peatland catchment, supports a high proportion of multi sea-winter salmon, and supports the full range of salmon life-history types.
Flow Country WHS	Surrounds the Site Boundary	Outstanding Universal Value for its biodiversity, including blanket bog which supports over 10% of the global Sphagnum bog moss flora and a distinctive surface pattern of plant communities and pool systems. It is also significant for carbon sequestration and storage, climate regulation, oxygen production, water regulation and water quality. It was inscribed for outstanding examples of ongoing ecological and biological processes.
Loch Caluim Flows SSSI	Underpins SAC designation; extends immediately northwest of Site Boundary	Notified interests include blanket bog, amongst ornithological interests.
Strathmore Peatlands SSSI	Underpins SAC designation; extends immediately northeast and east of Site Boundary	Notified interests include blanket bog and nationally rare water beetle *Oreodytes alpinus*, amongst ornithological interests.
Rumsdale Peatlands SSSI	Underpins SAC designation; extends immediately southwest of Site Boundary	Notified interests include blanket bog and oligotrophic loch, amongst ornithological interests.
Sletill Peatlands SSSI	Underpins SAC designation; extends immediately northwest of Site Boundary	Notified interests include blanket bog, amongst ornithological interests.

Ecological Feature	Connectivity	Additional Information
Forsinard Flows NNR	Extends immediately west of Site Boundary	No specific features have been designated; however, the site is described to be valuable for blanket bog, invertebrates, and birds. The designation overlaps with the Caithness and Sutherland Peatlands SAC and the land is managed by RSPB.
Conservation priority areas		
Plantlife Caithness & Sutherland Peatlands Important Plant Area	Overlaps with SSSI designations; surrounds Site Boundary	Covering the entire peatland area of Caithness and Sutherland, with the core area designated under the SAC. Qualifies under Criterion C(i) for the extensive area of blanket bog. Qualifies under Criterion A(ii) for presence of marsh saxifrage[46].
Buglife B-Line	Overlaps with northern section of Site Boundary and further south	A non-government organisation initiative to encourage positive actions for pollinators which would contribute to landscape-wide conservation efforts. There do not appear to be any projects listed within the B-Line in the immediate vicinity of the Site Boundary; however, projects in the region have included wildflower meadow creation to support great yellow bumblebee *Bombus distinguendus*.
Habitats (non-designated)		
Coniferous forestry	Within the Site Boundary	Land within the Site Boundary is predominantly forested for commercial purposes, forming Strathmore Forest. This is considered to be of relatively low ecological value. All current indicative turbine locations are in areas of forestry. **Appendix 5** provides the report on Forestry.
Waterbodies and watercourses	Within the Site Boundary	There are several non-designated lochans within the Site Boundary: Loch Sgrabach, Loch Caise, Garbh Loch, Lochan Croc nan Lair, as well as other smaller waterbodies. There are also several lochans immediately adjacent to the Site Boundary which are potentially hydrologically connected (e.g., Grassie Loch, Loch Dubh, Loch Eileanach, Loch Gaineimh, Loch Meadie, Loch More). Given the prevailing landscape, these are likely to be oligotrophic and represent priority habitat. There are several tributaries to the Sleach Water (designated under River Thurso SAC) which extend within the Site Boundary, as well as minor watercourses

[46] Plantlife (online). Factsheet for Caithness and Sutherland Peatlands IPA. Available at: https://www.plantlifeipa.org/site/factsheet

Ecological Feature	Connectivity	Additional Information
		connecting lochans. These could qualify as priority habitat. Some appear to be crossed by existing forestry tracks.
Blanket bog, bog pools, fen, wet and dry heath, and damp grassland	Within the Site Boundary	The existing NVC data indicates that blanket bog (predominantly M17 and M20) extends across the majority of open space between forestry, with bog pools (M1, M2 and M3) and pockets of fen (M6). There also appears to be relatively minor areas of dry heath (H12) and wet heath (M15 and M25), and damp neutral grassland (MG9 and MG10). Areas of blanket bog (including bog pools) and some areas of wet heath are likely to constitute priority peatland. The presence of M20 and M25 communities indicates there may be some areas of degraded blanket bog.
Protected species and conservation priority species		
Otter	Suitable habitat within the Site Boundary	As a European protected species, otter is fully protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) – Schedule 2. Otter is also an HNBAP priority species. No commercially available records of otter were identified within 2 km of the Site Boundary from NBN Atlas from the past 10 years; historic records (most recent 2011) were identified. It is plausible that any otters using the land within the Site Boundary would form part of the Caithness and Sutherland Peatlands SAC qualifying population due to the connectivity. Otter surveys have been proposed to gain additional baseline information to identify any functionally linked habitat and how qualifying species use land within the Site Boundary and surrounding area.
Bats	Suitable habitat within the Site Boundary	As European protected species, all bat species found in Scotland are fully protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) – Schedule 2. HNBAP priority species include common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, brown long-eared bat *Plecotus auritus*, Daubenton's bat *Myotis daubentonii*, and Natterer's bat *Myotis nattereri*. No commercially available records of bats were identified within 5 km of the Site Boundary from NBN Atlas. Analysis of bat pass data collected from automated static bat detectors through 2024 was ongoing at the time of writing. In the absence of field survey data to clarify otherwise at this stage, bats are assumed to occur within the Site Boundary. From a high-level review of data collected to inform an assessment of another wind farm in

Ecological Feature	Connectivity	Additional Information
		the region[47], the levels of bat activity are likely to be relatively low and typical for the northern geographical setting, and species composition is likely to be predominantly pipistrelle bats.
Wildcat	Suitable habitat within the Site Boundary	Following the Scottish Wildcat Action work between 2015-2020, it was concluded that the Scottish wildcat population was no longer viable without reinforcement or reintroduction[48,49,50] . Thereafter, conservation efforts have been/ will be (2019-2026) focused on captive breeding of wildcats and reintroduction to the Cairngorms National Park. No commercially available records of wildcat were identified within 5 km of the Site Boundary from NBN Atlas from the past 10 years; historic records (most recent 1985) were identified. Whilst suitable habitat exists within the Site Boundary, the presence of wildcat remains unlikely. Notwithstanding, this would be reviewed against any ad hoc sightings or signs recorded during future field surveys for other protected species.
Water vole	Suitable habitat within the Site Boundary	Water vole receives partial protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Water vole is a HNBAP priority species. Caithness Biodiversity Group reported a wide distribution of water voles in 2006, with the highest number of occupied sites found in peatland habitat[51].

[47] Infinergy (2021). Limekiln Wind Farm Section 36C Variation. EIA Report. Chapter 11 Ecology. Available at: https://www.limekilnwindfarm.co.uk/downloads/

[48] Littlewood, N.A., Campbell, R.D., Dinnie, L., Gilbert, L., Hooper, R., Iason, G., Irvine, J., Kilshaw, K., Kitchener, A., Lackova, P., Newey, S., Ogden, R. & Ross, A. (2014). Survey and scoping of wildcat priority areas. Scottish Natural Heritage Commissioned Report No. 768. Available at:

https://www.nature.scot/sites/default/files/2017-07/Publication%202014%20-%20SNH%20Commissioned%20Report%20768%20-%20Survey%20and%20scoping%20of%20wildcat%20priority%20areas.pdf

[49] Campbell R. D., Gaywood M.J., & Kitchener A.C. (Eds.) (2023). Scottish Wildcat Action: Final Summary Report. NatureScot, Inverness. Available at:

https://www.nature.scot/doc/scottish-wildcat-action-swa-final-summary-report-2023

[50] NatureScot (2023). National effort needed to save Scottish wildcat. Available at:

https://www.nature.scot/national-effort-needed-save-scottish-wildcat

[51] Fraser, E., Glass, D., Hogg, S. (2006). The Distribution of the Water Vole in Caithness. Caithness Biodiversity Group. Online at: https://www.caithness.org/nature/biodiversity/watervole/

Ecological Feature	Connectivity	Additional Information
		No commercially available records of water vole were identified within 2 km of the Site Boundary from NBN Atlas from the past 10 years. Historic records (most recent 2009) were identified from Allt nam Beist, Allt Lonielist, Rumsdale, Loch More, and Loch Eilanach, which are connected to habitat within the Site Boundary. Water vole monitoring surveys undertaken by Caithness Biodiversity Group between 2005-2009[52] recorded consistent occupancy at five sites scattered across Caithness, as well as inconsistent occupancy at four other sites. Of the sites monitored, Allt nam Beist is closest to the Site Boundary (connected to Loch More); this presented optimal habitat, however field signs became scarcer over the monitoring period and ultimately absent. Water vole populations may periodically decline, whilst nearby colonies become re-established. In the absence of field survey data to clarify otherwise at this stage, there is potential for water vole to use watercourses (particularly those which are slow-flowing), bankside habitat, and connected wetland/ peatland within the Site Boundary.
Pine marten	Suitable habitat within the Site Boundary	Pine marten receives full protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Certain methods of killing or taking pine martens are illegal under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Pine marten is a HNBAP priority species. No commercially available records of pine marten were identified within 2 km of the Site Boundary from NBN Atlas from the past 10 years; one historic record (2009) was identified. In the absence of field survey data to clarify otherwise at this stage, there is potential for pine marten to use woodland and peatland habitat within the Site Boundary.
Badger *Meles meles*	Suitable habitat within the Site Boundary	Badgers and their setts are protected under the Protection of Badgers Act 1992 as amended by the Wildlife and Natural Environment (Scotland) Act 2011. No commercially available records of badger were identified within 2 km of the Site Boundary from NBN Atlas from the past 10 years; however, records of badgers are

[52] Glass, D. (2009). Water vole monitoring in Caithness. Caithness Biodiversity Group. Available at: https://www.caithnessbiodiversity.org.uk/projects/water-voles/

Ecological Feature	Connectivity	Additional Information
		generally not publicly available due to their ongoing persecution. The territories of badgers would be relatively more extensive in the highlands, covering wider ranges with a lower population density; the distribution of setts within forestry and peatland habitats was found to be lower than productive badger habitat in the lowlands and agricultural landscapes[53]. However, in the absence of field survey data to clarify otherwise at this stage, there is potential for badger to use habitat within the Site Boundary.
Salmonids	Suitable habitat within the Site Boundary	In Scotland, migratory salmonids, their spawn and downstream migrating 'smolts' are legally protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 – this applies to Atlantic salmon and sea trout. Atlantic salmon is also a HNBAP species. It is plausible that any Atlantic salmon present within watercourses at the Site and surrounding would form part of the River Thurso SAC qualifying population due to the connectivity. The scope of specific fish surveys will be reviewed after an initial habitat suitability assessment in the field.
FWPM	Suitable habitat within the Site Boundary	Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) gives full protection to FWPM. FWPM is also a HNBAP priority species. No commercially available records of FWPM were identified within 2 km of the Site Boundary from NBN Atlas from the past 10 years. However, FWPM location data is typically sensitive/ not disclosed in the public domain. It is plausible that any FWPM present within watercourses at the Site and surrounding would form part of the Caithness and Sutherland Peatlands Ramsar qualifying population due to the connectivity. The scope of specific FWPM surveys will be reviewed after an initial habitat suitability assessment in the field.
Reptiles	Suitable habitat within the Site Boundary	All reptiles native to Scotland receive protection under the Wildlife and Countryside Act 1981 (as amended), against intentional or reckless killing, injury and trade.

[53] Rainey, E., Butler, A., Bierman, S., Roberts, A. M. I. (2009). Scottish Badger Distribution Survey 2006-2009: Estimating the distribution and density of badger main setts in Scotland. Scottish Badgers and Biomathematics and Statistics Scotland. Available: https://www.scottishbadgers.org.uk/wp-content/uploads/2020/12/Scottish-Badger-Distribution-Survey-06-09-Results-16-November-2009-3172963.pdf

Ecological Feature	Connectivity	Additional Information
		A recent adder *Vipera berus* sighting from Loch More was identified through the NBN Atlas search. It is considered likely that adders will be present within the Site Boundary, using peatland habitats and forestry edges.
Amphibians	Suitable habitat within the Site Boundary	The Proposed Development would be located within a geographical area considered unsuitable for great crested newts *Triturus vulgaris*[54]. Waterbodies within the Site Boundary are likely to be oligotrophic and less favourable to great crested newts. This species is considered likely absent from the Site Boundary. Habitats at the Site may support common toad *Bufo bufo*, common frog *Rana temporaria*, palmate newt *Lissotriton helveticus* and smooth newt *Lissotriton vulgaris* which receive protection under the Wildlife and Countryside Act 1981 (as amended) relating to trade. Recent common frog sightings from Forsinard were identified through the NBN Atlas search.
HNBAP species not already listed above	Suitable habitat within the Site Boundary	Land within the Site Boundary may also support a range of species considered a conservation priority under the HNBAP, which do not otherwise receive specific legal protection. This includes hedgehog *Erinaceus europaeus*, mountain hare *Lepus timidus*, European eel *Anguilla anguilla*, sea lamprey *Petromyzon marinus*, and a range of invertebrates, plants, and fungi.

5.4.6. Red squirrels *Sciurus vulgaris* appear to be absent from the Caithness area[55,56,57] and have not been considered in the baseline. The absence of other species from the baseline summary above does not preclude them from the Proposed Development's EZoI. Additional field surveys may reveal the presence or probability of other species using the land within the Site Boundary and surrounding area, including conservation priority species. New field data would be re-evaluated within the assessment.

[54] O'Brien, D. Hall, J., Miró, A., & Wilkinson, J. (2017). Testing the validity of a commonly-used habitat suitability index at the edge of a species' range: great crested newt *Triturus cristatus* in Scotland. *Amphibia-Reptilia* 38: 265-273.

[55] Red Squirrel Survival Trust (online). Where to find red squirrels. Available at: https://www.rsst.org.uk/where-to-find-red-squirrels/

[56] The Mammal Society (online). Red squirrel. Available at: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-red-squirrel/

[57] Saving Scotland's Red Squirrels (online). Available at: https://scottishsquirrels.org.uk/squirrel-sightings/

5.5 SCOPE OF ASSESSMENT

5.5.1. The scope of the assessment will be informed by legislation, national and local policy, and guidance which is set out further below (see Section 5.6).

5.5.2. The assessment will focus on Important Ecological Features (IEF) that could be affected by the construction or operation of the Proposed Development[58]. The IEFs will be identified by reviewing all baseline information and identifying which occur within the Proposed Development's EZoI. A geographic level of importance to each receptor within the EZoI will be assigned based on its conservation status, population/ assemblage trends and other relevant criteria (including size, naturalness, rarity, and diversity). An IEF would be a receptor within the EZoI which meets a threshold of at least Local level importance.

LIKELY SIGNIFICANT EFFECTS

5.5.3. A number of protected areas surround the Site and the River Thurso SAC runs through it. While turbines and new internal access tracks connecting them will be located outside protected areas, it is anticipated that existing access tacks within them will need to be upgraded to facilitate the construction of the Proposed Development. During construction, there is therefore the potential for significant adverse effects on: protected areas; non-designated habitats within the Site and surrounding area; and protected and conservation priority species that meet the IEF threshold which may occur within the Proposed Development's EZoI.

5.5.4. Note that as it is plausible that any otters using the land within the Site Boundary would likely form part of the Caithness and Sutherland Peatlands SAC and Ramsar qualifying population, an assessment of effects on this species would be included under the protected area only. Similarly, Atlantic salmon and FWPM have only been considered in the context of designated sites and associated conservation objectives.

5.5.5. Potential effects that will be considered during the construction phase are set out below.

- Protected areas:
  - Loss and degradation of qualifying and supporting habitat designated under Caithness and Sutherland Peatlands SAC, constituent SSSIs, and Ramsar site, River Thurso SAC, Flow Country WHS, and Forsinard Flows NNR; and
  - Disturbance, displacement, and harm to qualifying species designated under Caithness and Sutherland Peatlands SAC, constituent SSSIs, and Ramsar site, River Thurso SAC, Flow Country WHS, and Forsinard Flows NNR.
- Non-designated habitats:
  - Loss, degradation and fragmentation of blanket bog, bog pools, fen, wet and dry heath, and damp grassland; and

[58] As impacts during decommissioning are likely to of lower magnitude than during construction since ground level and below infrastructure will remain in situ, effects during this phase are likely to be no greater than during construction and will not therefore be subject to detailed assessment.

- Change in water quality of watercourses and waterbodies.

- Protected and conservation priority species:
  - Loss and degradation of habitat and features which support bats, wildcat, water vole, pine marten, badger, and other HNBAP species (if present); and
  - Disturbance, displacement, and harm to bats, wildcat, water vole, pine marten, badger, and other HNBAP (if present).

5.5.6. During the operational phase, there is potential for significant adverse effects on a reduced number of receptors. The permanent habitat loss would be relatively little, outside of protected areas, and it would be reasonable that drainage plans would be developed to avoid any significant changes in water quality. A Deer Management Statement would be prepared, and deer control would be factored into the Habitat Management Plan. With the exception of bats, operational effects on protected species are broadly unlikely because there would be a relatively little permanent habitat loss which should not obstruct passage/use for terrestrial non-flying wildlife. Any visits for maintenance are anticipated to be infrequent, isolated and temporary events, with access taken via permanent tracks. Potential effects that will be considered during operation would therefore be limited to the following.

- Protected species:
  - Harm to bats from collision and barotrauma.

5.5.7. A summary is provided in **Table 5-4**, alongside clarification of which elements are proposed to be scoped out of further assessment.

Table 5-4 – Elements Scoped In or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Caithness and Sutherland Peatlands SAC and its constituent SSSIs (Loch Caluim Flows SSSI, Strathmore Peatlands SSSI, Rumsdale Peatlands SSSI, Sletill Peatlands SSSI)	Construction	X		Partially overlaps and surrounds Site Boundary. In the absence of sufficient information on design and construction methods at this stage, potential for significant adverse effects on qualifying interests (primarily otter) at construction phase. Effects to the SAC and constituent SSSIs would be assessed collectively where appropriate, due to their overlapping spatial extents and interests. Significant operational effects unlikely. Relatively little permanent footprint with all new infrastructure to be located outside of the protected area. Reasonable to assume industry standard and effective drainage plan would be embedded.
Caithness and Sutherland Peatlands Ramsar site	Construction	X		Surrounds the Site Boundary. In the absence of sufficient information on design and construction methods at this stage, potential for significant adverse effects on qualifying interests (including

Element	Phase	Scoped In	Scoped Out	Justification
				otter and freshwater pearl mussel) at construction phase. Significant operational effects unlikely. Relatively little permanent footprint with all new infrastructure to be located outside of the protected area. Reasonable to assume industry standard and effective drainage plan would be embedded.
River Thurso SAC	Construction	X		Present within the Site Boundary. In the absence of sufficient information on design and construction methods at this stage, construction effects scoped in. Significant operational effects unlikely. Relatively little permanent footprint with all new infrastructure to be located outside of the protected area. Reasonable to assume industry standard and effective drainage plan would be embedded.
Flow Country WHS	Construction	X		Surrounds the Site Boundary. In the absence of sufficient information on design and construction methods at this stage, construction effects scoped in. Significant operational effects unlikely. Relatively little permanent footprint with all new infrastructure to be located outside of the protected area. Reasonable to assume industry standard and effective drainage plan would be embedded.
Forsinard Flows NNR	Construction	X		Extends immediately west of Site Boundary. Whilst same spatial extent and broad interests are protected under Caithness and Sutherland Peatlands SAC, this remains scoped in to review effects against the NNRs objectives.
Plantlife Caithness & Sutherland Peatlands Important Plant Area	-		X	Scoped out on the basis that the core area and same interests are protected under Caithness and Sutherland Peatlands SAC, which will be scoped in.
Buglife B-Line	-		X	Reported within the baseline to consider biodiversity enhancement opportunities which would contribute to landscape-wide conservation efforts; however, there is no potential for the function of this designation to receive significant adverse effects.

Element	Phase	Scoped In	Scoped Out	Justification
Coniferous forestry	-		X	Relatively low ecological value; unlikely to meet the threshold of Local level importance for detailed assessment.
Waterbodies and watercourses (non-designated)	Construction	X		Present within the Site Boundary. In the absence of sufficient information on the location of new infrastructure and construction methods at this stage, precautionarily scoped in. Notwithstanding, good construction practices to avoid and minimise pollution would be embedded. Significant operational effects unlikely as reasonable to assume industry standard and effective drainage plan would be embedded.
Blanket bog, bog pools, fen, wet and dry heath, and damp grassland (non-designated)	Construction	X		Present within the Site Boundary, likely including areas of priority peatland. Potential for significant adverse effects at construction phase. Significant operational effects unlikely. Relatively little permanent footprint, to be established at construction phase. Reasonable to assume industry standard and effective drainage plan would be embedded.
Bats	Construction and Operation	X		Suitable habitat within the Site Boundary. In absence of field data, potential for significant adverse effects at construction and operational phase.
Scottish wildcat	Construction	X		Presence of wildcat unlikely; however, wildcat scoped in as a precaution until additional field surveys have been undertaken. If present, potential for significant adverse effects at construction phase due to their conservation status. Significant operational effects unlikely with relatively little permanent habitat loss which should not obstruct passage/use for terrestrial non-flying wildlife. Any return visits for maintenance anticipated to be infrequent, isolated and temporary events, with access taken via permanent tracks.
Water vole	Construction	X		Suitable habitat within the Site Boundary and evidence of historic populations on connected watercourses and waterbodies. Potential for significant adverse effects at construction phase. Significant operational effects unlikely with a relatively minor permanent footprint which should not obstruct passage for terrestrial non-flying wildlife. Any return visits for maintenance

Element	Phase	Scoped In	Scoped Out	Justification
				anticipated to be infrequent, isolated and temporary events, with access taken via permanent tracks. Reasonable to assume industry standard and effective drainage plan would be embedded and avoid habitat deterioration.
Pine marten	Construction	X		Suitable habitat within the Site Boundary. In absence of field data, potential for significant adverse effects at construction phase. Significant operational effects unlikely with a relatively little permanent habitat loss which should not obstruct passage/use for terrestrial non-flying wildlife. Any return visits for maintenance anticipated to be infrequent, isolated and temporary events, with access taken via permanent tracks.
Badger	Construction	X		Suitable habitat within the Site Boundary. In absence of field data, potential for significant adverse effects at construction phase. Significant operational effects unlikely with a relatively little permanent habitat loss which should not obstruct passage/use for terrestrial non-flying wildlife. Any return visits for maintenance anticipated to be infrequent, isolated and temporary events, with access taken via permanent tracks.
Red squirrel	-		X	Likely absent from the Proposed Development's EZoI.
Reptiles	-		X	Reptiles may occur within the Proposed Development's EZoI – however there would be relatively little permanent habitat loss for these species, homogenous habitats prevail across the wider landscape, and good construction practices would sufficiently minimise the risk of injury or killing of individuals. Conversion of dense forestry to open areas could benefit reptiles by creating more suitable habitat. Significant adverse effects to reptiles would be unlikely.
Amphibians	-		X	Common and widespread species may occur within the Proposed Development's EZoI (e.g., common frog and common toad) – however there would be relatively little permanent habitat loss for these species, homogenous habitats prevail across the wider landscape, and good construction practices would sufficiently minimise the risk of injury or killing of

Element	Phase	Scoped In	Scoped Out	Justification
				individuals. Significant adverse effects to amphibians would be unlikely.
HNBAP species not already listed above	Construction and Operation	X		Species within this group remain scoped in, until further details may be available on their confirmed presence/ likely absence from the Proposed Development's EZoI and further assessment can be made on how they/ their conservation status may be affected.

OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

5.5.8. Throughout the ongoing design process, opportunities to deliver positive effects for biodiversity will be explored. An assessment of positive effects will be incorporated into the EIA Report chapter, to demonstrate compliance with NPF4 Policy 3 Biodiversity.

5.5.9. THC's pre-application advice recommended that peatland restoration be delivered in areas which are not to be reforested, and it is noted that restoration of forestry to blanket bog has been successful across land at Forsinard Flows, surrounding the Site Boundary[59].

5.5.10. Other opportunities to support species which use land within the Site Boundary will be explored, e.g., installation of pine marten den boxes.

5.5.11. NPF4 Policy 3 includes a requirement that proposals conserve, restore and enhance biodiversity, including nature networks so they are in a demonstrably better state than without intervention. It states best practice assessment methods should be used to demonstrate significant biodiversity enhancements would be provided, in addition to any proposed mitigation. The Applicant is committed to delivering biodiversity improvements in accordance with policy. This will be considered during the development of the Habitat Management Plan (HMP).

5.6 PROPOSED ASSESSMENT METHODOLOGY

RELEVANT LEGISLATION AND GUIDANCE

5.6.1. The ecological impact assessment will be completed in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment[60]. Relevant legislation and policy will be set out. Additional guidance that will be applied to support the assessment includes (but not limited to):

[59] NatureScot (2015). Making space for natural processes: forest to bog restoration at RSPB Forsinard Flows Reserve. Available at: https://docslib.org/doc/6935087/forest-to-bog-restoration-at-rspb-forsinard-flows-reserve

[60] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

- CIEEM advice note on the lifespan of ecological reports and surveys[61];
- UK Bat Mitigation Guidelines[62]
- NatureScot bats and onshore wind turbines – survey, assessment and mitigation [45];
- NatureScot standing advice for planning consultations on protected species[63];
- NatureScot advice on peatland, carbon-rich soils and priority peatland habitats in development management[64]; and
- THC Biodiversity Enhancement Planning Guidance[65].

5.6.2. Details of the Proposed Development will be used to assess the potential impacts to each scoped-in IEF and the resulting effect(s). Effects will be characterised as beneficial, adverse or neutral; significant or non-significant; and temporary or permanent. The significance of an effect will be determined using professional judgement, considering the relationship between two factors:

- The value, importance or sensitivity of the IEF that might be impacted; and
- The magnitude of the impact on that IEF (i.e., the actual change taking place).

5.6.3. Where appropriate, additional mitigation measures will be identified to reduce impact magnitude to avoid potentially significant adverse effects. An assessment of residual effects will be undertaken after the application of additional mitigation measures. Where residual effects remain potentially significant, compensation required to offset this will be identified. For any high value IEFs (e.g., protected areas), the residual effects which remain following consideration of both mitigation and compensation measures would be reported as 'net effects'.

SURVEY METHODOLOGY

5.6.4. To inform the assessment, the following surveys have been undertaken/ are proposed to be undertaken by capable[66] ecologists. Surveys have/ will follow prevailing best practice guidance, standing advice from NatureScot, and be timed with cognisance of seasonal changes.

[61] CIEEM (2019). Advice Note: On the lifespan of ecological reports & surveys. Available at: https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf

[62] Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1. CIEEM, Ampfield. Available at: https://cieem.net/wp-content/uploads/2023/09/Bat-Mitigation-Guidelines-2023-V1.1.pdf

[63] NatureScot (online). Planning and development: standing advice and guidance documents. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-standing-advice-and-guidance-documents

[64] NatureScot (online). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management#:~:text=Blanket%20bog%20%28including%20montane%20bog%29%20is%20identified%20as,which%20slowly%20accumulates%20below%20ground%20in%20carbon-rich%20soils

[65] https://www.highland.gov.uk/info/1210/environment/68/biodiversity/2

[66] CIEEM (2021). Competency Framework. Available at: https://cieem.net/resource/competency-framework/

- Ground-level automated static bat detector surveys – completed spring-summer-autumn 2024.
- Preliminary Ecological Appraisal (PEA) comprising a Phase 1 habitat survey, a Daytime Bat Walkover to identify woodland and structures which could support roosting bats, and a suitability assessment for other protected species.
- NVC survey, targeted to specific areas informed by the PEA.
- Riparian/ aquatic survey to identify evidence of otter and water vole, as well as recording data to inform fish habitat suitability and freshwater pearl mussel habitat.
- Terrestrial/ arboreal survey to identify evidence of badger, pine marten, and wildcat.

5.6.5. The requirement for further studies will be reviewed upon completion of the above surveys and incorporating any feedback from stakeholder engagement. This *could* include surveys of potential bat roost features, a second water vole survey where suitable habitat has been identified, camera trap monitoring of species' resting sites, DNA analysis of droppings, electrofishing, and a freshwater pearl mussel presence/ absence survey.

MITIGATION

5.6.6. The mitigation hierarchy will be applied throughout the ongoing design process and assessment. The consideration of potential significant effects on protected areas, habitats and species, informed by further survey data, will be used to influence the siting of infrastructure and construction access, where technically feasible, to avoid or minimise effects.

5.6.7. The following design mitigations and embedded good practice will be considered and applied where feasible.

- Where possible, the layout of turbines will be adjusted to avoid parts of the Site Boundary which have 'high' bat activity and where turbines might create a collision risk. A minimum 50m distance between turbine blade tip and the nearest woodland (or other key habitat feature) would be designed. Altering blade rotation (e.g., reduced speed, curtailment) would be considered where appropriate. This approach would comply with NatureScot guidance [45].
- A sensitive lighting scheme could be developed to minimise effects on nocturnal and crepuscular species.
- An effective drainage plan would be developed to avoid (or sufficiently minimise) changes in water quality and flow.
- Where there is evidence that certain species are present, construction works in their vicinity would be timed to avoid sensitive periods of their life-history, e.g., where salmonid populations and/ or suitable spawning habitat is present, there would be no in-channel or bankside works for watercourse crossings between 30 September and 1 June to protect spawning migratory salmonids, their spawn, and migrating 'smolts'.
- The placement of infrastructure would seek to avoid any resting sites used by protected species.
- The following plans would also be developed and implemented during construction and post-construction where relevant:
  - Construction Environmental Management Plan;

- Species Protection Plans – likely including for otter, water vole, pine marten, reptiles, and other species as appropriate;
- Deer Management Statement;
- Habitat Management Plan; and
- Peat Management Plan.

5.6.8. Additional mitigation measures to reduce impact magnitude to avoid potentially significant effects will be identified through the assessment (as noted above). Mitigation measures required to comply with legislative obligations will also be identified. The chapter will fully detail any additional measures including responsibilities, timescales, and any follow-on monitoring requirements.

5.6.9. Where residual effects remain potentially significant, compensation required to offset this will be identified. For any unavoidable loss of peatland that would result in a significant residual effect, whilst acknowledging the peatland would be irreplaceable, the Applicant is committed to further peatland enhancement works to an extent to be agreed via consultation with relevant consultees.

5.6.10. The requirement for post-construction monitoring will also be identified.

6 ORNITHOLOGY

6.1 INTRODUCTION

6.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Development upon ornithology. It includes consideration of ornithological features that are considered to be important, including statutory sites designated for ornithological interest and species considered to be of high importance, for example by virtue of being afforded a higher level of legal protection or because of population size, these being referred to as 'target' species. It should be noted that protected areas which have been designed exclusively for ecological interests are reported in **Chapter 5: Terrestrial Ecology**.

6.1.2. This chapter and its associated figures and appendices should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development** and with respect to relevant parts of other technical chapters, such as **Chapter 5: Terrestrial Ecology**.

6.2 CONSULTATION

6.2.1. All bird related consultation and survey work was undertaken by Atmos Consulting Ltd (Atmos), and information sourced from THC and NatureScot during the pre-application stage which is relevant to ornithology is summarised in **Table 6-1**. Further consultation may take place following receipt of the Scoping Opinion to confirm / clarify any additional requirements for the EIA.

Table 6-1 – Consultation Undertaken to Date

Body/ Organisation	Date of Consultation	Key Outcomes of Discussions
THC	22/12/2020	Pre-application advice relevant to this chapter, with input from NatureScot, is summarised below. <u>Protected areas</u> There would be connectivity with the following protected areas which are designated for ornithological (but not exclusively) interests: - Caithness and Sutherland Peatlands Special Protection area (SPA) and Ramsar Site; - Caithness Lochs SPA; and - East Caithness Cliffs SPA. *<u>Caithness and Sutherland Peatlands Special Protection area (SPA) and Ramsar site</u>* *The proposal lies adjacent to this SPA and Ramsar Site, protected for its upland breeding birds and native greylag geese. Given the high ornithological value of the proposal Site and adjacent SPA, NatureScot consider this to be a very challenging Site to develop a wind farm of this scale. Early discussion on completed and proposed bird survey work would be welcome given the proximity of this SPA and the potential for rare/scarce breeding birds in the area. It will be very important to also consider the implications of forest restructuring in relation to SPA raptors (such as hen harrier, merlin, and short-eared owl) and greenshank. Opening up closed canopy forestry can create suitable habitat for foraging and nesting, attracting these species into the wind farm Site. This may*

Body/ Organisation	Date of Consultation	Key Outcomes of Discussions
		result in increased risk of collision over the levels predicted in pre-application surveys. Further information on this is available from: https://www.nature.scot/wind-farm-proposals-afforested-Sites-advice-reducing-suitability-hen-harrier-merlin-and-short-eared. Early discussions with NatureScot were undertaken by Atmos to confirm the most appropriate survey methodologies given the complexity of the Site and are detailed below. The implications of forest restructuring in relation to SPA raptors will be considered in the ornithological impact assessment. *Caithness Lochs SPA* *The proposal lies approximately 10km from this SPA, protected for its wintering populations of Greenland white-fronted geese, greylag geese and whooper swans. The proposal would lie within theoretical foraging range for greylag geese and given the scale of the proposal, could pose a collision risk to SPA geese and swans on migration. We are also aware that Greenland white-fronted geese have previously used Loch More and nearby peatland areas for roosting and foraging. We advise that these species should be included as target species during survey work and an assessment made against the conservation objectives for the SPA.* All of the aforementioned species were included as target species during the survey programme; and impacts on such species and associated designated sites will be considered within the ornithological impact assessment. *East Caithness Cliffs SPA* *The proposal also lies within theoretical foraging range for herring gull and great black-backed gulls associated with this SPA. Activity by SPA gulls has been previously identified during survey work for nearby wind farm development in this area (e.g. Bad a' Cheò). Therefore, we advise both gull species should be included as target species during survey work and should activity be identified, connectivity with this SPA should be considered.* Both herring gull and great black-backed gull were included as secondary species during the survey programme (and as target species in 2024); and impacts on these and associated designated sites will be considered within the ornithological impact assessment. Please note that only herring gull were recorded during the baseline surveys (limited to three records during an extensive suite of VP surveys).
NatureScot	29/12/2018	Atmos sought advice and feedback on the methodological approach for the Proposed Development's ornithology surveys, any constraints that they were aware of and any bird data that it possessed that it may be able to share. An interim report was also provided to NatureScot. NatureScot replied on 30/01/2018 and highlighted a number of issues relating to ornithology. Additionally they stated that '*we consider siting a commercial scale wind farm in this location will be very challenging due to the proximity of a number of natural heritage interests. Based on the information provided, we highlight that we may object to such a proposal in this location*'. Key comments from the pre-application advice relevant to this chapter are as follows (and are addressed after each point).

Body/ Organisation	Date of Consultation	Key Outcomes of Discussions
		1. All species associated with the Caithness and Sutherland Peatlands SPA should be included as target species and highlighted that greylag goose was one such feature. By using the term 'associated with' it is taken that NatureScot regard all of the notified features of the SPA, as per the site citation, as target species to be assessed. It should be noted here that greylag goose is not a notified feature of the SPA according to the citation document available on the NatureScot Sitelink web page[67]. A Habitats Regulations Appraisal (HRA) will be required for the SPA and other European sites within connectivity distance of the Site. 2. Concerns were noted about deviations from the standard methodologies although it was accepted that the data provided was *'sufficient to give an overview of the ornithological importance of the site'*. Over two years of recent survey work has been undertaken at the Site and followed the most recent NatureScot (2017) guidance. Therefore it is considered that the correct survey methodologies were utilised and that they give a sufficient overview of the ornithological importance at the Site. 3. Although flight activity survey effort was acceptable it was noted that 'the viewshed coverage from these VP locations is not adequate' especially in the southern part of the site where there was greenshank activity. The VPs cover the entire Site, although it is noted that there is not full coverage at a lower sweep height of 20 metres in the southeastern part of the Site. This will be accounted for in any collision risk assessment. 4. NatureScot advised that *'targeted surveys for common scoter and wood sandpiper are carried out for this proposal'*. The ES for Beinneun Wind Farm and the PLI submission for Strathy South wind farm were recommended as best practice for assessing impacts on these species. Breeding season surveys for both species were carried out in both 2022 and 2024. The impacts on both species will be assessed using the most up to date best practice approach, drawing on the assessment approach outlined for the Beinneun Wind Farm ES and Strathy South Wind Farm PLI submission. 5. NatureScot also advised that 'due to the proximity of the SPA, it will be very important to consider the implications of forest restructuring in relation to SPA raptors (hen harrier, merlin and short-eared owl). Opening up closed canopy forestry can create more suitable habitat for foraging and nesting close to the turbines, so these species may be attracted into the wind farm

[67] https://sitelink.nature.scot/site/8476

Body/ Organisation	Date of Consultation	Key Outcomes of Discussions
		site. This may result in increased risk of collision over the levels predicted from pre-application surveys.' NatureScot have withdrawn their guidance entitled *'Wind farm proposals on afforested sites advice on reducing suitability for hen harrier, merlin and short-eared owl'*. The guidance outlined a range of possible measures to help reduce the collision risk to SPA qualifying raptor species. NatureScot concluded that mitigation should be assessed on a site-by-site basis. Future changes in forest cover will be assessed within the EIA and appropriate mitigation will be sought in order to reduce impacts on foraging raptors such as hen harrier, short-eared owl and merlin. 6. With regard to the cumulative assessment, NatureScot raised that advice would be provided on what to include during additional consultation.. It also states that '*The cumulative assessment of a new wind farm in this area will need to be fully considered in terms of impacts on the SPA and Ramsar site. Once VP surveys have been completed, Collision Risk Modelling should be undertaken, and an assessment made against the conservation objectives for the site*'. A cumulative assessment will be carried out, as well as assessing potential impacts on scoped in European sites, which will include collision risk modelling to inform the assessment.

6.3 STUDY AREA

6.3.1. An initial desk-based review of existing ornithological data on statutory sites extended up to 20km from the Site to help identify potentially Important Ornithological Features (IOFs) which may occur within the Proposed Development's Ornithological Zone of Influence (OZoI). This provisional 20km study area was adjusted for certain designations and species based on factors which would contribute to the potential for their presence within the OZoI, such as suitable habitat connectivity and a species' typical range (e.g. 20km was used for the presence of goose species as a result of NatureScot (2016)[68] guidance on connectivity).

6.3.2. The review also collated ornithological records pertaining to species listed on Annex I of the EC Birds Directive (2009/147/EC), Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), and/or vulnerable to impacts from wind farms, from the National Biodiversity Network (NBN) Atlas website from within 10km of the approximate centre of the Site (OS grid reference: ND 03001 45017).

[68] NatureScot. 2016. Assessing Connectivity with Special Protection Areas (SPAs) Guidance. Version 3. See: https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf accessed on 12 September 2024.

6.3.3. On the basis of the desk study and taking recommended survey methodology into account[69], the following study areas have been applied at this stage (**Table 6-2**).

Table 6-2 –Study Areas

Study area	Ornithological feature
Site and surrounding 20km buffer zone	European and internationally protected areas, e.g., SPAs and/or Ramsar Sites, with qualifying interests comprising goose species.
Site and surrounding 10km buffer zone	European, internationally and nationally protected areas, e.g., SPAs, Ramsar Sites, Sites of Special Scientific Interest (SSSI) and/or National Nature Reserves (NNR), with ornithological interest. Additionally, NBN data for target, and notable, bird species.
Site and surrounding 6km buffer zone (as per NatureScot (2017) guidance)[70]	Breeding season surveys for eagle species.
Site and surrounding 2km buffer zone	Breeding season surveys for target scarce raptor/owl species.
Site and surrounding 500m buffer zone[70]	Breeding season surveys for target upland breeding bird species; and also species-specific breeding season surveys for common scoter, diver species, greenshank, and wood sandpiper.
Site[71]	Vantage Point surveys for all target species.

6.4 BASELINE CONDITIONS

DATA SOURCES

Desk Study

6.4.1. The initial desk-based review used information available from the following publicly accessible online sources:

- NatureScot SiteLink website; and
- National Biodiversity Network (NBN) Atlas website.

[69] NatureScot. (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. March 2017 – Version 2.

[70] NatureScot. 2016. Assessing Connectivity with Special Protection Areas (SPAs) Guidance. Version 3. See: https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf accessed on 12 September 2024.

[71] VP surveys should extend to 500m outside of the Site, but this was not possible due to certain access restrictions.

Field Surveys

6.4.2. Atmos undertook a series of ornithological surveys at the Site between April 2017 and August 2019. These comprised:

- 28 months of VP surveys;
- Three seasons of scarce breeding raptor/owl surveys (including eagle species);
- Three seasons of upland breeding bird surveys;
- Two seasons of species-specific surveys for common scoter, greenshank and wood sandpiper.

6.4.3. Further surveys were carried out by Atmos between March 2022 and March 2023, as well as September 2023 to September 2024 inclusive. These comprised:

- 26 months of VP surveys;
- Two seasons of scarce breeding raptor/owl surveys (including eagle species);
- Two seasons of upland breeding bird surveys;
- Two seasons of species-specific surveys for common scoter/diver species, greenshank and wood sandpiper.

6.4.4. All field survey methods are summarised in the Survey Methodology section within 6.6.

CURRENT AND HISTORICAL BASELINE

6.4.5. A summary of the current baseline informed by the desk-based review and field surveys undertaken to date is set out in **Table 6-3**.

6.4.6. **Figure 6-1** shows the locations of designated statutory sites within 10km of the Site (20km for European and internationally protected sites with qualifying goose or gull interests).

Table 6-3 – Current Baseline

Ornithological feature	Connectivity	Additional information
SPAs		
Caithness and Sutherland Peatlands	Adjacent to the east and southwest of the Site. Majority of the SPA immediately adjacent to the Site.	Red-throated diver *Gavia stellata*; Black-throated diver *Gavia arctica*; Hen harrier *Circus cyaneus*; Golden eagle *Aquila chrysaetos*; Merlin *Falco columbarius*; Golden plover *Pluvialis apricaria*; Wood sandpiper *Tringa glareola*; Short-eared owl *Asio flammeus*; Dunlin *Calidris alpina*; Common scoter *Melanitta nigra*; Greenshank *Tringa nebularia*; Wigeon *Anas penelope*
Caithness Lochs	~10km northeast	Whooper swan *Cygnus cygnus*; Greenland white-fronted goose *Anser albifrons flavirostris*; Greylag goose *Anser anser*
East Caithness Cliffs	~17.5km southwest	Peregrine *Falco* peregrinus; Guillemot *Uria aalge*; Razorbill *Alca torda*; Herring gull *Larus argentatus*; Kittiwake *Rissa tridactyla*; Shag *Phalacrocorax aristotelis*; Seabird

Ornithological feature	Connectivity	Additional information
		assemblage; Great black-backed gull *Larus marinus*; Cormorant *Phalacrocorax carbo*; Fulmar *Fulmaris glacialis*
Ramsar Site		
Caithness and Sutherland Peatlands	Adjacent to the east and southwest of the Site. Majority of the Ramsar Site adjacent to the Site.	Blanket bog (Ramsar criterion 1); Rare species of wetland plants and animals (Ramsar criterion 2); Internationally important breeding population of Dunlin (Ramsar Criterion 6)
SSSI		
Strathmore Peatlands	Adjacent to the east of the Site	Blanket bog; Breeding bird assemblage; Common scoter; Dunlin; Golden plover; Greenshank; Wigeon; Beetle *Oreodytes alpinus*
Rumsdale Peatlands	Adjacent to the southwest of the Site	Blanket bog; Oligotrophic loch; Breeding bird assemblage; Dunlin; Golden plover; Greenshank
Sletil Peatlands	Adjacent to the northwest of the Site	Blanket bog; Breeding bird assemblage; Common scoter; Dunlin; Golden plover; Greenshank
Loch Caluim Flows	Adjacent to the northwest of the Site	Blanket bog; Breeding bird assemblage; Dunlin; Golden plover; Greenshank
Dunbeath Peatlands	~3.5km south	Blanket bog; Breeding bird assemblage; Dunlin; Golden plover; Greenshank
East Halladale	~5.5km northwest	Blanket bog; Breeding bird assemblage; Dunlin; Golden plover
Lambsdale Leans	~5km north	Open water transition fen; Breeding bird assemblage
NNR		
Forsinard Flows	Adjacent to the north of the Site	Blanket bog; Breeding bird assemblage
Target species		
Barn owl	Suitable habitat within the Site	No records between 2022-24. Bred within survey area (Site plus 2km buffer) in the period 2017-19.
Black-throated diver	Suitable habitat within the Site	Two flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024. Possibly bred within survey area (juvenile recorded) between 2017-19.
Common sandpiper	Suitable habitat within the Site	Three flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.

Ornithological feature	Connectivity	Additional information
Common scoter	Suitable habitat within the Site	11 individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024 (including family parties in August 2024). Possibly bred within survey area (juvenile recorded) between 2017-19.
Curlew	Suitable habitat within the Site	Eight individual flights (three incidental records of five birds) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Dunlin	Suitable habitat within the Site	Four records (five individual flights) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022.
Gadwall	Suitable habitat within the Site	Five individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022.
Golden eagle	Suitable habitat within the Site	12 individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022.
Golden plover	Suitable habitat within the Site	35 individual flights (four incidental records of seven birds) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Goldeneye	Suitable habitat within the Site	28 individual flights during VP surveys 2022-24.
Goshawk	Suitable habitat within the Site	Seven individual flights (one incidental records of one bird) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022.
Greenshank	Suitable habitat within the Site	66 individual flights (several incidental records) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024. Greenshank were recorded nesting on Site between 2017-19.
Greylag goose	Suitable habitat within the Site	33 records (total of 617 individual flights, five incidental records of 29 birds) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Hen harrier	Suitable habitat within the Site	48 individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024. Recorded on Site during the 2017-19 survey programme; with possible breeding outside Site during this period.
Honey-buzzard	Suitable habitat within the Site	One flight in 2024.

Ornithological feature	Connectivity	Additional information
Lapwing	Suitable habitat within the Site	Three records (four individual flights, one incidental record of three birds) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Merlin	Suitable habitat within the Site	Three records (two birds in flight, one incidental record of a singleton) during VP surveys 2022-24.
Osprey	Suitable habitat within the Site	45 individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022. Recorded breeding within the survey area in 2017-19.
Peregrine	Suitable habitat within the Site	Single incidental record during VP surveys 2022-24. Single record from breeding raptor survey in 2022.
Pink-footed goose	Suitable habitat within the Site	Eight records (total of 618 individual flights, three incidental records of a minimum of three birds) during VP surveys 2022-24.
Red-breasted merganser	Suitable habitat within the Site	One flight during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Redshank	Suitable habitat within the Site	Three records (two flights, one incidental record of two birds) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Red-throated diver	Suitable habitat within the Site	One flight during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024.
Short-eared owl	Suitable habitat within the Site	Five individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022.
Snipe	Suitable habitat within the Site	Three individual flights during VP surveys 2022-24.
Teal	Suitable habitat within the Site	18 records (37 individual flights, incidental records of birds loafing/roosting) during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022 and 2024. Possibly bred within survey area (juvenile recorded) between 2017-19.
White-tailed eagle	Suitable habitat within the Site	33 individual flights during VP surveys 2022-24. Recorded during breeding bird surveys carried out in 2022.
Whooper swan	Suitable habitat within the Site	Four records (total of 12 individual flights) during VP surveys 2022-24.
Wigeon	Suitable habitat within the Site	14 records (64 individual flights, incidental records of birds loafing/roosting) during VP surveys 2022-24.

Ornithological feature	Connectivity	Additional information
		Possibly bred within survey area (juvenile recorded) between 2017-19.
Woodcock	Suitable habitat within the Site	Three individual flights during VP surveys 2022-24.
Wood sandpiper	Suitable habitat within the Site	Single record during breeding bird surveys carried out in 2022. Wood sandpiper were observed displaying adjacent to the Site to the north between 2017-19.

6.4.7. Additionally, the NBN data (this is not presented in **Table 6-3**) provided notable records of 18 species within 10km of the Site, comprising[72]: Barn owl, black-throated diver, brambling, common scoter, crossbill, dunlin (*schinzii* subspecies), fieldfare, golden plover, greenshank, greylag goose, hen harrier, merlin, osprey, red-throated diver, redwing, Scottish crossbill, short-eared owl, and snowy owl.

6.4.8. Additional 'secondary[73]' species recorded during the survey programme comprised: Canada goose, common buzzard, herring gull (less than ten flights), common gull, goosander, cormorant, crossbill, little grebe, long-eared owl, tawny owl, tufted duck, and sparrowhawk.

6.5 SCOPE OF ASSESSMENT

6.5.1. The scope of the assessment will be informed by legislation, national and local policy, and guidance which is set out further below (see **Proposed Assessment Methodology** section).

6.5.2. The assessment will focus on IOFs that could be affected by the construction or operation of the Proposed Development[74]. The IOFs will be identified by reviewing all baseline information and identifying which occur within the Proposed Development's OZoI. A geographic level of importance to each receptor within the OZoI will be assigned based on its conservation status, population/ assemblage trends and other relevant criteria (including size, naturalness, rarity, and diversity).

[73] As per NatureScot (2017) guidance: "Local circumstances may indicate that survey information should also be acquired on other species, especially those of regional conservation concern. Such species are termed 'secondary species'. Recording of secondary species is subsidiary to recording of target species".

[74] As impacts during decommissioning are likely to be of lower magnitude than during construction since ground level and below infrastructure will remain in situ, effects during this phase are likely to be no greater than during construction and will not therefore be subject to detailed assessment.

6.5.3. During the construction phase, there is potential for significant adverse effects on protected areas adjacent to the Site and protected and conservation priority species which may occur within the Proposed Development's OZoI and meet the IOF threshold. Potential effects that will be considered are set out below.

- Protected areas:
  - Loss and degradation of qualifying and supporting habitat designated under Caithness and Sutherland Peatlands SPA, constituent SSSIs, and Ramsar Site; and Forsinard Flows NNR; and
  - Disturbance, displacement, and harm to qualifying species designated under Caithness and Sutherland Peatlands SPA, constituent SSSIs, and Ramsar Site; Caithness Lochs SPA; East Caithness Cliffs; and Forsinard Flows NNR.
- Target bird species:
  - Loss and degradation of habitat and features which support birds[75]; and
  - Disturbance, displacement, and harm to all bird species.

6.5.4. During the operational phase, there is potential for significant adverse effects on a reduced number of receptors, which are considered herein.

- Protected areas:
  - Disturbance, displacement, and harm (collision-related deaths) to qualifying species designated under Caithness and Sutherland Peatlands SPA, constituent SSSIs, and Ramsar Site; Caithness Lochs SPA; East Caithness Cliffs; and Forsinard Flows NNR.
- Target bird species:
  - Disturbance, displacement, and harm (collision-related deaths) to those species potentially affected by operational wind farms.

6.5.5. Additionally, it is important to assess the cumulative impacts of the Proposed Development and other proposed, consented and operational wind farms that may affect the wider populations of those bird species identified as IOFs that will be taken forward for assessment (see **Table 6-4**). NatureScot maintain a database of Proposed Developments within Natural Heritage Zone (NHZ) 5 and the most recent version of this database will be requested to assist with the cumulative assessment that will focus on NHZ5. A summary is provided in **Table 6-4**, alongside clarification of which elements are proposed to be scoped out of further assessment.

[75] Total land take by wind farm infrastructure generally represents a small proportion of a Site; and therefore, the permanent loss of nesting and foraging habitat for birds tends to be small and will generally have little effect on bird populations.

Table 6-4 – Elements Scoped In or Out of Further Assessment

Element	Phase(s)*	Scoped in	Scoped out	Justification
Caithness and Sutherland Peatlands SPA and its constituent SSSIs (Strathmore Peatlands, Rumsdale Peatlands, Sletil Peatlands, Loch Caluim Flows, Dunbeath Peatlands, and East Halladale)	C, O	X		Partially adjacent and surrounds Site. Potential for effects on qualifying species of the SPA and notified species of the respective SSSIs given the proximity of the Proposed Development to these designated sites. It is proposed that effects to the SPA and constituent SSSIs would be assessed collectively where appropriate, due to their overlapping spatial extents and interests. A separate HRA will be required for this European site along with those detailed below.
Caithness and Sutherland Peatlands Ramsar Site	C, O	X		Partially adjacent and surrounds Site. Potential for effects on qualifying (and assemblage) species of the Ramsar Site given the proximity of the Proposed Development to this designated site. HRA will be required.
Caithness Lochs SPA	C, O	X		Potential for effects on qualifying species of the SPA during operation (e.g. through collision mortality), given the proximity of the Proposed Development to these designated sites (i.e. within commuting range of qualifying goose species winter roosts) and records of qualifying species flying over the Site. HRA will be required.
East Caithness Cliffs SPA	-		X	There were only five counts of SPA qualifying species during the survey period (two records of peregrine and three of herring gull). Therefore, this designated site is scoped out and HRA is not proposed.
Lambsdale Leans SSSI	-		X	It is considered that this SSSI, notified for its breeding bird assemblage would not be subject to effects on any of its features given the distance between the Proposed Development and the SSSI, which is greater than the breeding season foraging ranges of those species detailed in NatureScot (2016).
Forsinard Flows NNR	C, O	X		Extends immediately west of Site. Whilst same spatial extent and broad interests are protected under Caithness and Sutherland Peatlands SPA, this remains scoped in to review effects against the NNRs objectives.

Element	Phase(s)*	Scoped in	Scoped out	Justification
Barn owl	-		X	There were no records of this species during the most recent two years of survey work (i.e. between 2022-24).
Black-throated diver	C, O	X		This species was recorded during breeding season walkover surveys (and possibly bred within the survey area between 2017-19). There were also two flight records during VP surveys 2022-24.
Common sandpiper	-		X	This species was recorded during breeding season walkover surveys but there were only three flights during VP surveys 2022-24.
Common scoter	C, O	X		This species was recorded during breeding season walkover surveys (and possibly bred within the survey area between 2017-19). There was also a moderate level of flight activity.
Curlew	C, O	X		This species was recorded during breeding season walkover surveys. Low levels of flight activity were recorded, however. This species has been scoped into the assessment on a precautionary basis.
Dunlin	C, O	X		This species was recorded during breeding season walkover surveys. Low levels of flight activity were recorded, however. This species has been scoped into the assessment.
Gadwall	-		X	This species was recorded during breeding season walkover surveys. Low levels of flight activity were recorded, however.
Golden eagle	C, O	X		This species was recorded during breeding season walkover surveys and a moderate level of flight activity was also recorded.
Golden plover	C, O	X		This species was recorded during breeding season walkover surveys and a moderate level of flight activity was also recorded.

Element	Phase(s)*	Scoped in	Scoped out	Justification
Goldeneye	O	X		28 individual flights during VP surveys 2022-24. There is the potential for effects during operation only (e.g. through collision mortality).
Goshawk	C, O	X		This species was recorded during breeding season walkover surveys, although only low levels of flight activity were recorded. This species has been scoped into the assessment on a precautionary basis.
Greenshank	C, O	X		This species was recorded during breeding season walkover surveys (and bred between 2017-19). Moderate levels of flight activity were also recorded.
Greylag goose	C, O	X		This species was recorded during breeding season walkover surveys. Moderate levels of flight activity were also recorded
Hen harrier	C, O	X		This species was recorded during breeding season walkover surveys (and also possibly bred between 2017-19). Moderate levels of flight activity were also recorded.
Honey-buzzard	-		X	Only one flight of this species was recorded during VP surveys from 2022-24.
Lapwing	-		X	This species was recorded during breeding season walkover surveys, but only low levels of flight activity were recorded, however.
Merlin	-		X	This species was not recorded breeding within the survey area during 2022 nor 2024. Only very low levels of flight activity were also recorded.
Osprey	C, O	X		This species was recorded during breeding season walkover surveys. Moderate levels of flight activity were also recorded. This species has been scoped into the assessment on a precautionary basis.
Peregrine	-		X	This species was not recorded breeding within the survey area during 2022 nor 2024. Only very low levels of flight activity were also recorded

Element	Phase(s)*	Scoped in	Scoped out	Justification
Pink-footed goose	C, O	X		This species was not recorded breeding/wintering within the survey area. Moderate levels of flight activity were recorded, however. This species has been scoped into the assessment on a precautionary basis.
Red-breasted merganser	C, O	X		This species was recorded during breeding season walkover surveys. Low levels of flight activity were recorded, however. This species has been scoped into the assessment on a precautionary basis because of its restricted and small breeding population.
Redshank	-		X	This species was recorded during breeding season walkover surveys but there were only low levels of flight activity recorded.
Red-throated diver	C, O	X		This species was recorded during breeding season walkover surveys and low levels of flight activity were recorded.
Short-eared owl	C, O	X		This species was recorded during breeding season walkover surveys. Low levels of flight activity were recorded, however. This species has been scoped into the assessment on a precautionary basis.
Snipe	-		X	This species was recorded during breeding season walkover surveys but there were only low levels of flight activity recorded.
Teal	C, O	X		This species was recorded during breeding season walkover surveys (and also possibly bred between 2017-19). Moderate levels of flight activity were recorded.
White-tailed eagle	C, O	X		Moderate levels of flight activity of this species were recorded between 2022-24. This species was also recorded during breeding season walkover surveys, although no nesting or roosting behaviour was noted.
Whooper swan	-		X	This species was not recorded breeding/wintering within the survey area. Very low levels of flight activity were also recorded.

Element	Phase(s)*	Scoped in	Scoped out	Justification
Wigeon	C, O	X		This species was recorded during breeding season walkover surveys (and also possibly bred between 2017-19). Moderate levels of flight activity were also recorded.
Woodcock	-		X	This species was not recorded breeding within the survey area during 2022 nor 2024. Very low levels of flight activity were also recorded.
Wood sandpiper	C, O	X		This species potentially bred within the survey area and therefore is scoped into the assessment.

* Phase of Development: C = Construction, O = Operation, D = Decommissioning**.

** Decommissioning has been scoped out of assessments as noted in Section 4.2

OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

6.5.6. Throughout the ongoing design process, opportunities to deliver positive effects for biodiversity will be explored. An assessment of positive effects will be incorporated into the chapter, to demonstrate compliance with NPF4 Policy 3 Biodiversity.

6.5.7. THC's pre-application advice recommended that peatland restoration be delivered in areas which are not to be reforested. The restoration of forestry to blanket bog has been successful across land at Forsinard Flows, surrounding the Site. This will be considered when developing the Habitat Management Plan.

6.5.8. Other opportunities to support species which utilise the Site will be explored, e.g. nesting rafts for divers.

6.6 PROPOSED ASSESSMENT METHODOLOGY

RELEVANT LEGISLATION AND GUIDANCE

6.6.1. The ornithological impact assessment will be completed in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) guidance[76]. Relevant legislation and policy will also be set out.

6.6.2. Additional guidance that will be applied to support the assessment includes (but not limited to):

- Recommended bird survey methods to inform impact assessment of onshore wind farms (NatureScot 2017);
- Assessing significance of impacts from onshore wind farms out with designated areas (NatureScot 2018a[77]);
- Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model (NatureScot 2018b[78]); and
- Assessing the cumulative impacts of onshore wind farms on birds (NatureScot 2018c[79]).

[76] CIEEM. (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Version 1.2 (updated 2022). Chartered Institute of Ecology and Environmental Management, Winchester.

[77] NatureScot. (2018a). *Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas*. See: https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected accessed on 13 September 2022.

[78] NatureScot. (2018b). *Wind farm impacts on birds - Use of Avoidance Rates in the NatureScot Wind Farm Collision Risk Model*. See: https://www.nature.scot/doc/wind-farm-impacts-birds-use-avoidance-rates-naturescot-wind-farm-collision-risk-model accessed on 13 September 2022.

[79] NatureScot. (2018c). *Assessing the cumulative impacts of onshore wind farms on birds*. See: https://www.nature.scot/doc/guidance-assessing-cumulative-impacts-onshore-wind-farms-birds accessed on 13 September 2022.

6.6.3. Details of the Proposed Development will be used to assess the potential impacts to each IOF and the resulting effects. Effects will be characterised as beneficial, adverse or neutral; significant or non-significant; and temporary or permanent. The significance of an effect will be determined using professional judgement, considering the relationship between two factors:

- the value, importance or sensitivity of the IOF that might be impacted; and
- the magnitude of the impact on that IOF (i.e., the actual change taking place).

6.6.4. Where appropriate, additional mitigation measures will be identified to reduce the magnitude of potentially significant adverse effects. An assessment of residual effects will be undertaken after the application of additional mitigation measures. Where residual effects remain potentially significant, compensation required to offset this will be identified. For any high value IOFs (e.g., protected areas), the residual effects which remain following consideration of both mitigation and compensation measures would be reported as 'net effects'.

SURVEY METHODOLOGY

Vantage Point Surveys

6.6.5. VP locations and associated viewsheds are illustrated on **Figure 6-2** (within **Appendix 1**). NatureScot (2017) guidance states that VPs should cover the entire potential developable area and a 500m buffer, and should also be sited outside the survey area "where possible". Many VPs are situated within the Site as a result of the limited visibility (the Site being relatively flat and covered in extensive plantation forest) and restricted access outside this.

6.6.6. A number of turbines are not fully covered by the viewsheds as they appear on **Figure 6-2**. **Appendix 6** provides additional information which illustrates VP11 height bands used and, therefore, the greater extent of area surveyed. The small residual visibility gap will be factored into the assessment to ensure potential impacts to birds at these turbine locations are adequately assessed (i.e., through a precautionary approach to assessing collision risk impacts, if considered appropriate). It should be noted that **Appendix 6** was drafted in 2018 and therefore illustrates a superseded layout that shouldn't be taken into consideration. It should also be noted that VP7 within the map in **Appendix 6** was never utilised.

6.6.7. VP surveys between April and August 2017 were undertaken as part of an initial feasibility study with the aim being to identify VP locations for future use while contributing to the understanding of the ornithological resource of the Site. Subsequent VP surveys were undertaken from six locations (increased to seven for surveys undertaken after March 2019).

6.6.8. The minimum survey effort requirement for raptors, waterfowl and waders as recommended by NatureScot is 36 hours per VP for each season that the birds may be present (NatureScot, 2017). A total of 36 hours of survey effort per VP (for the final seven VP locations) was undertaken in the 2019 breeding season and also over the 2022 breeding season and 2022/23 non-breeding season. Between September 2023 and 2024, the following level of VP survey effort was carried out:

- VP1 – 117 hours 40 minutes;
- VP2 – 93 hours;
- VP3 – 112 hours;

- VP8 – 108 hours 40 minutes;
- VP11 – 105 hours;
- VP12 – 96 hours; and
- VP13 – 114 hours 30 minutes.

Breeding Bird Surveys

6.6.9. A combined breeding bird walkover survey was undertaken during the 2017 breeding season. Following consultation with NatureScot separate survey methods were implemented in the 2018, 2019, 2022 and 2024 breeding seasons for scarce breeding raptors/owls, upland breeding birds, common scoter and diver species (combined), greenshank, and wood sandpiper.

Breeding Raptor Survey

6.6.10. The breeding raptor survey followed a walkover approach, aiming to access all areas of the survey area to within 250m (where access available), stopping to view over areas of suitable habitat for signs of breeding activity (e.g. display, territory defence etc). The survey area included a 2km buffer from the Site, extending to 6km for golden eagle, where access was available (this dataset will be supplemented with data from third-parties to support the impact assessment process).

6.6.11. Surveys for breeding moorland raptors were undertaken between March and July during each of the aforementioned breeding seasons; comprising an occupancy check, a second visit to locate active nests; the third visit to determine whether young are present; and a final check for productivity.

Breeding Bird Survey

6.6.12. Upland breeding bird surveys were carried out during the 2017, 2018, 2019, 2022, and 2024 breeding seasons using an adapted four-visit version of the Brown and Shepherd (1993) upland breeding bird survey method for moorland habitats, as per NatureScot (2017) guidance. The survey area included the Site and 500m buffer where access was available. This technique is used to census upland breeding waders (e.g. golden plover, curlew, dunlin etc) and other species of open upland moor (e.g. skua species).

6.6.13. Survey followed the method detailed in NatureScot (2017), with monthly visits carried out in suitable weather conditions between April and July each season. The results were plotted on to a final territory map for each survey season.

Common Scoter / Diver species Survey

6.6.14. The survey methodologies were undertaken in accordance with that detailed in Gilbert *et al.* (1998) during each of the aforementioned breeding seasons. Each loch/lochan was scanned systematically from one or more observation points. Where sections of the shoreline were not visible, the shoreline was walked to ensure complete coverage.

6.6.15. For common scoter, the number of females, pairs and probable pairs were all recorded. All diver registrations were also noted. The results were plotted on to a final territory map for each survey season.

6.6.16. Additional targeted VP surveys for common scoter were undertaken in 2022.

Greenshank Survey

6.6.17. Survey methodology followed the two-visit method detailed in Gilbert *et al.* (1998), with one visit undertaken between 10 April and 25 May, and a second between 26 May and 11 July. At least one of the two visits should be within a high-detectability period (i.e. 15 April to 08 May; or 01 to 23 June).

6.6.18. All areas within the Site were surveyed to within 500m, with particular attention paid to waterbodies. The presence and behaviour of any greenshank was recorded, with particular notes made on those alarm-calling (chipping), any broods seen or adults exhibiting territory/nest/brood defence. The results were plotted on to a final territory map for each survey season.

Wood Sandpiper Survey

6.6.19. In the absence of any species-specific survey methodology for wood sandpiper, additional Brown and Shepherd (1993) survey methodology was followed as detailed in Gilbert et al. (1998) with only registrations of wood sandpiper recorded on these visits. Particular attention was paid to the vicinity of the lochs and lochans within the Site. The results were plotted on to a final territory map for each survey season.

MITIGATION

6.6.20. The mitigation hierarchy will be applied throughout the ongoing design process and assessment. The consideration of potential significant effects on protected areas and species, informed by further data (i.e. third-party data), will be used to influence the siting of infrastructure and construction access, where technically feasible, to avoid or minimise effects.

6.6.21. The following design mitigations and embedded good practice will be considered and applied where feasible:

- Whilst parts of protected areas are adjacent to the Site, there would be no construction works within close proximity to these and a buffer applied;
- The layout of turbines would be adjusted to avoid parts of the Site which are assessed as having ‘high’ collision risk for IOFs;
- Specific turbine-free buffer zones would be applied around the nest and/or roost sites of Schedule 1 listed IOFs where appropriate;
- Any vegetation removal would be carried out during the non-breeding season (i.e. September to March). Where vegetation removal is not possible outside of the breeding season, then areas of vegetation would be checked by an Ecological Clerk of Works (EcoW) prior to removal and thereafter monitored during the vegetation removal process;
- Turbine locations would be key-holed into forest blocks to minimise effects on foraging raptor species;
- A sensitive lighting scheme would be developed to minimise effects on nocturnal and crepuscular species; and
- The following plans would also be developed in conjunction with Ecology, and implemented during construction and post-construction where relevant:

- Bird Protection Plans;
- Habitat Management Plan; and
- Input into Construction Environmental Management Plan (CEMP).

6.6.22. Additional mitigation measures to remove or suitably reduce potential significant effects will be identified through the assessment (as noted above). Mitigation measures required to comply with legislative obligations will also be identified. The chapter will fully detail any additional measures including responsibilities, timescales, and any follow-on monitoring requirements.

6.6.23. If any residual effects remain potentially significant, compensation to offset this will be identified.

7 LANDSCAPE AND VISUAL

7.1 INTRODUCTION

7.1.1. This chapter describes the methodology to be used within the Landscape and Visual Impact Assessment (LVIA) for the EIA Report and provides an overview of the baseline conditions and the datasets to be used to inform the LVIA. An outline of the likely significant effects and design considerations that may be needed to provide mitigation and enhancement of the Proposed Development are also described.

7.1.2. The LVIA process will take account of national and local planning policy in relation to wind farm development, in particular National Planning Framework (NPF) 4 (2023)[80], the Highland-wide Local Development Plan (HwLDP) (2012) (Policy 61 in particular)[81], The Highland Council's (THC) Onshore Wind Energy Supplementary Guidance (OWESG) and Spatial Framework[82] which was adopted in November 2016 and its Addendum (2017) and the Caithness and Sutherland Local Development Plan (CaSPlan), adopted in 2018[83]. It will also take into account the feedback from the pre-application consultation report by Highland Council on 22 December 2020.

7.1.3. Where required, the following technical assessments will be included as part of the scope of the LVIA:

- Residential Visual Amenity Assessment;
- Night-time Lighting Assessment; and
- Wild Land Assessment.

7.1.4. This chapter of the report is supported by **Figures 7.1 – 7.6** and should be read in conjunction with **Chapter 2**: **Site Context and Proposed Development Description**.

7.1.5. Consultees are requested to confirm the scope of this assessment and in particular comment on other known wind farm development which should be included in the assessment (**Table 7-1**), the proposed viewpoint locations (**Table 7-3**) and matters that are proposed to be scoped out of this assessment (**Section 7.9**).

[80] National Planning Framework 4, Scottish Government, 2023. https://www.gov.scot/publications/national-planning-framework-4/documents/

[81] Highland-wide Local Development Plan, Highland Council, 2012. https://www.highland.gov.uk/info/178/development_plans/199/highland-wide_local_development_plan

[82] Onshore Wind Energy Supplementary Guidance, Highland Council, 2016 and 2017. https://www.highland.gov.uk/directory_record/712079/onshore_wind_energy/category/465/wind_energy_and_sustainability

[83] Caithness and Sutherland Local Development Plan, Highland Council, 2018. https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/283/caithness_and_sutherland_local_development_plan

7.2 STUDY AREA

7.2.1. A 45km radius study area, in accordance with NatureScot (former Scottish Natural Heritage (SNH) guidance[84], and as illustrated on **Figure 7.1**, will be adopted for the LVIA. The assessment will focus on locations within the study area with theoretical visibility of the Proposed Development and where significant landscape and visual effects are likely to occur.

7.3 BASELINE CONDITIONS

SITE DESCRIPTION

7.3.1. The Proposed Development is situated within an undesignated forested area of *Sweeping Moorland and Flows – Caithness & Sutherland* Landscape Character as defined by NatureScot Landscape Character Assessment (2019)[85], approximately 14.9 km southwest of Mybster in the Highlands.

7.3.2. The topography of the site is slightly elevated in contrast to the adjacent landscape, nestled in-between the Far North Railway Line (and Altnabreac Station) to the north/ northwest and the River Thurso to the south/ southeast. There are numerous small landforms contained within the Site, with their elevation varying from 195 m AOD (Cnoc nan Sithean) and 140 m AOD (Cnoc Loch Eileanaich), to the south and northeast respectively. The Site is traversed and bound by various watercourses and lochans such as the River Thurso to the south/ southeast, Loch Sgrabach within the central extent of the Site and Loch Croc nan Lair to the east. The Site is remote with the closest residential property located over 0.8 km to the northwest of the nearest indicative turbine at Lochdhu Lodge. The Far North Railway line traverses the landscape southwest – northeast towards the north of the Site, connecting Wick to Inverness.

LANDSCAPE CHARACTER

7.3.3. The Site is located within the *Sweeping Moorland and Flows – Caithness & Sutherland* Landscape Character Type (LCT) Illustrated in **Figure 7.3**.

7.3.4. The key characteristics of the Sweeping Moorland and Flows – Caithness& Sutherland as noted by NatureScot are as follows:

- “Gently sloping or undulating landform which lies generally below 350 metres;
- Occasional isolated hills of limited height form local landmark features;
- Very distinct flora, dominated by sphagnum mosses, produced by the wetness and infertility of the flows;
- Areas of peat cuttings and hagging;

[84] Visual Representation of Wind Farms: Good Practice Guidance (Version 2.2, page 12), SNH, 2017. https://www.nature.scot/doc/visual-representation-wind-farms-guidance

[85] https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions

- Pockets of improved grazing, mainly within the outer fringes of sweeping moorland;
- Coniferous forest forming a dominant characteristic within some parts of this landscape character type;
- Very sparsely settled with dispersed crofts, farms and estate buildings largely found on the outer edges of this landscape or near a strath;
- Wind farms, transmission lines, the A9 and a network of minor roads are key features within the more modified outer fringes within Caithness;
- Long, low and largely uninterrupted skylines offering extensive views across this landscape and result in a feeling of huge space;
- Consistent views to the distant Lone Mountains and Rugged Mountain Massif – Caithness & Sutherland; and
- A strong sense of remoteness is associated within the largely uninhabited, inaccessible core flows and moorlands of this landscape."

LANDSCAPE DESIGNATIONS

7.3.5. The southeast and northern extent of the Site boundary is situated adjacent to the Causeymire – Knockfin Flows and the East Halladale Flows Wild Land Areas (WLAs) and The Flow Country and Berriedale Coast Special Landscape Area (SLA). None of the proposed turbines, however, are situated within the WLA or SLA boundaries as illustrated in **Figure 7.4**.

National Landscape Designations

- Kyle of Tongue National Scenic Area (NSA) located 35 km northwest of the Site.

Local Landscape Designations

- The Flow Country and Berriedale Coast SLA, situated 730 m southeast of the Site;
- Bens Griam and Loch nan Clar SLA, located 15.1 km to the west/ southwest of the Site;
- Farr Bay, Strathy and Portskerra SLA, located 22.8 km northwest of the Site;
- Loch Fleet, Loch Brora and Glen Loth SLA, located 27.3 km to the south/ southwest of the Site.
- Dunnet Head SLA, situated 27.7 km to the northeast of the Site;
- Duncansby Head SLA, located 44.8 km to the northeast of the Site; and
- Ben Klibreck and Loch Choire SLA situated 36.4 km to the west/ southwest of the Site.

WILD LAND AREAS

7.3.6. There are four WLAs located within the 45 km Study Area, the most relevant to the Proposed Development are the Causeymore – Knockfin Flows and the East Halladale Flows WLAs, both located adjacent the Site, to the south/ southeast and north, respectively. The remaining two WLAs (Ben Klibreck – Armine Forest, and Ben Hope – Ben Loyal WLAs) are located between 22 – 45km distance from the Proposed Development.

VISUAL AMENITY

7.3.7. The visual assessment would draw upon the ZTV, site visits and viewpoint analysis, assessing the potential visual effects on views and visual amenity likely to be experienced by receptors (people) within the landscape as follows:

- Views from residential properties and settlements;
- Views experienced whilst traveling through the landscape (road/ rail users, walkers, horse riders and cyclists for example); and
- Views from tourist and recreational destinations including hill summits and long ranger walking routes.

Settlement and Residential Properties

7.3.8. The assessment of visual effects likely to be experienced from settlements includes consideration of residential areas, the public realm, and public open spaces within settlement boundaries that would be frequented by people. Settlements included in the LVIA would be those defined in the HwLDP[86] and CASPlan[87].

7.3.9. There are no settlements within 10 km of the Proposed Development. However, there are a number of settlements between 10 – 20 km overlapped by the ZTV in **Figures 7.1 and 7.2** which include:

- Westerdale;
- Halkirk;
- Spittal and Mybster; and
- Westfield and Shebster.

7.3.10. Further afield, Watten, Latheron, Lybster, Dunbeath, Helmsdale, Brora, Castletown, Dunnet, Reay, Melvich, Bettyhill, John o' Groats and Tongue are not within the ZTV. Thurso and Wick, although partly within the ZTV, are considered to be too distant to have potential for significant effects (25 km and 32 km away respectively).

7.3.11. There are nine residential properties located within 2 km of the proposed nearest turbines, these include:

- Lochdhu Lodge, 802m distance;
- Keeper's House, 948m distance;

[86] Highland-wide Local Development Plan, Highland Council, 2012. https://www.highland.gov.uk/info/178/development_plans/199/highland-wide_local_development_plan

[87] Caithness and Sutherland Local Development Plan, Highland Council, 2018. https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/283/caithness_and_sutherland_local_development_plan

- Old School House, 1,017m distance;
- Langa Cottage, 1028m distance;
- Station Cottage, 1,060m distance;
- Dalnawillan Cottage, 1,126m distance;
- Dalnawillan Lodge, 1,219m distance;
- Dalnaha, 1,848m distance; and
- Badnaheen, 1,935m distance.

Transport Routes

7.3.12. There are no main roads (motorways, A or B roads) within 10 km of the Proposed Development. The only main transport route within 10km, overlapped by the ZTV, is the Far North Railway Line, connecting Wick and Inverness. The U1823 minor road from Westerdale to Loch More (the Old Road to Thurso) is also located within 10km.

7.3.13. Between 10 – 20km, there are a number of main transport routes overlapped by the blade tip ZTV in **Figures 7.1 and 7.2** and are listed as follows:

- A9;
- A882;
- A897;
- B870; and
- B874.

7.3.14. Minor, unclassified roads tend to form a rectilinear network of routes across the Caithness farmlands or run inland towards remote lodges.

Recreational Routes

7.3.15. National recreational routes within 45 km of the Proposed Development that are overlapped by the blade tip ZTV in **Figure 7.5** are listed below:

- North Coast 500;
- John o' Groats Trail; and
- Sustrans Cycle Routes: Inverness to John o' Groats.

7.3.16. A number of local recreational routes including Core Paths, Rights of Way/ Scottish Hill Tracks are scattered throughout the Study Area, the most relevant are Loch More to Altnabreac (CA01.01), Loch More to Dalnawillan (CA01.03), Altnabreac to Dalnawillan (CA01.04), Dalnawillan to Glutt (CA01.02 and Glutt to Braemore (CA04.05). All of these are located within the central extent of the Site and/ or within the central extent of the Study Area.

Recreational and Tourist Destinations

7.3.17. Recreational and tourist destinations included in the LVIA would include those features that appear as prominent landmarks or landscape features, locations associated with passive recreation such as walking, and where there is a clear relationship between the feature/ destination and the landscape. Gardens and Designed Landscapes (GDL) (such as Castle of Mey which is overlapped by the ZTV) would be included where these are open to the public, as well as National Trust for Scotland gardens/ land and Historic Environment Scotland visitor sites. The assessment would exclude locations for team sports and other recreational / tourist destinations where the focus of activity is not on the landscape or is indoors – for example museums, libraries, and gift shops. The assessment would make general reference to areas that might be used for fishing/hunting/ stalking activities but would exclude specific assessment as the primary focus would be the activity, rather than the landscape.

7.3.18. Other recreational destinations would also include golf clubs, campsites and caravan parks, landmark and popular hill summits (Munros and Corbetts), and Forestry and Land Scotland / RSPB walking and cycling trails.

DATA SOURCES

Desk Study

7.3.19. A range of desk-based and site-based data will be sourced to undertake the LVIA, covering landscape and visual receptors and other relevant cumulative developments. The desk-based data will be drawn from Ordnance Survey (OS) and a range of document sources, in addition to the relevant planning policy documents.

7.3.20. Computer modelling of the landscape/ landform, other cumulative developments and the Proposed Development will be undertaken using a variety of software to support the LVIA and cumulative assessment.

7.3.21. The principal desk-based data sources used to inform this chapter are set out in **Table 7-1**:

Table 7-1 – Data Sources

Landscape and Visual Receptors	Source Document / Data
Landscape Character	NatureScot advises, *"The 2019 Landscape Character Type map and associated Landscape Character Type Descriptions now supersede the 1990s landscape character descriptions and mapping. Where there are topic-specific landscape capacity or sensitivity studies, they would take precedence for informing that development type, e.g. wind farms. Many of the 1990s LCAs [Landscape Character Areas] contained "Landscape Sensitivities" and "Forces for Change" sections. Many of these have become dated, for example planning policy references and turbine heights. The 2019 NatureScot LCA has not updated these. Some of the details, such as settlement pattern analysis in some reports, may still be useful".* Consequently, landscape character within 45km will be sourced from the following documents: • Onshore Wind Energy Supplementary Guidance (The Highland Council, 2016); and • Landscape Character Assessment (SNH, 2019).

Landscape and Visual Receptors	Source Document / Data
National landscape designations	• The Special Qualities of the NSAs, Commissioned Report No. 374 (NatureScot, 2010); and • NSAs: https://www.gov.scot/publications/national-scenic-areas-of-scotland-maps/.
Local landscape designations	• Assessment of Highland SLAs, commissioned report for Highland Council in partnership with SNH (Horner + Maclennan with Mike Wood Landscape Architect, June 2011).
Wild Land Areas	• https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/wild-land/wild-land-area-descriptions-and-assessment-guidance; • Map of Wild Land Areas, (NatureScot, 2014); • Description of Wild Land Area 36: Causeymire – Knockfin Flows (SNH, 2017); and • Description of Wild Land Area 39: East Halladale Flows (SNH, 2017).
Settlements and residential properties	• Settlements defined in the local development plans for Highlands; and • Residential properties shown on 1:25,000 scale OS mapping within 2km of the proposed turbine locations.
Transport routes	• 'A' and 'B' class roads and passenger railway lines: OS mapping and Network Rail.
Recreational routes	• Scotland's National Tourist Routes: https://www.visitscotland.com/travel-planning/getting-around/driving/most-scenic-routes; • Scotland's Great Trails: http://www.snh.gov.uk/enjoying-the-outdoors/where-to-go/routes-to-explore/scotlands-great-trails/; • Sustrans National Cycle Network: http://www.sustrans.org.uk/ncn/map/national-cycle-network/using-network/route-numbering-system. • Core Path Network and Plans within 10-15km of the proposed turbine locations for Highlands.
Recreational locations	• Golf courses, caravan and camping sites and other passive recreational locations, excluding team sports/ indoor locations shown on 1:50,000 scale OS mapping.
Tourist/ visitor attractions	• Inventory of Gardens and Designed Landscapes and other visitor attractions, Historic Environment Scotland sites open to the public: http://www.historic-scotland.gov.uk/; • National Trust for Scotland: https://www.nts.org.uk/visit/places, and VisitScotland sites: https://www.visitscotland.com/travel-planning/getting-around/driving/most-scenic-routes; • Woodland Trust sites: https://www.woodlandtrust.org.uk/visiting-woods/find-woods/ and Forest and Land Scotland sites: https://forestryandland.gov.scot/; and • OS mapping at 1:50,000 scale.
Hill walking summits	• Munros, Corbetts and other hills/ local walks: Walk Highlands Website: http://www.walkhighlands.co.uk.

Field Surveys

7.3.22. Field surveys will be undertaken to provide a photographic record of each assessment viewpoint in accordance with Visual Representation of Wind Farms, Version 2.2 (NatureScot, February 2017) and Visualisation Standards for Wind Energy Developments (Highland Council, July 2016). The field studies will include documented visits to all relevant landscape and visual receptors to assess the likely effects of the Proposed Development in the field, checking data, 'ground truthing' and examining landscape elements, characteristics/ character and views/ visual amenity.

7.4 CUMULATIVE DEVELOPMENTS

7.4.1. Drawing from NatureScot guidance[88], the baseline of all other cumulative wind energy development, above 50 m to blade tip height, within the 45 km Study Area has been collated. This includes all existing and consented wind energy development, and planning applications. In accordance with the same NS guidance, projects at scoping stage have not been included except those within 10 km of the Proposed Development, which would be included within the viewpoint wirelines in the LVIA.

7.4.2. In total, 46 wind energy developments are included within the assessment as listed in **Table 7-2** and illustrated in **Figure 8.6**. As of the 12 September 2024, this includes 27 existing wind farms, 11 consented developments, six applications and two scoping developments within the Study Area.

Table 7-2 - Wind Energy Development included within the CLVIA

Reference	Name	Distance (km)	Number of Turbines	Blade tip Height (m)
EXISTING WIND ENERGY DEVELOPMENT WITHIN 45 KM				
E01	Causeymire	11.4	21	100
E02	Bad a Cheo	11.9	13	112
E03	Achlachan	12.2	5	115
E04	Buolfruich	13.2	15	75
E05	Halsary	13.3	15	120
E06	Limekiln	13.9	19	149.9

[88] Guidance: Assessing the Cumulative Landscape and Visual Impacts of Onshore Wind Energy Developments, NatureScot (March 2021). https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments

Reference	Name	Distance (km)	Number of Turbines	Blade tip Height (m)
E07	Limekiln Extension	41.2	5	149.9
E08	Baillie	18.7	21	110
E09	Camster	19.8	25	121.2
E10	Camster II	22.3	11	126.5
E11	Strathy North	22.8	33	110
E12	Bilbster	23.8	3	93
E13	Wathegar	23.3	5	101
E14	Burn of Whilk	23.3	9	115
E15	Forss I & II	23.4	6	78
E16	Wathegar II	23.9	9	110
E17	Achairn	25.2	3	100
E18	Gordonbush	30.5	35	107
E19	Bettyhill	31.4	2	119
E20	Gordonbush Extension	32.9	11	149.9
E21	Lochend	33.3	4	99.5
E22	Stroupster	35.4	13	113/ 110
E23	Kilbraur	40.1	19	115
E24	Kilbraur Extension	40.3	8	125
E25	Beatrice	40.8	125	198.4
E26	Moray West	42.2	60	257

Reference	Name	Distance (km)	Number of Turbines	Blade tip Height (m)
E27	Beatrice Demo	43.9	2	154
CONSENTED WIND ENERGY DEVELOPMENT WITHIN 45 KM				
C01	Tacher	12.2	3	129.9
C02	Golticlay	15.7	19	130
C03	Rumster	15.7	3	75
C04	Hill of Lychrobbie	16.6	3	74
C05	Strathy Wood	20.7	13	180
C06	Strathy South	20.9	39	200
C07	Forss III	23.4	1	100
C08	Bettyhill Phase 2	29.6	10	149.9
C09	Pentland Floating	29.8	6	300
C10	Hollandmey	33.7	10	149.9
C11	Slickly	34.1	11	135 / 149.9
APPLICATION WIND ENERGY DEVELOPMENT WITHIN 45 KM				
A01	Tormsdale	9.7	12	149.9
A02	Watten	16.1	7	220
A03	Kirkton	18.5	11	149.9
A04	Cairnmore Hill	21.9	5	138.5
A05	Melvich	22.6	12	149.9
A06	Lochend Extension	32.7	5	149.9

Reference	Name	Distance (km)	Number of Turbines	Blade tip Height (m)
SCOPING WIND ENERGY DEVELOPMENT WITHIN 10 KM				
S01	Forsinain Forest	8.6	17	250
S02	Baledigle	9.1	13	250

7.5 DESIGN AND MITIGATION

7.5.1. As set out in **Chapter 2** of this report, the 'scoping layout' of the Proposed Development represents a maximum of 17 turbines within the Site boundary; each with a 200 m height to blade tip and a battery storage facility. The EIA process will lead to further refinement of this layout as the Site constraints become known and are assessed in greater detail.

7.5.2. From a landscape perspective, there are a number of landscape objectives that reflect the Site constraints and surroundings as follows:

- Notwithstanding that landscape and visual impacts are to be expected as a result of onshore wind farm development, appropriate design mitigation should be applied to reduce the effects on key landscape and visual receptors including The Flow Country and Berriedale Coast SLA, the Causeymire – Knockfin Flows WLA, East Halladale Flows WLA and views from nearby settlements (and individual residential properties within 2km), transport and recreational routes;
- There will be potential for significant landscape and visual effects on the landscape character of the Site and localised surroundings.
- Additional forms of mitigation to address these effects include a critical design review of the 'scoping layout' and the subsequent development of a landscape-led revised design strategy and 'application layout', underpinned by the above high-level objectives. In particular, the design review will consider:
    - Visibility of aviation warning lights and the potential options for further mitigation in the form of a Lighting Strategy or other alternatives;
    - Likely landscape effects and visibility of turbines from within other designated landscapes and visual receptors resulting in a need for further mitigation in terms of turbine scale and layout; and
    - Likely cumulative landscape effects and visibility including landscape change and compatibility with other schemes.

7.5.3. The Applicant is also proposing to implement nature positive measures as part of the Proposed Development. This is likely to include peatland habitat management and forestry design management, and measures to increase landscape capacity, biodiversity and landscape improvements.

7.6 INCLUSION OR EXCLUSION FROM THE EIA

7.6.1. The selection of receptors to include in the assessment is based on the requirement for EIA to consider the likely significant effects. Effects that are not likely to be significant do not require assessment under the EIA Regulations.

7.6.2. The assessment will identify landscape and visual effects separately, as detailed in the approach to the assessment set out further below. The assessment will focus on the identification and, wherever appropriate, the mitigation of potential significant landscape and visual effects.

7.6.3. The primary form of mitigation for landscape and visual effects arising from large scale wind farm development is through iterative design of the layout of the turbines and associated infrastructure, with reference to key views, viewpoints, and receptors. Design evolution will be set out in detail in the design strategy that will form part of the EIA Report and will demonstrate how the design of the Proposed Development has sought to avoid, reduce or minimise landscape and visual effects wherever feasible.

7.6.4. Further mitigation will be considered where relevant and appropriate, and the residual effects taking account of the implementation of this mitigation will be presented in the assessment.

7.7 SCOPE OF THE ASSESSMENT

ZONE OF THEORETICAL VISIBILITY AND VIEWPOINT ANALYSIS

7.7.1. The Zone of Theoretical Visibility (ZTV) analysis is used to assist the design and further define the scope of the assessment and are used to indicate the areas from where they may be theoretically possible to view all or some of the proposed turbines. The ZTVs have been calculated using ReSoft WindFarm computer software to produce an area of potential visibility of any part of the proposed turbines, calculated to turbine blade-tip and hub-height, or other selected infrastructure. The ZTV does not however take account of built development and vegetation, which can significantly reduce the area and extent of actual visibility in the field and as such provides the limits of the visual assessment Study Area. As a result, there may be an over-estimate of the theoretical visibility with roads, tracks and footpaths in the wider setting which, although shown as falling within the ZTV, have restricted viewing opportunities since they are heavily screened or filtered by banks, walls and vegetation. The ZTVs therefore provide a starting point in the assessment process and accordingly tend towards giving an over-estimated or maximum theoretical visibility of the proposed turbines.

7.7.2. A preliminary ZTV map has been produced and is calculated to show the area of theoretical visibility of the proposed turbines based on an indicative 17 turbine layout of 200 m to tip in height as follows:

- **Figure 7.1** illustrates the ZTV calculate to blade tip height at 1:360,000 scale across the 45 km Study Area and provides an overview of the theoretical extent of visibility. The figure also illustrates the viewpoint locations and cumulative wind farms; and
- **Figure 7.2** illustrates the same ZTV as above but presented as 1:120,000 scale at A0 paper size.

7.7.3. For the avoidance of doubt, areas out with the coloured areas of the ZTV would have no view of the Proposed Development and landscape and visual receptors within these areas are consequently scoped out of the LVIA.

Confirmation of the LVIA Study Area

7.7.4. The LVIA Study Area for the Proposed Development (**Figures 7.1 - 7.2** within **Appendix 1**) allows a minimum of 45km distance from an indicative 17 turbine layout in accordance with NS guidance89. It represents an over-estimated or maximum theoretical visibility of the Proposed Development. As illustrated in **Figures 7.1 - 7.2** much of the area between 30-45km includes areas of either have no visibility or very limited visibility of the Proposed Development at long distance. For these reasons it is proposed to reduce the LVIA Study Area to 30km distance from the Proposed Development and to focus the assessment of likely and potential significant effects on receptors within this area and the extent of the blade tip ZTV. Viewpoints 18-20 are proposed beyond 30km to illustrate the limited extent of effects at these distances.

7.7.5. The detailed LVIA study area would be defined by the potential threshold for significant effects based on the viewpoint analysis and would include local / regional level receptors such as local LCTs, local landscape designations, main settlements, transport routes, 'B' and 'C' class roads, core paths / local recreational routes and local attractions. The viewpoint analysis and field survey will be used to confirm if a receptor can be scoped out and viewpoint analysis used to identify a conservative distance or 'threshold' for significant landscape and visual effects.

Confirmation of Cumulative LVIA Study Area

7.7.6. In accordance with NS guidance[90] on cumulative assessment, information on existing and consented wind farms and other planning applications for other wind farm developments would be sourced within a 'search area' of 60 km in order to inform the cumulative assessment of effect on landscape and visual receptors within the 45 km radius LVIA Study Area. As noted in Paragraph 7.74 above, it is also proposed to reduce the cumulative search area to 30 km in line with the LVIA Study Area.

7.7.7. The current cumulative situation within 45km is however indicated in **Table 7-2** and illustrated in Figure 7.6, showing the locations of wind farms that are operational, under construction, consented or which are at application stage and where the turbines are greater than 50m to blade tip.

Viewpoint Selection and Visualisations

7.7.8. A range of viewpoints have been proposed (as illustrated on **Figures 7.1 and 7.2**) and consultees are requested to confirm the viewpoint selection set out in **Table 7-3,** including requests to scope out viewpoints or recommend additional / alternative locations.

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[89] Scottish Natural Heritage, February 2017. Visual Representation of Wind Farms: Good Practice Guidance, Version 2.2. https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf

[90] NatureScot, 2021. Guidance: Assessing the Cumulative Landscape and Visual Impacts of Onshore Wind Energy Developments. https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments

7.7.9. Visualisations would be prepared for each viewpoint to accord with NS guidance[91] and THC guidance[92].

Table 7-3 - Proposed LVIA Viewpoints

ID	Viewpoint Name	Visualisation Technique	Receptor and Viewpoint Type	Illustrated Night-time viewpoint
VP01	Altnabreac Station	180-degree FoV – Baseline photograph, wireline and photomontage	Specific – Rail users, nearby residents	-
VP02	Ben Alisky	360-degree FoV – Baseline photograph, wireline and photomontage	Specific –Hill walkers, WLA, SLA	-
VP03	Cnocloisgte Water	360-degree FoV – Baseline photograph, wireline and photomontage	Specific – Hill walkers, WLA	-
VP04	Loch More Carpark	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Recreational users (Core Path and Clyde trail).	-
VP05	Beinn nam bad Mor	360-degree FoV – Baseline photograph, wireline and photomontage	Specific – Hill walkers, WLA	-
VP06	Ben Dorrery	360-degree FoV – Baseline photograph, wireline and photomontage	Specific – Hill walkers, tourists (Standing Stones)	-
VP07	Westerdale	180-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users, residential receptors (Westerdale settlement)	Yes

[91] Scottish Natural Heritage, February 2017. Visual Representation of Wind Farms: Good Practice Guidance, Version 2.2. https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf

[92] Highland Council, 2016. Visualisation Standards for Wind Energy Developments. https://www.highland.gov.uk/downloads/file/12880/visualisation_standards_for_wind_energy_developments

ID	Viewpoint Name	Visualisation Technique	Receptor and Viewpoint Type	Illustrated Night-time viewpoint
VP08	A9 War Memorial	90-degree FoV – Baseline photograph, wireline and photomontage	Representative – Road users, tourists	-
VP09	A9 Loch Rangag Parking	90-degree FoV – Baseline photograph, wireline and photomontage	Representative – Road users, tourists	Yes
VP10	Minor Road South of Broubster	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users	-
VP11	Morven	360-degree FoV – Baseline photograph, wireline and photomontage	Specific – Hill walkers, WLA, SLA	-
VP12	A9, Spittal	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users, tourist, residential receptors	-
VP13	A9 Smerral Junction	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users, tourists	-
VP14	B874 North of Halkirk	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users, tourists and residential receptors (settlement of Halkirk)	Yes
VP15	Ben Griam Beg	360-degree FoV – Baseline photograph, wireline and photomontage	Specific – Hill walkers, SLA	-
VP16	Minor Road north of Grey Cairns of Camster	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users	-
VP17	Minor Road between Forss and Westfield	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users	-
VP18	A836/ NC500 between Bettyhill and Armadale	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Road users, tourists, local residents, NC500 and Sustrans Cycle	-

ID	Viewpoint Name	Visualisation Technique	Receptor and Viewpoint Type	Illustrated Night-time viewpoint
			Route: Inverness to John O'Groats	
VP19	Dunnet Head	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – tourist, recreational, SLA, NC500	-
VP20	Ben Armine	90-degree FoV – Baseline photograph, wireline and photomontage	Specific – Hill walkers, SLA, WLA	-

Other Technical Guidance

7.7.10. The assessment will be undertaken in accordance with the methods outlined in best practice guidance documents but not limited to the following:

- Guideline for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute and IEMA (May 2013), hereafter referred to as GLVIA 3;
- Siting and Designing Windfarms in the Landscape, Version 3a, SNH (August 2017);
- Guidance: Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments, NatureScot (March 2021);
- Visual Representation of Wind Farms Version 2.2, SNH (February 2017);
- Visualisation Standards for Wind Energy Developments, Highland Council, July 2016;
- Guidance: General pre-application and scoping advice for onshore wind farms, NatureScot (2024);
- University of Newcastle for SNH: Visual Assessment of Windfarms: Best Practice, Commissioned Report F01AA303A, 2002;
- Residential Visual Amenity Assessment: Technical Information Note, Landscape Institute, 15 March 2019;
- Guidance: Spatial Planning for Onshore Wind Turbines – natural heritage considerations, Version 3a, SNH, June 2015;
- Landscape Sensitivity Assessment Guidance. NatureScot, April 2022;
- Assessing impacts on Wild Land Areas - technical guidance, NatureScot, August 2023;
- Annex 14 to the Convention on International Civil Aviation – Volume I Aerodrome Design and Operations, Eighth Edition (ICAO, July 2018);
- CAP393, The Air Navigation Order 2016, SI 2016 No.765;
- CAP 764: Policy and Guidelines on Wind Turbines (Civil Aviation Authority, CAA);

- Safety & Airspace Regulation Group. Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level (CAA, 2017);
- Guidance Notes for the Reduction of Obtrusive Light, GN01:2011 (Institute of Lighting Professionals, 2011);
- Night-time Photography (Institute of Lighting Professionals, 2019); and
- Aviation Lighting and Onshore Wind Turbines – Draft Guidance on Aviation Lighting Impact Assessment, Scottish Government, June 2024.

7.8 LIKELY SIGNIFICANT EFFECTS

LIKELY SIGNIFICANT EFFECTS DURING CONSTRUCTION

7.8.1. The landscape, visual and cumulative effects that could arise as a result of the Proposed Development during construction are identified as follows:

- Direct localised and temporary effects on the host landscape character, characteristics and landscape elements, primarily as a result of wind turbine installation during construction;
- Indirect and temporary effects related to the visibility of the turbines and their effect on surrounding landscape character and locally designated landscapes and perceptual characteristics / special landscape qualities, primarily as a result of wind turbine installation during construction; and
- Temporary effects on views and visual amenity, primarily as a result of visibility of wind turbine installation during construction, experienced by visual receptors (groups of people) with visibility of the Proposed Development, on specific views and on their visual amenity/experience of the landscape.

LIKELY SIGNIFICANT EFFECTS DURING OPERATION

7.8.2. The landscape, visual and cumulative effects that could arise as a result of the Proposed Development during operation are identified as follows:

- Direct localised and long-term effects on the host landscape character, characteristics and potentially the landscape elements are likely to be significant within ~2 - 3km. Night-time effects resulting from aviation warning lights are also likely to be significant subject to a Lighting Strategy;
- Indirect and long-term effects related to the visibility of the turbines and their effect on surrounding landscape character and locally designated landscapes and perceptual characteristics / special landscape qualities. Night-time effects resulting from aviation warning lights are also likely to be significant subject to a Lighting Strategy; and
- Long-term effects on views and visual amenity resulting from visibility of the proposed wind turbines within ~5 - 10km distance, subject to detailed viewpoint analysis. Views of the proposed aviation warning lights and adverse effects on night-time views within ~5 - 10km distance, subject to detailed viewpoint analysis and a Lighting Strategy.

LIKELY SIGNIFICANT EFFECTS DURING DECOMMISSIONING

7.8.3. The landscape and cumulative landscape effects of the Proposed Development during decommissioning are unlikely to be significant and would largely reverse the effects of turbine construction and operation. The visual and cumulative visual effects during decommissioning would lead to a reduction in the operational effects on views and visual amenity resulting from no visibility of the proposed wind turbines.

7.9 POTENTIAL EFFECTS PROPOSED TO BE SCOPED OUT OF FURTHER ASSESSMENT

7.9.1. As a result of the characteristics of the Site, baseline receptors and the Proposed Development, it is considered that some receptors would not be significantly affected in the context of the EIA Regulations. These receptors / effects can therefore be scoped out from further assessment in the EIA Report as follows:

- LVIA Wider and Detailed Study Area:
  - Limit wider LVIA Study Area for the landscape, visual and cumulative assessment to 30km as a result of the blade tip ZTV in **Figure 7.1**; and
  - The detailed LVIA study area would be defined by the potential threshold for significant effects based on the viewpoint analysis and would include local / regional level receptors such as local LCTs, local landscape designations, main settlements, transport routes, 'B' and 'C' class roads, core paths / local recreational routes and local attractions. The viewpoint analysis and field survey will be used to confirm if a receptor can be scoped out and viewpoint analysis used to identify a conservative distance or 'threshold' for significant landscape and visual effects;
- Cumulative Assessment:
  - Limit the cumulative baseline of all operational and consented wind energy development and other applications for wind energy development to within 30km of the Site to match the LVIA Wider Study Area; and
  - Exclude other scoping stage and pre-application schemes in line with NS guidance apart from those within 10km which will be included on the viewpoint wirelines;
- Receptors out with the ZTV:
  - All receptors within the Study Area that are out with the blade tip ZTV would have no view of the Proposed Development and should be scoped out;
- National Scenic Areas (NSAs):
  - The effects of the Proposed Development on the SLQs of the Kyle of Tongue NSA is scoped out due to the long intervening distance of over 35 km and the very limited visibility of the Proposed Development located beyond existing and consented wind farms;
- Highland SLAs:
  - The Highland SLAs located within the 45 km Study Area are illustrated on **Figure 7.4**. The ZTV illustrated that with exception to The Flow Country and Barriedale Coast and Bens Griam

and Loch nan Clar SLA, there would be very limited to no visibility within the remaining five SLAs within the Study Area. Effects on the Special Landscape Qualities (SLQs) of these SLAs are therefore scoped out of the assessment on the basis there would be no significant effects. Effects on the SLQs of the Bens Griam and Loch nan Clar SLA is also proposed to be scoped out as the Proposed Development would be located over 15 km distance and beyond other cumulative wind farms which would have a greater influence on the SLA. Therefore, the only SLA proposed to be included within the assessment is the Flow Country and Berriedale Coast SLA;

- Wild Land Assessment:
  - Due to the proximity of the Proposed Development to the Causeymire – Knockfin Flows and the East Halladale Flows WLA, a 'high-level' Wild Land Assessment on the wild land qualities of both of these WLAs will be included in the assessment. All other WLAs are thereby scoped out of the assessment due to intervening distance, no or very limited intervisibility and other wind farms located between the WLAs and the development Site. In accordance with NPF4, it states that "buffer zones around wild land will not be applied, and effects of development out with wild land areas will not be a significant consideration";
- Night-time Landscape Assessment:
  - A proportionate night-time visual assessment would be undertaken in accordance with NS guidance[93] and the draft Scottish Government guidance[94]. It is proposed that night-time effects on landscape character and designation that do not include dark skies, for example, within their key characteristics or SLQs is scoped out.

7.10 PROPOSED ASSESSMENT METHODOLOGY

7.10.1. LVIA and cumulative assessment forms one of the key components of the EIA process when assessing proposed wind farm developments. The assessment will be undertaken in accordance with Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3) (Landscape Institute and IEMA, 2013). An overview of the LVIA methodology, including cumulative assessment, is provided below with the detailed methodology to be provided as an appendix to the completed EIAR.

LANDSCAPE EFFECTS

7.10.2. Landscape effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

[93] Guidance: General pre-application and scoping advice for onshore wind farms, NatureScot (2024). https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms

[94] Aviation Lighting and Onshore Wind Turbines – Draft Guidance on Aviation Lighting Impact Assessment, Scottish Government, June 2024. https://www.gov.scot/groups/aviation-lighting-guidance-working-group/#:~:text=Aviation%20Lighting%20Guidance

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the Proposed Development may influence in a significant manner."

7.10.3. The landscape effects occurring during the construction, operational and decommissioning periods may therefore include, but are not restricted to, the following:

- Changes to landscape elements: the addition of new elements (wind turbines) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the landscape character type;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of landscape character types/areas or contribute to the landscape value;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall landscape character within a particular area; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

VISUAL EFFECTS

7.10.4. Visual Effects are concerned wholly with the effect of the development on views, and the general visual amenity, and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."

7.10.5. Visual effects are identified for different receptors (people) who would experience the view(s) at their places of residence, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view(s); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

DETERMINING THE SIGNIFICANCE OF EFFECTS

7.10.6. Essentially, the level of landscape and visual effect (and whether this is significant) is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change likely to result from the Proposed Development. The LVIA includes an iterative design and assessment process that takes account of design improvements and mitigation. Further assessment is then undertaken of any remaining, residual effects that could not otherwise be mitigated or 'designed out'. In accordance with the relevant EIA Regulations, it is important to determine whether the effects, assessed as a result of the Proposed Development, are likely to be significant.

7.10.7. A matrix is used to guide the assessment process and is shown in **Table 7-4** below. Significant landscape and visual effects are highlighted in bold, shaded in dark grey and relate to all those effects that result in a '**Substantial**', '**Substantial to Major**', '**Major**' or a '**Major to Moderate**' level of effect. In some circumstances, 'Moderate' levels of effect (shaded light grey in **Table 7-4**) have the potential to be considered as significant, subject to the assessor's opinion. Such exceptions are also highlighted in **bold** and will be explained as part of the assessment where they occur. White or un-shaded boxes indicate a non-significant effect.

7.10.8. The type of effect will also be described and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral, or adverse.

Table 7-4 - Evaluation of Landscape and Visual Effects

Magnitude of Change	Landscapes and Visual Sensitivity			
	High	Medium	Low	Very Low
High	**Substantial**	**Major**	Moderate	Not used
High - Medium	**Substantial to Major**	***Major to Moderate***	*Moderate to Minor*	
Medium	**Major**	Moderate	Minor	
Medium - Low	**Major to Moderate**	*Moderate to Minor*	*Minor*	
Low	Moderate	Minor	Negligible	
Low – Very Low	Moderate to Minor	*Negligible*	*Negligible*	
Very Low	Minor	Negligible	Negligible	
Zero	None / No View			

7.10.9. The assessment of cumulative effects is essentially the same as for the assessment of the 'solus' landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change. Cumulative assessment however considers the magnitude of change posed by multiple developments.

7.10.10. The Cumulative LVIA (CLVIA) will assess the following types of cumulative effects:

- Cumulative landscape effects: where more than one wind energy development may have an effect on a particular area of landscape character or landscape designation; and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development that may combine to have a cumulative visual effect. These can be further defined as follows:
  - Simultaneous or combined: where two or more developments may be viewed from a single fixed viewpoint simultaneously, within the viewer's field of view and without requiring them to turn their head;
  - Successive or repetitive: where two or more developments may be viewed from a single viewpoint successively as the viewer turns through 360°; and
  - Sequential: where a number of developments may be viewed sequentially or repeatedly at increased frequency, from a range of locations when travelling along a route within the study area.

7.10.11. CLVIA will adopt the same study area as the LVIA. Cumulative wind energy development for inclusion in the CLVIA are listed in **Table 7-4**. This cumulative database will be updated as required as part of the consultation process and prior to completion of the assessment.

7.10.12. The cumulative assessment will accord with NS guidance[95] and will be prepared to ensure that, as well as the effects of the Proposed Development (LVIA), the 'additional' cumulative effects and the 'combined' cumulative effects (CLVIA) will also be also reported as follows:

- Scenario 1 - (the main cumulative assessment) would consider: Existing + Consented + the Proposed Development - the additional and combined cumulative effects of the Proposed Development and existing (including schemes under construction) and consented wind energy developments will be assessed. Further, the cumulative assessment will take account of the timescales for the operation of the existing and consented developments.

[95] NatureScot, 2021. Guidance: Assessing the Cumulative Landscape and Visual Impacts of Onshore Wind Energy Developments. https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments

7.10.13. In addition, a short assessment will also be undertaken for Scenario 2 which takes into account the additional and combined cumulative effects of the Proposed Development and existing and consented wind energy developments and live applications (including schemes at planning appeal). This Scenario is less certain given the unknown decisions on live application wind farms.

RESIDENTIAL VISUAL AMENITY ASSESSMENT

7.10.14. Residential amenity is a planning matter that involves a wide number of effects, such as noise and shadow flicker, and benefits of which residential visual amenity is just one component.

7.10.15. There are nine residential properties located within 2 km of the proposed turbines and in accordance with GLVIA 3 and the Landscape Institute guidance[96], a Residential Visual Amenity Assessment (RVAA) will be included within the assessment. As a minimum, the visual effects from each property included in the assessment will be illustrated by a wireline.

NIGHT-TIME LIGHTING ASSESSMENT

7.10.16. Aviation warning lights attached to turbine hubs and towers are required on all proposed wind turbines ≥150 m in accordance with Article 222 of the UK Air Navigation Order (ANO) (2016), subject to any proposed lighting mitigation strategy.

7.10.17. A proportionate night-time assessment of the proposed aviation lighting will be undertaken in accordance with NatureScot's General Pre-application and Scoping Advice for Onshore Wind Farms, Annex 2 (2023) and Scottish Government's draft guidance Aviation Lighting and Onshore Wind Turbines – Draft Guidance on Aviation Lighting Impact Assessment, June 2024. The assessment will be supported by maps indicating the ZTV of any proposed aviation warning lights and three night-time viewpoints. The proposed night-time viewpoints, listed in Table 7-3, have been selected as representative of locations where there are likely to be people at night, including settlements and roads.

7.10.18. A night-time ZTV of the turbine lighting positions would accompany the visualisations which would aid the assessment. The extent of the study area is likely to be restricted to 10-15km from the outer turbine positions according to the technical criteria of the proposed candidate light fixtures.

WILD LAND ASSESSMENT

7.10.19. Due to the proximity of the Causeymire – Knockfin Flows (WLA36) and the East Halladale Flows (WLA39) WLAs to the Site, a 'high-level' Wild Land Assessment (day and night effects) on both WLAs will be included in the assessment. In accordance with NPF4, it states that "buffer zones around wild land will not be applied, and effects of development out with wild land areas will not be a significant consideration".

[96] Residential Visual Amenity Assessment: Technical Information Note, Landscape Institute, 15 March 2019. https://www.landscapeinstitute.org/news/new-rvaa-guidance-2019/

7.10.20. The assessment will be guided by the NatureScot, Assessing Impacts on Wild Land Areas – Technical Guidance, 2023; and the published WLA description of both WLAs. It is noted that the study areas for the wild land assessments "may be more limited than the whole of the LAs to better reflect the extent of likely effects" and is therefore proposed that the study area for WLA36 is limited up to 20km whilst the study area for WLA39 is limited up to 10km, given there is none to very limited visibility (blade tip) from the WLA beyond this distance. The WLA assessment will also consider "how the wild land qualities are experienced across the WLAs" as it will look at the whole of the WLAs within the wider LVIA study area.

7.10.21. LVIA Viewpoints 3 and 5 are located within WLA39 and Viewpoints 2, 4 and 11 are located within WLA36, which will be used to inform the Wild Land Assessment. In addition, the WLA assessment will examine the views from any other popular hill summits within the WLAs. The wild land assessment will also take account of all other cumulative wind farm development shown on **Figure 7.6**.

7.10.22. The Applicant would also like NS to confirm which of the WLA36 and WLA39 qualities included in the WLA descriptions should be assessed. In previous WLA assessments NS have agreed that some of the qualities should be excluded as they only relate to physical characteristics that cannot be affected by Proposed Developments beyond the WLA boundary for example.

WLA36 – Causeymire – Knockfin Flows

7.10.23. Three of the five qualities for WLA36 are proposed to be included in the assessment, these are as follows:

- *Awe inspiring simplicity of wide-open peatland from which rise isolated, arresting, steep mountains;*
- *Irregular peatland and dubh lochan, comprising a complex mix of hidden pools, bogs and lochans that contribute to perceived naturalness and limit access;* and
- *An extensive remote interior with few visitors in contrast to the margins of the area from which many people view into the WLA.*

7.10.24. The remaining two qualities relating to *"wide glens containing meandering rivers that limit access and are often the focus for isolated historic features"* and *"rolling, interlocking hills in the south containing remote, sheltered glens with limited visibility"* are proposed to be excluded from the assessment given neither of these areas within the WLA descriptions would be affected by the Proposed Development.

WLA39 – East Halladale Flows

7.10.25. All four qualities for WLA39 are proposed to be included in the assessment, these are as follows:

- An awe-inspiring simplicity of landscape at the broad scale, with a strong horizontal emphasis, 'wide skies' and few foci;
- A remote, discrete interior, with limited access and a strong sense of solitude;
- A rugged and complex pattern of hidden burns, lochans and pools at the local level, despite the landscape's simple composition at the broad scale; and

- A remarkably open landscape with extensive visibility, meaning tall or high features in the distance are clearly visible.

8 CULTURAL HERITAGE

8.1 INTRODUCTION

8.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Development upon Cultural Heritage. It includes consideration of impacts to non-designated heritage assets within the Site and designated heritage assets within the wider study area.

8.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development** and with respect to relevant parts of other technical chapters.

8.2 CONSULTATION

8.2.1. Initial consultations took place in 2020 as part of pre-application consultation with THC. The responses from these consultations can be found within **Appendix 4** of this Scoping Report.

8.2.2. For the preparation of the EIA for the Proposed Development, cultural heritage will require consultation with Historic Environment Scotland (HES) and Highland Historic Environment Record (HHER). Discussions will focus on study areas, methodology, heritage assets, and any other information which may not be available through historic environment records (HER) data.

8.3 STUDY AREA

8.3.1. The study area for non-designated heritage assets is defined by the Site Boundary and a 10km buffer around the Site Boundary which has been adopted to assess changes to setting on designated heritage assets.

8.4 BASELINE CONDITIONS

8.4.1. An initial desk-based study of cultural heritage records has been carried out to inform the potential for significant effects in the vicinity of the Proposed Development. The Site Boundary was used to determine the potential for effects on designated and non-designated heritage assets during construction, through physical impacts. The 10km buffer for heritage assets has been used at this stage to identify designated and non-designated heritage assets that have the potential for effects through changes within their setting. Significant effects are considered unlikely to occur outside of a 5km radius from the turbine locations, unless the significance of the heritage asset includes specific long distance landscape views or intervisibility with other heritage assets and/or landscape features.

8.4.2. Details of designated heritage assets has been gathered from information available from HES and non-designated heritage assets from the Scottish National Record of the Historic Environment (SNRHE). A gazetteer of heritage assets within the Site and the 10km study area is provided in **Appendix 8.1**.

8.4.3. The distribution of heritage assets within the Site Boundary and the 10km study area are discussed below and illustrated on **Figure 8.1 (Appendix 1)**.

DATA SOURCES

Desk Study

8.4.4. Data sources consulted for this desk-based study include:

- GIS data on World Heritage Sites, scheduled monuments, listed buildings, conservation areas, Registered Battlefields, and Gardens and Designed Landscapes obtained from HES; and
- GIS data on other, non-designated heritage assets obtained from the SNRHE which is maintained by HES.

CURRENT AND HISTORICAL BASELINE

8.4.5. There are no Registered Battlefields, conservation areas or Gardens and Designed Landscapes within the Site Boundary or 10km study area.

8.4.6. There is one listed building in proximity to the Site Boundary, Lochdhu Lodge (LB7802), which is a Category B listed building. There are 16 non-designated heritage assets within the Site Boundary on the SNRHE. These are predominantly post-medieval in date, with one 19-20th century in date, and others of unassigned date.

8.4.7. Eight listed buildings and 45 scheduled monuments were recorded within the 10km study area. Of the listed buildings, six are Category B and two are Category C; the building types include houses, lodges, bridges and churches. The scheduled monuments are predominantly prehistoric in date, comprising cairns, brochs, standing stones, and settlements. There are eight scheduled monuments of later date. Five of these are secular and include Dirlot Castle (SM5897), situated 3.6km east of the Proposed Development, two sheilings (SM5170 and SM5146) and two settlements (SM5235 and SM5480). The remaining three are ecclesiastical and include St Peter's Chapel (SM5296), St Magnus' church, burial ground and hospital (SM5413) and Creagan a'Bheannaich, chapel and graveyard (SM2660).

8.5 SCOPE OF ASSESSMENT

LIKELY SIGNIFICANT EFFECTS

8.5.1. The baseline research confirms that there are designated and non-designated heritage assets within the Site Boundary and the 10km study area, which have the potential to be affected by the Proposed Development. As a result, there could be potential physical effects on heritage assets, caused by the construction of turbines, access tracks, compounds, substation and associated infrastructure. The operation of the turbines has the potential to have significant effects on heritage assets due to changes in their setting.

8.5.2. There is potential for previously unrecorded archaeological remains to survive within the Proposed Development. These remains could be affected during excavation works at the construction phase, such as ground clearance for turbine bases, compounds, access roads and service trenches.

8.5.3. Given the potential for significant effects on heritage assets, cultural heritage is scoped into the EIA for the Proposed Development.

Table 8-1 – Elements Scoped in or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Lochdhu Lodge Grade B Listed Building	Construction and Operation	X		Potential for temporary and permanent impacts on setting.
Non-designated heritage assets	Construction and Operation	X		Physical impacts caused by the construction of turbine bases, access tracks and temporary work areas, which may cause significant effects. Where relevant, permanent impacts caused by changes in the setting of non-designated assets will also be considered, where setting contributes to asset significance.
Designated Heritage Assets within 10km (8 listed buildings and 45 scheduled monuments)	Operation	X		Potential for permanent impacts caused by changes in setting.
Designated Heritage Assets within 10km (8 listed buildings and 45 scheduled monuments)	Construction		X	These assets would not be physically impacted upon during construction and temporary impacts on setting would not be anticipated to lead to significant effects.
Registered Battlefields, conservation areas and Gardens and Designed Landscapes	Construction and Operation		X	There are no examples of these within the Proposed Development.
Temporary impacts on setting during construction	Construction		X	The temporary nature of construction impacts on changes within the setting of heritage assets would not be anticipated to lead to significant effects,
Indirect impacts on heritage assets	Construction and Operation		X	Indirect, or secondary impacts, are not anticipated due to the Proposed Development.

OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

8.5.4. Opportunities for enhancing the environment through cultural heritage can be limited. However, consideration will be given to increase knowledge of cultural heritage to local communities. This may be delivered through activities such as talks to local groups or provision of information boards, as appropriate.

8.6 PROPOSED ASSESSMENT METHODOLOGY

8.6.1. The assessment will be supported by a detailed and illustrated desk study to inform the cultural heritage baseline and will include consultation with HES and Highland Council Historic Environment Team (HCHET). The results of the desk study will be provided in an appendix to the EIA Chapter, supported by a cultural heritage gazetteer.

8.6.2. The baseline data will be informed by a review of all available archaeological records, historical documentary evidence, cartographic evidence, and photographic material. This will involve consultation of the following sources:

- GIS data on World Heritage Sites, scheduled monuments, listed buildings obtained from HES;
- GIS data on other, non-designated heritage assets obtained from the SNRHE which is maintained by HES, and from the Highland Historic Environment Record (HER);
- Readily accessible primary and secondary historical sources for information relating to the area's historical past, including past land use from The National Library of Scotland and Highland HER;
- Pre- Ordnance Survey (OS) maps of the site boundary, available online from the National Library of Scotland (NLS);
- First and subsequent editions of the OS maps of the Site Boundary, examined via the NLS;
- LiDAR datasets of the general area through NLS;
- The solid and drift geology for the Site Boundary based on that recorded by the British Geological Survey/Geological Survey of Great Britain maps; and
- The results of a walkover survey of the construction areas of the Proposed Development.

8.6.3. Effects on the cultural heritage resource will be determined by identifying the value of the heritage assets within the baseline and assessing the magnitude of any potential impacts. Mitigation measures will be recommended to minimise the impact of the proposed development on identified heritage assets, and a residual effect will be determined.

8.6.4. The determination of the value of heritage assets is based on statutory designation and/or professional judgement against the characteristics and criteria expressed in HES Designation Policy and Selection Guidance and the Historic Environment Policy for Scotland. The assessment of heritage asset value will adopt five ratings for value: very high, high, medium, low, and negligible.

Table 8.2 Criteria for Assessing the Value of Cultural Heritage Asset

Value	Example
Very High	World Heritage Sites (including nominated sites); and Assets of acknowledged international importance.
High	Scheduled Monuments (including proposed sites); Listed Buildings (Category A and B); Battlefields included within the inventory; Marine Protected Areas; Gardens and Designed Landscapes Conservation areas containing nationally important buildings; Undesignated assets of scheduled quality and importance; and Assets of national importance.
Medium	Listed Buildings (Category C); Conservation areas containing buildings that contribute significantly to its historic character; and Assets of regional importance.
Low	Assets of local importance; Assets compromised by poor preservation and/or poor survival of contextual associations; and Buildings of modest quality in their fabric or historical association.
Negligible	Assets with very little or no surviving archaeological interest; Artefact find spots (where the artefacts are no longer in situ and where their provenance is uncertain); and Poorly preserved examples of particular types of minor historic landscape features (e.g. quarries and gravel pits, dilapidated sheepfolds, etc).

8.6.5. The assessment of magnitude of impact will adopt four ratings for impacts ranging from Major, where heritage assets are fully removed, to Negligible, where there are very minor changes to the heritage asset, or within its setting.

Table 8.3 Criteria for Assessing the Magnitude of Impact on Cultural Heritage Assets

Value	Adverse	Beneficial
Major	Changes to most or all key archaeological materials or key historic building elements such that the resource is totally altered; and Comprehensive changes to setting such as extreme visual effects, gross change of noise or change to sound quality, or fundamental changes to use or access.	Preservation of a heritage asset in situ where it would otherwise be completely or almost lost; and Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated and experienced.

Value	Adverse	Beneficial
Moderate	Changes to many key archaeological materials or key historic building elements, such that the resource is clearly modified; and Considerable changes to setting that affect the character of the asset such as visual change to many key aspects or views, noticeable differences in noise or sound quality, or considerable changes to use or access.	Changes to important elements of a heritage asset's fabric or setting, resulting in its cultural significance being preserved (where this would otherwise be lost) or restored; and Changes that improve the way in which the heritage asset is understood, appreciated and experienced.
Minor	Changes to key archaeological materials or key historic building elements, such that the asset is slightly altered; and Slight changes to setting such as slight visual changes to few key aspects or views, limited changes to noise levels or sound quality, or slight changes to use or access.	Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed; and Changes that result in a slight improvement in the way a heritage asset is understood, appreciated and experienced.
Negligible	Very minor changes to archaeological materials, historic buildings elements, or setting; and Very minor changes to setting such as virtually unchanged visual effects, very slight changes in noise levels or sound quality, or very slight changes to use or access.	Very minor changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed; and Very minor changes that result in a slight improvement in the way a heritage asset is understood, appreciated and experienced.
No Change	Changes to fabric or setting that leave significance unchanged.	

8.6.6. The effects will be assessed by taking account of the predicted magnitude of impact and the value of the receptor, that follows closely to the guidance provided within the Environmental Impact Assessment Handbook (2018[97]).

[97] Scottish Natural Heritage, 2018 Environmental Impact Assessment Handbook

Table 8.4 Significance of Effects

Value	Magnitude of Impact				
	Major	**Moderate**	**Minor**	**Negligible**	**No Change**
Very High	**Very Large**	**Large or Very Large**	**Moderate or Large**	Slight	Neutral
High	**Large or Very Large**	**Moderate or Large**	**Moderate** or Slight	Slight	Neutral
Medium	**Moderate or Large**	**Moderate**	Slight	Neutral or Slight	Neutral
Low	Slight or **Moderate**	Slight	Neutral or Slight	Neutral or Slight	Neutral
Negligible	Slight	Neutral or Slight	Neutral or Slight	Neutral	Neutral

RELEVANT LEGISLATION AND GUIDANCE

8.6.7. The assessment of potential effects on heritage assets within the baseline will be carried out in accordance with the standards set by the Chartered Institute for Archaeologists (CIfA), and follow the methodology contained within the Environmental Impact Assessment Handbook (2018[98]) published by Scottish Natural Heritage (now NatureScot) and HES.

8.6.8. The following national legislation and guidance forms the background against which the assessment has been made:

- Scotland National Planning Framework 4 (2023[99]);
- Planning Advice Note (PAN) 2/2011: Planning and Archaeology (2011[100]);
- Town and Country Planning (Scotland) Act 1997[101];
- The Historic Environment Scotland Act 2014[102];
- Historic Environment Policy for Scotland (2019)[103];

[98] Scottish Natural Heritage, 2018 Environmental Impact Assessment Handbook

[99] Scottish Government, 2023 Fourth National Planning Framework 2023. Available at: https://www.gov.scot/publications/national-planning-framework-4/pages/3/

[100] Scottish Government, 2011 Planning Advice Note (PAN) 2/011: Planning and Archaeology

[101] UK Government, 2017 The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017

[102] Scottish Government, 2014 The Historic Environment Scotland Act 2014

[103] Scottish Government, 2019 Historic Environment Policy for Scotland (HEPS)

- Ancient Monuments and Archaeological Areas Act 1979[104]; and
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[105].

SURVEY METHODOLOGY

8.6.9. The walkover survey to be undertaken within the Site Boundary will be limited to turbine locations and access tracks, in order to assess the known heritage assets and to assess the potential for previously unrecorded archaeological remains. Heritage assets where their setting contributes to their significance, and which are deemed to have their setting impacted as shown on the Zone of Theoretical Visibility (ZTV), will be visited only if they are publicly accessible.

MITIGATION

8.6.10. Mitigation measures would typically take the form of demarcation and avoidance of heritage assets within the Site, to remove the potential for direct physical impacts. Where avoidance cannot be achieved then mitigation would take the form of archaeological recording through survey and/or excavations, to preserve the archaeological remains by record. Any archaeological investigations recommended would require the approval of the HCHET.

8.6.11. Mitigation to screen the proposed development where there are impacts to the setting of heritage assets, would not be feasible, although design considerations will be considered to minimise or reduce impacts where possible.

[104] UK Government, 1979 The Ancient Monuments and Archaeological Areas Act 1979

[105] UK Government, 1997 Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997

9 HYDROLOGY, HYDROGEOLOGY AND PEAT

9.1 INTRODUCTION

9.1.1. This chapter presents the proposed scope and approach to the assessment of likely significant effects arising from the Proposed Development upon the Water Environment. It includes consideration of geology (including peat), hydrology (including flood risk) and hydrogeology (including ground conditions).

9.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development Description** and with respect to relevant parts of other technical chapters, such as **Chapter 5: Terrestrial Ecology**, **Chapter 7: Landscape and Visual** and **Chapter 12: Climate Change.**

9.2 CONSULTATION

9.2.1. Pre-application consultation was conducted with The Highland Council (THC) in 2020 as described in Chapter 4 of this Scoping Report and set out in **Appendix 4**. Following on from this, further consultation will be conducted as described below.

9.2.2. The Scottish Environment Protection Agency (SEPA) and THC will be approached for 'freedom of information' environmental data. The Caithness District Salmon Fishery Board (CDSFB) will also be consulted along with Marine Scotland Science (MSS). MSS will be asked to confirm that proposals meet with their specific guidance relating to hydrology, such as that pertaining to water quality description and potential impacts, relevant mitigation measures, potential cumulative effects and monitoring.

9.2.3. Other stakeholders will also be approached during the consultation process as appropriate.

9.3 STUDY AREA

9.3.1. A detailed description of the Development Site is included in **Chapter 2: Site Context and Proposed Development Description**. The data for this chapter has been gathered with respect to a defined Study Area. The Study Area is focussed on the Development Site and a 2 km buffer area immediately beyond it (**Figure 9.1 (Appendix 1)**). Data for beyond the Study Area have also been collected where catchment areas for distant water features may intersect the Study Area, such as those relating to downstream watercourses and associated downstream flood risk areas and conservation sites.

9.4 DATA SOURCES

9.4.1. Online available sources of information have been used to define the baseline conditions on which the assessment scope has been based (e.g. data from record centres, internet searches, etc.).

DESK STUDY

9.4.2. The desk study data sources for the assessment are provided in **Table 9-1**.

Table 9-1 - Sources of Desk Study Information for Geology, Hydrology and Hydrogeology

Source (Accessed September 2024)	Data
Ordnance Survey (OS) maps: ▪ OS 1:50,000, Landranger Sheets 11 Thurso & Dunbeath ▪ OS 1:25,000, Explorer Sheet 449: Strath Halladale & Strathy Point, OS 1:25,000, Explorer Sheet 450: Wick & Flow Country ▪ OS 1;10,000 Raster map (Bing Maps)	Topography and features
Centre for Ecology and Hydrology (CEH) National River Flow Archive (NRFA): National River Flow Archive (ceh.ac.uk) Gauging Station data: Thurso at Halkirk: NRFA Station Data for 97002 – Thurso at Halkirk (ceh.ac.uk) Rainfall data: Weather and climate change - Met Office Climate station data at Wick John O Groats Airport: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfmu99nxj	Climate
British Geological Survey (BGS) datasets: ▪ BGS Hydrogeological Map of Scotland (1:625,000) (1988) ▪ BGS GeoIndex (onshore) (1:50,000) ▪ BGS 1:50,000 geological map series Solid and Drift – Sheet 109, Achetoul (1957) ▪ BGS 1: 63,360 geological map series Solid – Sheet 115, Reay (1898) ▪ BGS/Natural Environment Research Council (NERC). A GIS of Aquifer Productivity in Scotland. Explanatory Notes. Commissioned Report CR/04/047N_SEPA ▪ BGS Aquifer classification map layer on Scotland's Environment website: Map | Scotland's environment web ▪ SEPA/BGS/Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) Vulnerability of Groundwater in the Uppermost Aquifer (Scotland)	Geology, ground conditions and hydrogeology
National Soil Map of Scotland (Macaulay Institute for Soil Research): Home | Scotland's soils (https://soils.environment.gov.scot/)	Soils and peat
River Network Map - CEH NRFA: National River Flow Archive (ceh.ac.uk) UK CEH NRFA: Gauge 97002: NRFA Station Mean Flow Data for 97002 – Kinbrace, Hatchery (ceh.ac.uk)	Hydrology and flows
SEPA flood map: http://map.sepa.org.uk/floodmap/map.htm Landmark 1 in 75, 1 in 100 and 1 in 1000-year flood maps	Flood risk

Source (Accessed September 2024)	Data
Scottish Government (SGt) The River Basin Management Plan for Scotland River Basin District 2015-2027 SGt interactive mapping Map | Scotland's environment web SEPA interactive mapping facility for the Scotland River Basin Management Plan (RBMP): https://www.sepa.org.uk/data-visualisation/water-environment-hub/?riverbasindistrict=Scotland Water Classification Hub: https://www.sepa.org.uk/data-visualisation/water-classification-hub/ SEPA data request: information on river water quality	RBMP and water quality
SEPA data requests: information on locations of CAR licences and abstraction licences THC data request: PWSs ▪ SGt Maps of the Drinking Water Protected Areas (DWPAs, Scotland) ▪ Licenced sites data download from SEPA website: Environmental data | Scottish Environment Protection Agency (SEPA)	Abstractions and discharges
NatureScot information on protected areas: https://sitelink.nature.scot/ Ecology surveys - as per **Chapter 5: Terrestrial Ecology**	Wetlands and peatlands

FIELD SURVEYS

9.4.3. No field surveys have been carried out to inform the Scoping Report. Field surveys will be undertaken following Scoping to inform the EIA Report and in line with responses received from consultees.

9.5 BASELINE CONDITIONS

CURRENT BASELINE

A summary of the baseline conditions of the Study Area are provided in the following sections.

Topography

9.5.1. The Proposed Development is situated southeast of Altnabreac railway station, on the Far North Railway Line, approximately 24 km southwest of Thurso. The Altnabreac area, situated within the Caithness Hills, is characterised by gently sloping hills and moorlands that generally lie below 200 metres Above Ordnance Datum (mAOD). The Development Site includes occasional lochs to the north and south of the Sleach Water, which flows eastward from Altnabreac Station into Loch More.

Rainfall

9.5.2. The local area has an average annual rainfall of 793 mm / year (1991 – 2020), as recorded at the Wick John O'Groats Airport, approximately 32 km east of the Development Site. This is low compared to the average rainfall of 1701 mm / year over the same time period for Northern Scotland and is due to the eastern location and relatively low elevation of 36 mAOD of the climate station. The annual rainfall of the Development Site is expected to be higher than the climate station as the site is located further inland and at a higher elevation. This is confirmed by SEPA rainfall data provided by the gauge at Halkirk[106] (station number 234231) at National Grid Reference (NGR) 31312 959561, approximately 14 km northeast of the Development Site, which gave an average rainfall of 908 mm / year for the period 2015 – 2023.

Geology

9.5.3. The generalised bedrock geology and superficial deposits within the Development Site are shown in **Figure 9.2** and **Figure 9.3** respectively to illustrate the geology described below.

Bedrock geology

9.5.4. The BGS 1:50,000 and 1:63,360 geological maps indicate that the predominant bedrock geology underlying the Development Site comprises the Moine Supergroup of semipeltic metamorphic rock. A band of Lower Old Red Sandstone encroaches the northeastern extent of the main Proposed Development Area (that part of the Development Site with planned infrastructure), comprising a coarsening-upwards succession of proximal alluvial channel strata comprising conglomerate, sandstone, siltstone and mudstone strata. Lower Old Red Sandstone also underlies the non-turbine development area to the northwest of Loch More, comprising lacustrine flags, fluvial sandstone and conglomerates. The non-turbine development area to the northeast of Loch More is underlain by Middle Old Red Sandstone, comprising the Caithness Flagstone Group of alternating beds of mudstone, limestone, siltstone and sandstone.

Superficial deposits

9.5.5. The BGS 1:50,000 map indicates that the entire Development Site, including proposed turbine and non-turbine development areas, is underlain by peat deposits. Alluvial deposits are mapped following the channel of the River Thurso, approximately 650 m south of the main Proposed Development Area. These deposits comprise unconsolidated clay, silt, sand and gravel.

[106] SEPA rainfall data Halkirk gauge (2024), available at: https://www2.sepa.org.uk/rainfall//data/index/234231

Local boreholes

9.5.6. The BGS GeoIndex indicates that several boreholes have previously been completed in the western extent of the main Proposed Development Area. They show ~2.7 - 5.7 m of sands and gravels overlying granite. Peat is noted at the surface in one location, extending to 1.0 m depth. Localised thin veneers (0.1 - 0.3 m) of Made Ground are present. A copy of the BGS borehole logs is presented in **Appendix 9-1**.

Geosites

9.5.7. No locally or nationally important geological or geomorphological sites (Geosites) are present in the Study Area.

Soils and land use

9.5.8. The Development Site is within a rural area with only a few buildings / properties. These include the Altnabreac railway station, 'Keepers Cottage' and a number of other cottages and buildings to the north of the site, Lochdhu Lodge on the eastern shore of Loch Dubh and several properties at Dalnawillan to the south of the Development Site.

9.5.9. Land cover consists of heath, grassland, bog, coniferous plantation woodland and some agricultural land. The predominant soil cover of the Development Site is peaty soils. Scotland's Soils Environment Webmap[107] indicates that much of the Development Site comprises organic soils of dystrophic blanket peats, with a central band of Countesswells comprising peaty gleyed podzols with dystrophic blanket peat and limited areas of Arkaig soils in the north, east and south of the Development Site comprising peaty gleys with dystrophic blanket peat and peaty gleyed podzols.

Peat

9.5.10. Peat deposits are present across the entire Development Site, with the eastern extent comprising Class 1 Peat and the majority in central and western areas comprising Class 5 Peat. Class 1 Peat is defined as nationally important carbon-rich soils, deep peat and priority peatland habitat, and its areas of coverage are likely to be of high conservation value. Class 5 Peat is defined as not having indicative peatland vegetation, nor having peatland habitat recorded. These areas may include areas of bare soil, and soils are likely to be carbon-rich and may contain deep peat. Both peat classifications can be defined as dystrophic blanket peats overlying the bedrock lithologies (NatureScot, 2019a). Dytrosphic blanket peats are poor drained, partly confined, acidic and nutrient poor soils with no mineral within 50 cm of the surface.

[107] Scotland's Soils Environment Webmap (2024), available at: https://map.environment.gov.scot/Soil_maps

9.5.11. An interpolated peat depth map provided by Atmos Consulting Limited (Ref: TL01, 40406/GY/113a, 26/01/2021, see **Appendix 9.2**) indicates that peat depths range from <0.5 - >3 m across the Proposed Development Area. No information is available for the non-turbine development areas. In the southern half of the Development Site peat depths range from 0.5 - >3 m depth with small, isolated pockets where peat is absent. The northern half of the Development Site is similar, but with larger areas of no peat, particularly around the central portion of Sleach Water and to the north and east of Lochan Croc nan Lair.

9.5.12. All proposed turbine locations are indicated to be situated over peat deposits ranging from <0.5 – >3.0 m thick except for Turbine 15, where peat is determined to be absent.

Hydrogeology

9.5.13. The bedrock underlying the majority of the Development Site is classified as comprising a 2c, low productivity aquifer[108], where flow is virtually all through near-surface fractures and other discontinuities. As a result, the bedrock can locally yield only small amounts of groundwater, with short and localised flow paths in the weathered zone. Superficial deposits across the Development Site do not constitute a significant aquifer even within the alluvial sands and gravels, which are limited in extent.

Hydrology

General description

9.5.14. There are numerous lochs in the surrounding area including Loch Dubh, Loch nam Fear, Lochan Croc nan Lair, Loch Calse, Grassie Loch, Garbh Loch, Loch Gaineimh and Loch More. The Development Site lies within the River Thurso catchment (412.8 km^2), with a network of rivers and tributaries flowing to the east through the Development Site. Drainage comprises primarily the River Thurso which connects to many of the lochs and Sleach Water which flows eastward through the centre of the Site from Altnabreac and discharges into Loch More. Public water supply is taken from Loch Calder, approximately 11 km north of the Development Site. Loch Calder would naturally drain into both the Thurso and Forss catchments, but the outlet to Forss to the north is blocked by a barrage and the outflow is to the north into the Forss Water via the Alltan Ghuinne.

River flow gauges

9.5.15. The nearest river gauging station is on Thurso Water at Halkirk (No. 97002, NGR 3131 9595), approximately 11 km to the northeast of the Development Site. This gauge has a flow record covering the period 1972 - 2023. The river catchment is 412.8 km^2 in area and has a mean flow of 8.953 m^3/s and baseflow index (BFI) of 0.46.

[108] A "2C" signifies an aquifer with moderate to low productivity with a low productivity aquifer wells typically yielding less than 100 cubic metres per day (m^3/d).

Water Framework Directive water bodies

9.5.16. The Water Framework Directive (WFD) groundwater and surface water bodies identified within the Study Area and their SEPA classification of overall status are shown within **Table 9-2.**

Table 9-2 – Water Framework Directive Water Bodies

Water Body name	Type	ID	Catchment	Classification – Overall Status (2022)
Northern Highlands	Groundwater	150701	Scotland River Basin District (RBD)	Good
Caithness	Groundwater	150692	Scotland RBD	Good
Sleach Water	River	20650	River Thurso	Moderate
River Thurso - source to Loch More	River	20638	River Thurso	Good
River Thurso - Loch More to sea	River	20637	Scotland RBD	Good
Burn of Olgrinbeg	River	20645	River Thurso	Good
Allt Backlass	River	20651	River Thurso	Good
Loch More	Lake	100035	River Thurso	Moderate

WFD groundwater bodies

9.5.17. The Development Site is predominantly located on the Northern Highlands WFD groundwater body which is classified as having Good overall status. The easternmost land parcel of the Development Site is located over the Caithness WFD groundwater body which is also classified as having Good overall status.

WFD surface water bodies

9.5.18. The WFD surface water bodies lie within the Scotland RBD which covers much of Scotland. Sleach Water flows west to east through the centre of the Development Site and discharges to Loch More. River Thurso (source to Loch More) and Allt Backlass are located to the southeast of the Development Site and also discharge into Loch More. Loch More discharges, in turn, into the River Thurso (Loch More to sea). The Burn of Olgrinberg is located to the northeast of the Development Site and discharges into River Thurso (Loch More to sea) further downstream of Loch More.

9.5.19. The River Thurso (source to Loch More), River Thurso (Loch More to sea) and Allt Backlass all achieved Good WFD overall status in 2022. However, Sleach Water and Loch More have Moderate overall status as of 2022, due to the concentration of nutrients in the water bodies being higher than the environmental standards set for Good status.

Drinking Water Protection Areas

9.5.20. The Development Site's easternmost land parcel is situated within a Surface Water Drinking Water Protected Area[109] (DWPA) in the Scotland RBD, with the rest of the Development Site being situated upstream of the DWPA. However, it should be noted that the Development Site is predominantly within the catchment of Loch More which discharges into the River Thurso at the DWPA boundary.

9.5.21. All the WFD groundwater bodies are groundwater DWPAs. The site is not within or in close proximity to any Nitrate Vulnerable Zones[110] (NVZs).

Abstractions

CAR licenses

9.5.22. The Scotland Environment Webmap[111] indicates there are several CAR licenses within the Study Area, including the following:

- Loch More impoundment (CAR/L/1036144);
- Culvert replacement for Deer Pass (CAR/R/5007828) - structure removal; and
- Station Cottage (PSTS/9e8c42) - point source - existing primary sewage treatment system (PSTS).

9.5.23. Other licensed abstractions are suspected in the area, and CAR license locations and other relevant information will be requested from SEPA prior to the formulation of the EIA.

Private water supplies

9.5.24. THC Open Map Data provides details of known PWSs and indicates multiple PWSs within the Study Area. Details of the supplies are provided in **Table 9-3**.

9.5.25. It is noted that BGS GeoIndex indicates that a water well at the Badnaheen (Keepers) Cottage was drilled in 2021 (NGR 300289 945287) to a depth of 55 metres below ground level (mbgl) and screened from 26.5 mbgl to the bottom of the hole within granite and semipelite rocks. During drilling water was struck at 3.6 and 13.10 mbgl. Another borehole log is located 1.27 km to the southwest of the Badnaheen Cottage, drilled to 75 mbgl and screened from 37.95 mbgl within semipelite rocks. During drilling water was struck at 3.0 and 10.7 mbgl.

[109] Surface Water Drinking Water Protected Area (2024), available at: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/

[110] Nitrate Vulnerable Zones (2024), available at: https://www.gov.scot/policies/agriculture-and-the-environment/nvz/

[111] The Scotland Environment Webmap (2024), available at: https://map.environment.gov.scot/sewebmap/

Table 9-3 – Highland Council PWSs in the Study Area

PWS Name	Easting	Northing	Classification	Address	Type A Reason	Source Type
Altnabreac	300353	945505	FA1	Altnabreac, Halkirk, KW12 6UR	Holiday Let	Spring
Badnaheen	299431	944248	FA1	Badnaheen, Altnabreac, Halkirk, KW12 6UR	N/A	Spring
Dalnaha	306800	943900	FB1	Strathmore, Westerdale, Caithness	Domestic	Surface - Watercourse
Dalnawillan	303000	940900	FB1	By Halkirk	Domestic	Well
Keepers Cottage	300248	945275	FA1	Altnabreac, Halkirk, KW12 6UR	Holiday Let	Borehole
Lochdhu Lodge	301100	944200	FB1	Lochdhu Lodge, Altnabreac	Domestic	Borehole

9.5.26. PWS information will be formally requested from THC prior to the formulation of the EIA.

Conservation sites

9.5.27. The NatureScot[112] webmap shows a number of conservation sites of varying designations surrounding the Development Site. Details of all the conservation sites can be found within **Table 5-3** of the **Terrestrial Ecology** chapter and are summarised below:

- Caithness and Sutherland Peatlands SAC surrounds the Development Site;
- Caithness and Sutherland Peatlands Ramsar site surrounds the Development Site;
- River Thurso SAC extends through centre of Development Site (Sleach Water) and further northeast and southwest;
- Flow Country World Heritage Site (WHS) surrounds the Development Site;
- Loch Caluim Flows Site of Special Scientific Interest (SSSI) underpins the Caithness and Sutherland Peatlands SAC designation and extends immediately northwest of the Development Site;

[112]The Nature Scot Webmap, available at: https://sitelink.nature.scot/map

- Strathmore Peatlands SSSI underpins the Caithness and Sutherland Peatlands SAC designation and extends immediately northeast and east of the Development Site;
- Rumsdale Peatlands SSSI underpins the Caithness and Sutherland Peatlands SAC designation and extends immediately southwest of the Development Site;
- Sletill Peatlands SSSI; underpins the Caithness and Sutherland Peatlands SAC designation and extends immediately northwest of the Development Site; and
- Forsinard Flows National Nature Reserve (NNR) extends immediately west of the Development Site.

Groundwater Dependent Terrestrial Ecosystems

9.5.28. The nature of the local environment suggests that Groundwater Dependent Terrestrial Ecosystem (GWDTE) habitats will occur within the Development Site area. These habitat areas will be identified by an ecology habitat and National Vegetation Classification (NVC) survey after which the groundwater dependency of the GWDTE habitats will be assessed.

Flood risk

Fluvial

9.5.29. According to SEPA flood risk mapping (see **Figure 9.4**), there are multiple areas of significant fluvial flood risk associated with the watercourses which flow through the Study Area, including the following:

- A fluvial flood plain associated with Sleach Water, which flows east across the centre of the Development Site. The flood plain is up to ~100 m wide and is within 200 m of the proposed site infrastructure (e.g., turbine location ALT-09);
- A fluvial flood plain associated with the River Thurso (upstream of Loch More), which flows southwest to northeast, in close proximity (~550 m) to the southern Development Site boundary. The fluvial flood plain is up to ~340 m wide; and
- A significant area of fluvial flood plain between Loch Gaineimh and Loch More, along the eastern boundary of the main Development Area. The area is up to ~500 m wide.

9.5.30. The smaller watercourses and tributaries also have mapped areas of fluvial flood risk, but these areas are reasonably limited in extent, being located in close proximity to the watercourses and restricted by topography.

Surface water

9.5.31. The SEPA flood risk mapping indicates that surface flood risk is prevalent across the Development Site, but many of the areas at risk of surface water flooding are associated with forestry access tracks.

9.6 SCOPE OF ASSESSMENT

GENERAL APPROACH

9.6.1. The scope of the assessment will be informed by legislation, national and local policy and guidance which is set out later in this Scoping Report.

9.6.2. The assessment will focus on key hydrological and hydrogeological receptors that could be affected by the construction, operation and potentially decommissioning of the Proposed Development. Receptors have been identified by reviewing all available baseline information within the Study Area and also by determining any intersecting catchments of distant water features, such as those relating to downstream watercourses and associated downstream flood risk areas and conservation sites.

POTENTIAL RECEPTORS

9.6.3. Receptors that could be significantly affected by the Proposed Development and that therefore need to be taken forward for further consideration in the EIA are identified within the baseline description above and are 'scoped in' within **Table 9-4** and also **Figure 9.5** when their location is known. Additionally, receptors identified within the baseline that have been 'scoped out' of further assessment on the basis of their value / sensitivity and / or lack of hydraulic connectivity are also detailed.

Table 9-4 – Elements Scoped In or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Geology (geodiversity)	Construction		X	No permanent damage to locally or nationally important Geosites is possible because they are not present on the Development Site. Scoped out.
Peat	Construction	X		Class 1 and 5 Peat present across the Development Site. For example, all proposed turbine locations are indicated to be situated over peat deposits ranging from <0.5 – >3.0 m thick, with the exception of Turbine 15, and therefore potential during construction for peat damage. Scoped in.
WFD groundwater bodies: - Northern Highlands - Caithness	Construction and operation	X		The WFD groundwater bodies have Good overall status and underlie the Development Site. Pollutants and sediments from construction and operation for instance may detrimentally affect WFD statuses. Scoped in.
WFD river water bodies: - Sleach Water - River Thurso source to Loch More - River Thurso Loch More to sea - Burn of Olgrinbeg	Construction and operation	X		Watercourses are downstream of the proposed works. Pollutants and sediments from construction and operation for instance may affect WFD statuses. Scoped in.

Element	Phase	Scoped In	Scoped Out	Justification
WFD river water bodies: - Allt Backlass	Construction and operation		X	Catchment divide between proposed works and watercourse. Proposed works are unlikely to affect WFD status. Scoped out.
WFD lake water bodies: - Loch More	Construction and operation	X		The Development Site sits within the catchment of Loch More, as such pollutants and sediments from construction and operation for instance may detrimentally affect WFD status or prevent water body from achieving Good overall status. Scoped in.
Other loch water bodies	Construction	X		High number of loch water bodies throughout the Study Area. For example, lochs and lochans could be detrimentally affected by pollutants and sediments during construction and operation. Scoped in.
Water abstractions (licensed abstractions and PWSs)	Construction	X		Locations of abstractions are to be confirmed, and for instance any pollutants and sediments during construction and operation could detrimentally affect supplies. Scoped in.
Caithness and Sutherland Peatlands SAC and its constituent SSSIs (Loch Caluim Flows SSSI, Strathmore Peatlands SSSI, Rumsdale Peatlands SSSI, Sletill Peatlands SSSI), Caithness and Sutherland Peatlands Ramsar site	Construction and operation	X		Partially overlaps and surrounds Development Site, and for instance any pollutants and sediments during construction and operation could detrimentally affect the conservation sites. Scoped in.
River Thurso SAC	Construction and operation	X		Present within the Development Site, and for instance any pollutants and sediments during construction and operation could detrimentally affect the conservation site. Scoped in.
Flow Country WHS	Construction and operation	X		The Flow Country WHS surrounds the Development Site and for instance during construction and operation water supply could detrimentally affect the reasoning for its inscription. Scoped in.
GWDTEs	Construction and operation	X		Locations of GWDTEs have not yet been identified and for instance any pollutants and sediments during construction and

Element	Phase	Scoped In	Scoped Out	Justification
				operation could detrimentally affect any GWDTEs. Scoped in.
Fluvial flood risk	Construction and operation	X		Significant areas of flood risk throughout the Study Area adjacent to watercourses and in close proximity to proposed works. Scoped in.
Surface water flood risk	Construction and operation		X	Surface water flood risk is predominantly linked to isolated pockets associated with current forestry infrastructure. Scoped out.

9.6.4. Risks associated with the remobilisation of land contamination are currently scoped out based on the nature and history of the land use on the site. However, a desk-based review, including ground condition and contamination constraints maps and a Phase 1 Geoenvironmental Desk Study, will be undertaken to confirm site conditions.

LIKELY SIGNIFICANT EFFECTS

9.6.5. The likely significant hydrological and hydrogeological effects that will be taken forward for assessment in the EIA are summarised in **Table 9-5**.

Table 9-5 – Likely Significant Geology, Hydrology and Hydrogeology Effects

Activity	Effects	Receptors
Excavation of turbine foundations and borrow pits	Ground disturbance leads to sediment loading and / or the remobilisation of existing contamination resulting in the pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works. Excavation and fill leads to disruption of surface and near-surface flow paths and changes to the drainage regime, most typically increased run-off. Dewatering interception of groundwater leading to a loss of water resource and disruption of groundwater support (baseflow) to watercourses and GWDTEs.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Laydown of construction compounds	Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works.	Peat.

Activity	Effects	Receptors
	Reduced infiltration capacity results in increased run-off, and reduced recharge to groundwater, leading to loss of water resource and disruption of baseflow to watercourses and GWDTEs.	Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Forest felling and land clearance	Forest felling and associated ground disturbance leads to sediment and nutrient loading and / or the remobilisation of existing contamination resulting in the pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works. Disruption of surface and near-surface flow paths and changes to the drainage regime, most typically increased run-off. It also leads to a breakdown of peat structure and disturbance of peat hydrology.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Peat working	Ground disturbance leads to sediment loading and / or the remobilisation of existing contamination resulting in pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works. Peat disturbance leads to disruption of surface and near-surface flow paths and changes to the drainage regime, most typically increased run-off. It also leads to breakdown of peat structure and disturbance of peat hydrology.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs).

Activity	Effects	Receptors
		Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Material stockpiling / removal	Ground disturbance leads to sediment loading and / or the remobilisation of existing contamination resulting in pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Watercourse crossings	Bank and bed disturbance leads to sediment loading, changes in morphology and pollution of watercourses. Contamination of watercourses due to accidental release of pollutants during works.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Track and crane pad placement	Ground disturbance leads to sediment loading and / or the remobilisation of existing contamination resulting in the pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water,

Activity	Effects	Receptors
	Disruption of surface and near-surface flow paths and changes to the drainage regime, most typically increased run-off. Dewatering interception of groundwater leading to a loss of water resource and disruption of groundwater support (baseflow) to watercourses and GWDTEs.	River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Control building, substation and battery storage facility placement	Ground disturbance leads to sediment loading and / or the remobilisation of existing contamination resulting in the pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during works. Disruption of surface and near-surface flow paths and changes to the drainage regime, most typically increased run-off.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Surface Water DWPA. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.
Operational facilities and activities	Exposed ground leads to continued sediment loading and / or the remobilisation of existing contamination resulting in the pollution of watercourses. Contamination of soils, surface waters and groundwater due to accidental release of pollutants during maintenance activities. Contamination of soils, surface waters and groundwater due to chemical leaks and concrete leaching. Continuation of flow disruption, reduced infiltration capacity and peat disruption effects.	Peat. Groundwater within bedrock and associated Northern Highlands and Caithness WFD groundwater bodies. Watercourses and associated WFD surface water bodies (Sleach Water, River Thurso source to Loch More, River Thurso Loch More to sea, Burn of Olgrinbeg and Loch More). Other loch water bodies. Water abstractions (licensed abstractions and PWSs). Water conditions supporting conservation sites, including GWDTEs and the Flow Country WHS. Fluvial flood risk.

9.6.6. The main potential hydrological / hydrogeological impacts associated with the Proposed Development relate to the construction phase, in particular from tracks and watercourse crossings. The EIA will identify the location and the nature of the impact from this construction and upgrading activities, in particular the potential for the generation of silt-laden runoff and pollution. It will then prescribe measures to be adopted during construction to mitigate against negative impacts on the water environment.

9.6.7. Other activities of relevance include the construction of wind turbine foundations and crane pads, the control building, the substation and the battery storage facility. The impacts from these activities, such as the leaching of concrete residues to the water environment and changes in the runoff / recharge characteristics, will also be addressed in the EIA. Again, mitigation measures will be outlined that will reduce negative impacts.

9.6.8. The need and potential for borrow pits and stockpiling will be explored and if required their impacts will also be assessed.

9.6.9. Impacts during decommissioning are likely to be similar to those during the construction phase but will depend on the exact nature of the decommissioning activities that take place. However, it is likely that the ground disturbance will be much less. Mitigation similar to that implemented during the construction and operational phases (updated to reflect changes in legislation / guidance) will also help ensure that the significance of such impacts is minimised, and it is therefore currently proposed that consideration of decommissioning effects is 'scoped out' of the EIA.

OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

9.6.10. Throughout the ongoing design process, opportunities to deliver positive effects for hydrology and hydrogeology will be explored. An assessment of positive effects will be incorporated into the EIA Report chapter.

9.6.10.1 THC's pre-application advice recommended that peatland restoration be delivered in areas which are not to be reforested. The restoration of forestry to blanket bog has been successful across land at the nearby Forsinard Flows.

9.7 PROPOSED ASSESSMENT METHODOLOGY

GENERAL APPROACH

9.7.1. The generic project-wide approach to the assessment methodology is set out in **Chapter 4: Approach to EIA**. The section presented here describes how this methodology will be applied, and adapted as appropriate, to address the specific needs of the geology, hydrology and hydrogeology assessment.

9.7.2. The EIA Report chapter will summarise the findings of the desk study, field surveys and consultation, these together forming the baseline against which the potential impact of the Proposed Development, alone and cumulatively with other wind farm developments, will be assessed. The peat surveys will also inform a Peat Landslide Risk Assessment (PLRA).

9.7.3. The significance of the effects resulting from the Proposed Development will be primarily determined by the value of a given water feature and the magnitude of change. In terms of the hydrology and hydrogeology, the key types of effects relate to water quantity (level and flow) and quality. However, depending on the effects on surface water flows, there may also be effects on immediate and downstream morphology and sediment dynamics and flood risk.

9.7.4. In the assessment all mitigation considered necessary will be identified and residual effects with this mitigation in place will be determined. It is intended that no residual significant effects will remain following adoption of the proposed mitigation, but whether this is achievable will be investigated as part of the EIA.

RELEVANT LEGISLATION AND GUIDANCE

Legislation

9.7.5. The key legislation relating to geology, hydrology and hydrogeology that will be considered in this assessment include the following (in chronological order, oldest first):

- Control of Pollution Act 1974 (as amended);
- Agriculture Act 1986;
- Environment Protection Act 1990;
- Water Resources Act 1991;
- Environment Act 1995;
- Pollution Prevention and Control Act 1999;
- Water Environment and Water Services (Scotland) Act 2003 (WEWS), as amended by the Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019 (the 'Environment Regulations 2019');
- Landfill (Scotland) Regulations 2003 (as amended);
- Water Environment (Register of Protected Areas) (Scotland) Regulations 2004;
- Nature Conservation (Scotland) Act 2004;
- Private Water Supplies (Scotland) Regulations 2006;
- Environmental Liability (Scotland) Regulations 2009, as amended by the Environment Regulations 2019;
- Flood Risk Management (Scotland) Act 2009;
- Water Quality (Scotland) Regulations 2010;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011 ('CAR') (as amended);
- Waste Management Licensing (Scotland) Regulations 2011;
- Pollution Prevention and Control (Scotland) Regulations 2012;
- Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013;

- Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013;
- Water Act 2014;
- Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017; and
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, as amended.

9.7.6. The requirements of various EU Directives such as the Water Framework Directive (WFD) (2000/60/EC), the European Liability Directive (2004/35/EEC) and the Groundwater Daughter Directive (2006/118/EEC) have been transposed into domestic legislation by WEWS 2003, as amended by the Environment Regulations 2019. The above legislation establishes a legal framework for the protection, improvement and sustainable use of surface waters, transitional waters, coastal waters and groundwater resources.

9.7.7. The regulation of activities relating to the water environment is implemented through CAR. This covers activities including abstraction, discharges, impoundments and engineering works that could impact on a watercourse. Depending on the size and nature of the activity, General Binding Rules (GBRs) need to be followed, the activity registered, or a full licence obtained.

Planning Policy Context

9.7.8. The Scottish Ministers adopted and published National Planning Framework 4[113] (NPF4) on 13 February 2023. It contains policies with relevance to this geology, hydrology and hydrogeology assessment, including Policy 22 (sustainable drainage systems, SUDS), and provides support for renewable technologies, such as wind farms via Policy 11.

9.7.9. National planning policy is supported by Planning Circulars, Planning Advice Notes (PANs) and Specific Advice Sheets (SASs), and by Ministerial / Chief Planning Letters to Planning Authorities, which set out detailed advice from the SGt in relation to planning issues.

9.7.10. The following publications are also relevant to this assessment:

- The Carbon and Peatland Map 2016, published by Scottish Natural Heritage (SNH, now NatureScot) on 29th June 2016, which identifies areas considered likely to host Scotland's nationally important resource of deep peat, carbon rich soils and priority peatlands habitats; and

[113] Scottish Government (2023). National Planning Framework 4 (NPF4). Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4-revised-draft.pdf

- SGt's draft Peatland and Energy Policy Statement (June 2016), which provides the basis from which the SGt and its agencies will act in developing and implementing policies in relation to peatland and energy.

Development Plan Policies

9.7.11. A number of policies relevant to geology, hydrology and hydrogeology are also found within THC LDP, including the following:

- Policy 55 – Peat and Soils;
- Policy 58 – Protected Species;
- Policy 62 – Geodiversity;
- Policy 63 - Water Environment;
- Policy 64 – Flood Risk;
- Policy 65 – Waste Water Treatment;
- Policy 66 – Surface Water Drainage; and
- Policy 67 – Renewable Energy Developments.

9.7.12. The CaSPlan identifies the Flow Country as a Special Landscape Area and the Caithness and Sutherland area as having substantial onshore wind renewable energy resource.

Guidance

9.7.13. Relevant policy and general guidance utilised includes the following (in alphabetical order, by lead author organisation and then report number or chronological, oldest first):

- British Standards:
  - BS6031: 2009 Code of Practice for Earth Works (2009)[114];
  - BS59302:199+A22010 Code of Practice for Site Investigations (2010);
  - BVS10175:2011 Code of Practice for Investigation of Potentially Contaminated Sites (2011).
- Environment Agency:
  - Land contamination risk management (LCRM) (2020, updated 2023).
- Construction Industry Research and Information Association (CIRIA) reports:
  - Report C532: Control of Water Pollution from Construction Sites (2001);
  - Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004);

[114] British Standards Institution (2009). BS6031: 2009 Code of Practice for Earth Works.

- Report C648: Control of Water Pollution from Linear Construction Projects (2006);
- Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006);
- Report C698: Site Handbook for the Construction of SuDS (2007);
- Report C741: Environmental Good Practice on Site Guide, Fourth Edition (2015);
- Report C750: Groundwater Control - Design and Practice, second edition (2016);
- Report C753: The SuDS Manual (2015); and
- Report C786: Culvert, Screen and Outfall Manual (2019)[115].

- Department for Food, Environment and Rural Affairs (Defra) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009);
- Forestry Commission (FC), Forestry Commission Scotland (FCS, now Forestry Land Scotland, FLS)[116] and co-authored reports:
  - FC Forestry Practice Guide: Whole-Tree Harvesting: A Guide to Good Practice (1997);
  - FCS and SNH Floating Roads on Peat (2010)[117];
  - FC Forests and Water Guidelines, 5th Edition (2011)[118];
  - FC Forests and Soil Guidelines (2011); and
  - FC The UK Forestry Standard (2017)[119].
- Ministry of Agriculture, Fisheries and Food (MAFF) Good Practice Guide for Handling Soils (2000);
- SNIFFER A Functional Wetland Typography for Scotland (2009);
- SEPA lead author publications:
  - Regulatory Position Statement - Developments on Peat (February 2010);

[115] Construction Industry Research and Information (2019). Report C786: Culvert, Screen and Outfall Manual. Available at: https://knowledge.bsigroup.com/products/code-of-practice-for-earthworks?version=standard

[116] FLS was formed on 1st April 2019, to take over some of the responsibilities of FCS.

[117] Forestry Commission Scotland and Scottish Natural Heritage (2010). Floating Roads on Peat: A report into good practice in design, construction and use of floating roads on peat, with particular reference to wind farm developments in Scotland. Available at: https://www.roadex.org/wp-content/uploads/2014/01/FCE-SNH-Floating-Roads-on-Peat-report.pdf

[118] Forestry Commission (2011). Forests and Water Guidelines, 5th Edition. Available at: https://www.gov.uk/government/publications/the-uk-forestry-standard

[119] Forestry Commission (2017). The UK Forestry Standard. Available at: https://www.gov.uk/government/publications/the-uk-forestry-standard

- Guidance: Life Extension and Decommissioning of Onshore Wind Farms (2016);
- Guidance on Developments on Peatland – Site Surveys, SGt, SNH and SEPA (2017);
- Guidance WST-G-052: Development on Peat and Off-site Uses of Waste Peat (2017);
- Planning Information Note 3: Flood Risk Advice for Planning Authorities (August 2017);
- Flood Risk Standing Advice for Planning Authorities and Developers (November 2020);
- Technical Flood Risk Guidance for Stakeholders (June 2022);
- CAR: A Practical Guide (2023)[120]; and
- CAR Flood Risk Standing Advice for Engineering, Discharge and Impoundment Activities (undated).

- SEPA Land Use Planning System Guidance Notes (LUPS-GU):
  - No. 4: Planning Guidance on On-shore Windfarm Developments (2017);
  - No. 24: SEPA Flood Risk and Land Use Vulnerability Guidance (2018);
  - No. 27: Use of Trees Cleared to Facilitate Development on Afforested Land (2014);
  - No. 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[121] (2017); and
  - No. 50 - Controlling the Environmental Effects of Surface Mineral Workings.
- SEPA Policies:
  - No. 19: Groundwater Protection Policy for Scotland (2009); and
  - No. 41: Development at Risk of Flooding: Advice and Consultation (Oct 2016).
- SEPA Guidance for Pollution Prevention (GPP) Notes and former (now discontinued) Pollution Prevention Guidance (PPG) Notes:
  - GPP 1 Understanding your Environmental Responsibilities – Good Environmental Practices (October 2020);

[120] Scottish Environment Protection Agency (2023). Controlled Activities Regulations, a Practical Guide. Available at: https://www.sepa.org.uk/media/cd3doeli/car-a-practical-guide.docx

[121] Scottish Environment Protection Agency (2017). Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3. Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions.pdf

- GPP 2: Above Ground Oil Storage Tanks (January 2018);
- GPP 3: Use and Design of Oil Separators in Surface Water Drainage Systems (March 2022);
- GPP 4: Treatment and Disposal of Wastewater where there is no Connection to the Public Foul Sewer (November 2017);
- GPP 5: Works and Maintenance in or near Water (February 2018);
- PPG 6: Working at Construction and Demolition Sites (2012);
- GPP 8: Safe Storage and Disposal of Used Oils (July 2017)[122];
- GPP 13: Vehicle Washing and Cleaning (April 2017);
- PPG 18: Managing Fire Water and Major Spillages (June 2000);
- GPP 20: Dewatering of Underground Ducts and Chambers (January 2018);
- GPP 21: Pollution Incident Response Planning (June 2021); and
- GPP 26: Safe Storage of Drums and Intermediate Bulk Containers (February 2019).

- SEPA Position Statements (PS) and Supporting Guidance (SG), namely:
  - WAT-PS-06-02 Culverting of Watercourses (June 2015);
  - WAT-PS-07-02 Bank Protection (April 2012);
  - WAT-PS-10-01 Assigning Groundwater Assessment Criteria for Pollutant Inputs (August 2014);
  - WAT-SG-21: Bank Protection Environmental Standards for River Morphology (July 2012);
  - WAT-SG-23: Engineering in the Water Environment, Good Practice Guide, Bank Protection Rivers and Lochs, Version 1 (April 2008);
  - WAT-SG-25: Engineering in the Water Environment, Good Practice Guide, River Crossings, Version 2 (November 2010)[123];
  - WAT-SG-26: Engineering in the Water Environment, Good Practice Guide, Sediment Management, Version 1 (June 2010);

[122] Scottish Environment Protection Agency (2017). GPP 8 Safe Storage and Disposal of Used Oils. Available at: https://www.netregs.org.uk/media/1900/guidance-for-pollution-prevention-8-2022-update.pdf

[123] Scottish Environment Protection Agency (2010). WAT-SG-25: Engineering in the Water Environment, Good Practice Guide, River Crossings, Version 2. Available at: https://www.sepa.org.uk/media/151036/wat-sg-25.pdf

- WAT-SG-29: Engineering in the Water Environment, Good Practice Guide, Temporary Construction Methods, Version 1 (March 2009)[124];
- WAT-SG-31: Prevention of Pollution from Civil Engineering Contracts: Special Requirements, Version 2 (June 2006);
- WAT-SG-75: Sector Specific Guidance: Construction Sites[125] (February 2018); and
- WAT-SG-78: Sediment Management Authorisation (December 2012).

- SGt publications:
  - Scotland's Zero Waste Plan (June 2010);
  - River Crossings and Migratory Fish: Design Guidance (2012)[126];
  - PAN 1/2013 – Environmental Impact Assessment (August 2013);
  - Online Planning Advice on Flood Risk (June 2015); and
  - Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition) (April 2017).
  - SGt, Environmental Protection Act 1990 - Part IIA Contaminated Land: statutory guidance edition 2 (2006).
- NatureScot / SNH lead author publications:
  - Guidelines on the Environmental Impacts of Wind Farms and Small-Scale Hydroelectric Schemes (2001)[127];
  - Constructed Tracks in the Scottish Uplands (June 2013);
  - Siting and Designing Wind Farms in the Landscape Version 3a (2017);
  - A Handbook on Environmental Impact Assessment (2018).
- Scottish Renewables (SR) lead publications:
  - SR and SEPA Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (January 2012); and

[124] Scottish Environment Protection Agency (2009). WAT-SG-29: Engineering in the Water Environment, Good Practice Guide, Temporary Construction Methods, Version 1. Available at: https://www.sepa.org.uk/media/150997/wat_sg_29.pdf

[125] Scottish Environment Protection Agency (2018). WAT-SG-75: Sector Specific Guidance: Construction Sites, Version 1. Available at: https://www.sepa.org.uk/media/340359/wat-sg-75.pdf

[126] Scottish Government (2012). River Crossings and Migratory Fish: Design Guidance. Available at: https://www.gov.scot/publications/freshwater-and-diadromous-fish-and-fisheries-associated-with-onshore-wind-farm-and-transmission-line-developments-generic-scoping-guidelines/

[127] Scottish Natural Heritage (2020). General pre-application and scoping advice for onshore wind farms. Available at: https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms

- SR, SNH, SEPA, FCS, Historic Environment Scotland (HES), Marine Scotland Science (MSS) and Association of Environmental and Ecological Clerks of Works (AEECoW), 'Good Practice During Wind Farm Construction', Fourth edition (2019)[128].

SURVEY METHODOLOGY

9.7.14. To inform the assessment, the following surveys are proposed to be undertaken:

- An NVC[129] survey to identify potential GWDTEs, targeted to specific areas informed by a Preliminary Ecological Appraisal; and
- Peat probing surveys across the site, likely to comprise 100 m grid spacing across the site and 10 m grid spacing in turbine and other developed areas.

9.7.15. The surveys will follow prevailing best practice guidance, including standing advice from NatureScot, and will be timed with cognisance of seasonal vegetation changes.

MITIGATION

9.7.16. In the assessment of effects account will be taken of 'embedded' mitigation measures i.e., those mitigation measures that are inherent to the Proposed Development. These measures include all mitigation usually assumed to be in place during construction and operation and that are generally regarded as industry standard or Best Practice and will be included with a Construction Environment Management Plan (CEMP) that will be produced prior to the commencement of construction activities. With respect to geology, hydrology and hydrogeology, these measures include, but are not limited to, the following:

- Avoidance of steep gradients, deep peat and flood zones when establishing the footprint of the Proposed Development;
- Application of a 50 m buffer zone applied to the entire OS watercourse network;
- Application of 100 m and 250 m SEPA (LUPS-GU31) buffers around abstractions, PWSs and GWDTEs;
- Use of micro-siting if unforeseen ground conditions are encountered;
- Adherence to the conditions of the required Construction Site Licence (CSL), including adoption of a Pollution Prevention Plan (PPP);

[128] Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland, Historic Environment Scotland, Marine Science Scotland and Association of Environmental and Ecological Clerks of Works (2024). Good Practice guidance during Wind Farm Construction, Version 4. Available at: https://www.nature.scot/doc/good-practice-during-wind-farm-construction

[129] Joint Nature Conservation Committee (2001). National Vegetation Classification: field guide to mires and heaths. Available at: https://hub.jncc.gov.uk/assets/1d0037bd-6c77-4677-8040-2f6e1d852eb1

- Adoption of sensitive track and drainage design, including 'floating' roads on areas of deeper peat, with all drainage measures set out in a Water Management Plan (WMP);
- Adherence to Best Practice guidance and CAR authorisation with respect to watercourse crossings, with designs capable of conveying a 1 in 200-year return period flood event with an allowance for climate change;
- All areas identified as being located within a 1 in 100-year fluvial flooding zone should be considered to be unsuitable for development and developments should not be permitted in the 1 in 200-year flood zone unless it can be demonstrated that it will not affect the ability of the flood plain to store and convey water;
- Deeper excavations will be designed so that they can freely drain by gravity where possible and incorporate perimeter cut-off drains. Any required dewatering and associated discharge will be undertaken in accordance with Best Practice, and abstractions greater than 10 m^3/d will require CAR Registration, while over 50 m^3/d will require a CAR licence;
- Measures based on Best Practice guidelines from SEPA will be adopted during construction to prevent pollution, with all contractors aware of a pre-planned pollution incident response procedure (PIRP). Ground investigation will be undertaken at any borrow pit search locations to determine the presence and extent of any shallow soil contaminants;
- Fuel will be stored in a suitably sized bunded area or self-bunded above-ground storage tank (AST), and maintenance and refuelling of machinery will be undertaken offsite or within designated areas of temporary hardstanding;
- Whilst the extent of protected areas partially overlap with the Site Boundary, there will be no construction works within the conservation sites;
- A Peat Management Plan (PMP) will be implemented into the design;
- Peat storage areas will be located more than 50 m from any watercourses and will be contained to prevent sediment or nutrient run-off from reaching the watercourses;
- Felled forestry areas will be checked by an Ecological Clerk of Works (ECoW) for any springs or flushes that may indicate unidentified GWDTEs. Any such features will be clearly marked and avoided; and
- A Flood Evacuation Plan (FEP) will be implemented for personal during construction and operation.

9.7.17. Additional mitigation measures to remove or suitably reduce potential significant effects will be identified through the assessment (as noted above). Mitigation measures required to comply with legislative obligations will also be identified. The EIA Report chapter will fully detail any additional measures including responsibilities, timescales and any follow-on monitoring requirements.

9.7.18. Where residual effects remain potentially significant, compensation required to offset this will be identified.

9.7.19. The requirement for post-construction monitoring will also be identified.

10 TRAFFIC, TRANSPORT AND ACCESS

10.1 INTRODUCTION

10.1.1. This chapter considers the scope of work required to assess the potential significant effects associated with Traffic, Transport and Access during the construction phase of the Proposed Development.

10.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development Description** and with respect to relevant parts of other technical chapters, such as:

- Landscape and Visual - **Chapter 7 Landscape and Visual**;
- Cultural Heritage - **Chapter 8 Cultural Heritage**; and
- Acoustics - **Chapter 11 Acoustics**.

10.2 CONSULTATION

10.2.1. Consultation responses which are relevant to this chapter such as those provided by THC and Transport Scotland, are captured in **Table 10-1**. The scoping responses will be reviewed following receipt of the Scoping Opinion and, following this, further consultation may be necessary with THC Roads Development and Transportation.

Table 10-1 – Consultation Undertaken to Date

Body/Organisation	Type of Consultation/ Date	Key Outcomes of Discussions
THC - – Roads Development and Transportation	Pre-Application (Ref: 20/04174/PREMAJ) 22 December 2020	Requirement for: - a Transport Assessment (TA); - a Construction Traffic Management Plan (CTMP) including an Access Management Plan (AMP); and, - an Abnormal Load Route Assessment (ALRA) including Swept Path Analysis (SPA).
		Transport Assessment requirements: - Identify public roads affected by the development, including routes for abnormal loads, suppliers, and staff. Assess current road conditions, traffic generation, and distribution, and evaluate impacts on roads, structures, and adjacent communities.
		Mitigation Measures: - Propose road strengthening, widening, and safety improvements, as well as traffic management strategies to

Body/Organisation	Type of Consultation/ Date	Key Outcomes of Discussions
		minimise impacts. Include specific measures for schools and voluntary speed limits for construction traffic.
		Grid connection works: - Should related grid connection and/or substation works be likely to impact on the local road network, it would be desirable to consider the impact of these works, and the mitigation required in conjunction with the proposed wind farm.
		Trunk Road Network: - Transport Scotland will require a threshold assessment to evaluate potential environmental impacts from increased traffic on the trunk road network. Issues like driver delay, pedestrian safety, and severance must be assessed.

10.3 STUDY AREA

10.3.1. At current stage of writing is it not known where construction trips will originate from, however given the proximity to the A9, it is intended that all construction traffic will access the Site from the trunk road via the B870 and the U1823 with the A9 located approximately 12km to the north-east of the Site.

10.3.2. The study area for the assessment of Traffic, Transport and Access will therefore be the B870 from the A9 staggered junction with the B870, and the U1823 up to the Site access. The study area is shown in **Figure 10.1 (Appendix 1)**.

10.4 BASELINE CONDITIONS

10.4.1. At the time of writing, the Port of Entry is unknown, although it is anticipated that all Abnormal Indivisible Loads (AILs) transporting turbine components will travel by road from either Scrabster or Wick Harbour, the latter of which is being used to support the delivery of turbine components for two nearby windfarms (Ref: 13/01190/FUL, 12/02868/FUL, and 21/04984/S36) and is the closest port in the region capable of handling wind turbine equipment. Wick Harbour has been frequently used for the delivery of wind turbine components in this region. The proposed AIL route to Site from Wick would involve the AIL vehicle undertaking:

- A reverse manoeuvre out of the harbour on Martha Terrace into Station Road;
- A right turn onto the A99 Cliff Road;
- A right turn onto the A9;
- A left turn onto the B870;
- Continue straight onto the U1823; and

- At NGR 311885 (Easting), 949112 (Northing) leaving the adopted road network and accessing the Site via tracks used to support forestry extraction activities.

10.4.2. Access to the Site is anticipated to be via the existing forestry tracks which will be utilised wherever practical, subject to any necessary upgrades to accommodate construction traffic.

10.4.3. The proposed route for AILs would not be assessed within this section of the EIA Report as a separate Abnormal Load Route Assessment (ALRA) will be submitted. The findings from the ALRA will be considered within this section of the EIA.

10.4.4. To establish baseline traffic flows, data will be obtained from Automatic Traffic Counters (ATCs) installed on both roads in the study area, the U1823 and the B870. The ATCs will be installed for a 7-day period and capture 24-hour traffic speed and volumetric data. This traffic flow data will inform the assessment of the impact of construction traffic on the operation of the study area road network.

10.4.5. The locations of the ATC sites are shown in **Figure 10.2 (Appendix 1)**.

DATA SOURCES

Desk Study

10.4.6. The sources of information that will be used for the Traffic, Transport and Access assessment are listed below in **Table 10-2.**

Table 10-2 - Sources of Information

Organisation	Source	Data
Traffic Data Collection Ltd	Traffic Survey	Automatic Traffic Count Survey
Google	Google Traffic	Online mapping, Desk Study
Google	Google Street View	Desk Study
Microsoft Bing	Bing OS Maps	Ordnance Survey (OS) Mapping
Agilysis	Crashmap	Personal Injury Accidents (PIAs)

10.4.7. Further data will be collected as required.

CURRENT AND HISTORICAL BASELINE

Trunk Road Network (TRN)

A9

10.4.8. The B870 and U1823 support access to the Site from the A9 which forms part of the TRN with the A9 connecting Thurso with Inverness, located approximately 12.5 km north-east of the proposed Site access. Within the Study Area, the A9 is generally of a good standard supported by a two-lane single carriageway between Thurso and the A99 at Latherton.

Local Road Network

Unclassified U1823

10.4.9. The unclassified U1823 forms the south-eastern boundary of the Site and is a rural single carriageway road linking Loch More in the south-west, to the B870, Glengolly Road at Westerdale, approximately 5.3 km north-east of the Site. The U1823 is a lightly trafficked road, subject to a 60mph speed limit and is approximately 3 m wide throughout its length. The U1823 forms a priority junction with the B870 and features a turning head at Lochmore Croft.

B870

10.4.10. Within the Study Area, for most of its length the B870 is a rural single carriageway, subject to a 60mph speed limit, approximately 3 m wide with passing places provided along its length. The B870 routes between the A9 at Mybster and the B874 at Glenglolly in an east-west direction until Westerdale, and thereafter a north-south direction until Glengolly. The B870 forms a staggered crossroad junction with the A9, with an area provided to the south-west of the junction to accommodate turbine component deliveries associated with the Achlachan Wind Farm located approximately 6 km south of Halkirk.

Personal Injury Audit

10.4.11. Personal Injury Accident data has been obtained from CrashMap for five years of the latest available data. An initial high-level review indicates that there have been two slight accidents within the Study Area. The low level of accidents reported suggests that the local road network is operating in a safe manner.

10.4.12. The locations of the reported accidents are shown in **Figure 10.3 (Appendix 1)**.

Pedestrian Facilities

10.4.13. The Site's rural nature results in there being limited pedestrian facilities being provided in its vicinity. The road network which will be used to support construction access, is also generally rural in nature, with a minimal number of residential properties located close to the B870 and U1823. There is therefore unlikely to be a significant amount of pedestrian activity in the vicinity of the access route.

Cycle Facilities

10.4.14. The Site's rural nature results in there being no formal cycle infrastructure being provided in its vicinity. However, there is a mountain bike route which passes through the study area and the Proposed Development Site from the EV12 (National Cycle Route) at Upper Gills (near Gills Bay) to the A987 via Mybster, Westerdale, Loch More and Altnabreac Rail Station.

Core Paths

10.4.15. There are a number of Core Paths within close proximity to the Proposed Development. These include:

- Core Path CA06.07 – is 1.91 km in length and routes between the B870, approximately 1 km west of the A9 in a north-south direction from Ballone to Achanarras Quarry;
- Core Path CA06.13 – is named 'Dirlot Gorge ingress' and forms a 6 m length access track from the U1823, routing south towards the River Thurso;

- Core Path CA01.01 – is a 10.43 km forestry track from Loch More to Altnabreac Rail Ration and which crosses the Site from east to west;
- Core Path CA01.03 – is a 7.51 km track located south-west of the Site and forms a junction with Core Path CA01.01, routing north to south from Loch More to Dalnawillan alongside the River Thurso; and,
- Core Path CA01.04 – is a 5.98 km forestry track routing north to south from Altnabreac to Dalnawillan and which crosses the western portion of the Site.

Outdoor Access

10.4.16. While there are limited formal facilities provided in the area, there is a general right of access to all land and inland water in Scotland, also known as "right to roam" as per the Land Reform (Scotland) Act 2003 and it is prudent to look at active travel data to provide an indication of the level of activity in the study area.

10.4.17. A Heatmap provided by Strava.com identifies that the surrounding roads and tracks which are anticipated to be used by construction traffic, are used for walking / running and cycling. Whilst the heatmap identified that the sections of the B870, the U1823 are currently used by cyclists and by pedestrians, significantly less activity has been recorded from Westerdale to Strathmore to the southern boundary of the Site. It is considered that although the afore mentioned mountain bike route passes along the U1823, the potential for conflict between users of the route and construction traffic can be managed through the Outline Construction Traffic Management Plan (OCTMP), a draft of which will be appended to the EIA Chapter if deemed necessary.

Public Transport

10.4.18. The Site's rural nature results in there being limited public transport facilities being provided in its vicinity. With no bus services, the nearest public transport is by rail. Altnabreac Train Station is the nearest public transport node, located north-west of the Site Boundary serving the rural settlement of Altnabreac.

10.4.19. It is noted that Scotrail have suspended services temporarily for this station as of Sunday 12 November 2023 due to maintenance services being unable to access it during winter months. Scotrail state that they intend to reinstate services "*as soon as possible*".

10.4.20. Prior to this closure in 2023, according to thetrainline.com the station was serviced by four north-eastbound trains and four south-westbound trains per day, Monday to Saturday, and a one train in each direction on Sundays. As Altnabreac is a request stop, trains did not stop unless requested ahead of time.

SENSITIVE RECEPTORS

10.4.21. The following receptors, including groups and special interests, will be assessed for the identified study area, to determine the sensitivity of receptors:

- non-motorised users;
- core path users;
- motorists and freight vehicles;
- public transport; and

- emergency services.

10.4.22. The receptors above can broadly be grouped as the following affected parties; 'Users of Roads', and 'Users / Residents of Locations'. The following list identifies special interests that should be considered when defining sensitive receptor geographic locations, and the sensitive locations will inform the assessment of effect significance when the development traffic is assigned to the network:

- people at home;
- people at work;
- sensitive people including young age; older age; income; health status; social disadvantage; and access and geographic factors;
- locations with concentrations of vulnerable users (e.g. hospitals, places of worship, schools);
- recreational and shopping areas;
- recreation areas including ecological / nature conservation sites;
- tourist / visitor attractions;
- collision clusters and routes with road safety concerns; and
- junctions and road links at (or over) capacity.

10.5 SCOPE OF ASSESSMENT

LIKELY SIGNIFICANT EFFECTS

10.5.1. The following transport-related environmental effects will be considered in the assessment:

- severance: the separation of people from places and other people or impede pedestrian access to essential facilities;
- driver delay: traffic delays to non-development traffic;
- non-motorised user amenity: the effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width/separation from traffic;
- non-motorised user delay: the ability of people to cross roads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions of the Proposed Development;
- fear and intimidation: these may be experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors such as narrow pavement widths; and
- accident and safety: the risk of accidents occurring where the Proposed Development, including during its construction, are expected to produce a change in the character of traffic.

10.5.2. The potential sources of impact have been divided into two development phases: construction and operation.

Construction Phase

10.5.3. The construction phase of Proposed Development is likely to create the greatest environmental impact. This is due to the number of Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) required to transport the materials to the Site, and the requirement for Abnormal Indivisible Loads (AILs) for turbine components which may cause delay. As such, there would be traffic impacts associated with the properties and roads along the delivery route.

10.5.4. As baseline traffic flows are currently unknown, this element is expected to generate a potentially significant, temporary effect in a local area, which will be managed through the implementation of a CTMP.

Operational Phase

10.5.5. Once the Proposed Development is operational, the development would have negligible traffic/ transport related impacts caused by intermittent maintenance vehicles travelling to the Site.

Issues Scoped out

10.5.6. As previously stated, the following topics have been scoped out of further assessment:

- The effects relating to Traffic, Transport and Access are unlikely to be significant beyond the identified Study Area, and as such no further routes are proposed to be included;
- The traffic impacts associated with the operational phase are anticipated to be of low volume, and therefore, further assessment of the traffic impacts of the Proposed Development during the operational phase is not considered necessary;
- Due to the negligible environmental effects, which would occur during the decommissioning phases of the Proposed Development, it is proposed that decommissioning effects are scoped out of the Traffic, Transport and Access assessment for the EIA;
- AIL deliveries would be considered in more detail within a separately submitted ALRA. The findings and recommendations from the report will be discussed within this section of the EIA Report with any impacts identified and assessed as required.

10.5.7. **Table 10-3** summarises the topics which it is proposed to scope in to and out of the EIA Traffic and Transport chapter.

Table 10-3 – Elements Scoped in or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Construction Traffic	Construction	✔		It is anticipated that the movements associated with stone and concrete will have the greatest impact in terms of Traffic, Transport and Access and should therefore be assessed.
Construction Traffic beyond the extent of the study area	Construction		✔	As vehicles travel away from the Proposed Development during the construction phase, they will disperse across the wider road network, thus diluting any potential effects.
Operational Phase Traffic	Operation		✔	Given the low traffic movements anticipated to be associated with this phase, assessment is not considered necessary.
Decommissioning Phase Traffic	Decommissioning		✔	It is considered that due to the low movements associated with this phase that it be scoped out of assessment.
Cumulative Effects	Construction	✔		The cumulative impacts from the other local permitted developments will be a key consideration for the assessment, particularly in relation to the control of construction traffic in the local area. The cumulative assessment would focus on the construction phase as this would be the most likely period to create significant effects should construction phases overlap or occur sequentially amongst permitted developments. The assessment of cumulative effects would rely on the availability of traffic data.
Abnormal Loads Road Assessment (ALRA)	Construction	✔		The assessment of the likely effects of expected AIL deliveries will be assessed separately as part an ALRA and will be appended to the Traffic, Transport and Access EIA chapter.

OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

10.5.8. There is a potential requirement to upgrade forestry tracks across the Altnabreac Site to accommodate construction traffic, which (if necessary) could remain in-situ throughout the project lifecycle. Outdoor access across Altnabreac will be maintained during and after construction, therefore, there is potential to improve the quality of the tracks' surface as part of the Proposed Development for the benefits of existing pedestrians and cyclists.

10.6 PROPOSED ASSESSMENT METHODOLOGY

Desk Study

10.6.1. The desk study included reviews and identification of the following to inform this scoping report:

- A review of relevant transport policy;
- A review of personal injury accident data;
- Identifying sensitive receptor locations;
- Identifying any other traffic sensitive receptors in the area (Core Paths, walking routes, communities, etc.);
- Reviewing Ordnance Survey (OS) maps;
- Determining potential origin locations of construction staff and supply locations for construction materials to inform the extent of the local road network to be included in the assessment; and
- Identifying constraints to the movement of HGV traffic and larger loads.

IEMA Guidelines

10.6.2. It is intended that potential effects of the Proposed Development will be reviewed in accordance with the Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Traffic and Movement[130] which confirms that an assessment should be undertaken in accordance with the following two thresholds:

- where the total traffic would increase by 30% or more (10% in sensitive areas); and/ or
- where the HGV traffic would increase by 30% or more (10% in sensitive areas).

10.6.3. The IEMA Guidelines suggest that 30%, 60% and 90% changes in traffic levels should be considered as “slight, moderate and substantial” impacts, respectively. It is generally considered that traffic flow increases of less than 10% are ‘not significant’ and further detailed assessment is not warranted.

Receptor Sensitivity

10.6.4. As set out in the IEMA Guidelines, when assessing the impact of traffic on the network, the impact is dependent upon a wide range of factors which include the volume of traffic, traffic speeds and operational characteristics and traffic composition (such percentage of HGVs). The perception of changes in traffic varies according to factors such as:

- Existing traffic levels;
- The location of traffic movements;

[130] IEMA (2023) *Institute of Environmental Management and Assessment (IEMA) Guidelines: Environment Assessment of Traffic and Movement.* (online). Available at: https://www.iema.net/resources/blog/2023/07/12/new-iema-guidance-environmental-assessment-of-traffic-and-movement [Accessed October 2024].

- The time of day;
- Temporal and seasonal variation of traffic;
- Design and layout of the road;
- Land-use activities adjacent to the route; and
- Ambient conditions of adjacent land-uses.

10.6.5. For the purposes of assessment, each road link included in the assessment will be assigned a sensitivity which will be based on the proximity of sensitive receptors to the road link and the road environment. The IEMA Guidelines details how the sensitivity of receptors should be assessed. Professional judgement was subsequently used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in **Table 10-4**.

Where a road passes through a location, users are considered subject to the highest level of sensitivity defined by either the road or location characteristics.

Table 10-4 Receptor Sensitivity

Receptor	Sensitivity						
	Very High*	High*	Medium	Low	Very Low*	Negligible*	No Receptors
Users of Roads	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures, and frequent bus services.		Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures, and bus services.	Where the road is a Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures, and bus services.	Where roads have few adjacent settlements, and bus services. Includes strategic trunk roads that would be little affected by additional traffic and suitable for construction type vehicles, including Abnormal Loads and new strategic trunk road junctions capable of accommodating similar types of vehicles.		Where roads have no adjacent settlements. Includes routes where there are no bus services.
Users / Residents of Locations	Where a location contains receptors with the greatest sensitivity to traffic flows: Schools, colleges, playgrounds, accident clusters, retirement homes, roads without footways that are used by pedestrians.		Where a location contains receptors with medium sensitivity to traffic flow: congested junctions/ links, doctors' surgeries, hospitals, shopping area with roadside frontage, roads with narrow footways, recreation facilities.	Where a location contains receptors with low sensitivity to traffic flow links: with adjacent land-uses such as public open space, nature conservation areas, listed buildings and residential areas with adequate footway provision and limited pedestrian/cycle users.	Where a location includes individual dwellings or few settlements with no facilities. Including farmland usage and where receptors are sufficiently distant from affected roads and junctions and no /very limited number of pedestrian and cyclists.		Where roads have no adjacent settlements. Includes farmland.

**Professional judgement required to determine whether High / Very High and Very Low / Negligible.*

10.6.6. The IEMA Guidelines states that sensitivity judged as 'High' or 'Medium' results in Rule 2 (sensitive areas where traffic flows are predicted to increase by 10% or more), being considered for that link. Sensitivity judged as 'Low' or 'Negligible' results in Rule 1 being considered for that link where traffic flows are predicted to increase by more than 30% or where the number of HGVs is predicted to increase by more than 30%.

10.6.7. The IEMA Guidelines states that increases in traffic flows of less than 10% are generally accepted as having no discernible environmental or social impact as daily variance in traffic flows can be of equal magnitude.

10.6.8. The 30% threshold relates to the level at which receptors may perceive change and there may therefore be an effect. Impacts above this level therefore do not suggest that there is a significant impact, only that further consideration is required to assess the significance.

10.6.9. The criteria for assessing the magnitude of the predicted impact on severance, pedestrian delay and pedestrian amenity, is presented in **Table 10-5**.

Table 10-5 Magnitude of Impact

Transport Effect	Magnitude of Impact					
	Very High	High	Medium	Low	Very Low	Negligible
Severance	-	Change in total traffic or HGV flows of >90 %	Change in total traffic or HGV flow of >60 % ≤90 %	Change in total traffic or HGV flows of >30 % ≤60 %	-	Change in total traffic or HGV flows of ≤30 %
Driver delay	Very High increase in queuing at junctions and/or congestion on road links	High increase in queuing at junctions and/or congestion on road links.	Medium increase in queuing at junctions and/or congestion on road links.	Low increase in queueing at junctions and/or congestion on road links.	Very Low increase in queuing at junctions and/or congestion on road links.	Negligible or no increase in queuing at junctions and/or congestion on road links
Non-Motorised users' amenity	A halving or doubling of traffic flow (or HGV flow) can be used as a broad threshold when considered in the local context and applied with caution.					
Non-motorised user delay	Generally, increases in traffic may lead to greater delay, though is dependent on the level of non-motorised users' activity in the area. Assessed based on pedestrian delay experienced when crossing road links considering a range of factors including crossing type, pedestrian flows, traffic levels, visibility and general road condition.					
Fear and Intimidation	Assessed as per the threshold criteria within the IEMA Guidelines. Note that if there are AILV's user, the perception of fear and intimidation may be heightened.					
Road safety	Assignment informed by a review of existing collision patterns and trends based upon the existing personal injury accident records and the forecast increase in traffic that may change the risk of serious and fatal injuries.					

10.6.10. The magnitude of each impact has subsequently been determined in accordance with the IEMA Guidelines and based on professional judgement.

Significance of effects

10.6.11. The significance of an effect from the Proposed Development is expected to be either be Neutral or Adverse, and will be graded by Negligible, Minor, Moderate and Major in determining an effect's significance.

10.6.12. Effects are also considered spatially and temporally when considering significance. An effect may be:

- **Spatial consideration**: Local, District wide, Regional or National; and
- **Temporal consideration**: Temporary or Permanent.

10.6.13. The combination of the receptor sensitivity and magnitude of impact from the Proposed Development, enables the significance of effects to be determined, as shown in **Chapter 4: Approach to EIA**. Effects will be considered significant where they are assessed to be Major or Moderate. Where an effect could be one of Major/Moderate or Moderate/Minor, professional judgement has been used to determine which option should be applicable. The shading indicates those significance ratings that are deemed to be 'significant' effects.

Other Impacts

10.6.14. The scope of assessment for the following environmental impacts will be considered out with this EIA scoping chapter:

- Landscape and Visual - **Chapter 7 Landscape and Visual Impact**;
- Cultural Heritage - **Chapter 8 Cultural Heritage;** and
- Acoustics - **Chapter 11 Acoustics**.

10.6.15. Local air quality and dust / dirt impacts have not been assessed in detail, however actions to ensure appropriate management of these impacts will be included in a Construction Environmental Management Plan (CEMP).

RELEVANT LEGISLATION AND GUIDANCE

10.6.16. The Traffic, Transport and Access EIA Report Chapter will base the method of assessment on the IEMA Guidelines and will also take into account national policies referred to in **Chapter 3: Legislation and Planning Policy**.

10.6.17. The EIA Report chapter will also take into account local policies published by THC:

- Highland-wide Local Development Plan, THC (April 2012);
- West Highland and Islands Local Development Plan, THC (September 2019); and
- Roads and Transportation Guidelines for New Developments, THC (May 2013).

10.6.18. The EIA chapter will also be undertaken in accordance with:

- Scottish Government – Planning Advice Note (PAN) 75 – Planning for Transport (17 August 2005);

- Transport Scotland – Transport Assessment Guidance (July 2012); and
- National Highways et. al. (various dates). Design Manual for Roads and Bridges, Volume 15, Section 1, Part 1 The Nesa Manual (DMRB).

MITIGATION

10.6.19. Mitigation measures will be proposed following the completion of the impact assessments, as informed by the baseline. Where potential significant adverse effects are identified, the Applicant will implement mitigation measures to reduce or remove or compensate these effects.

10.6.20. An outline CTMP will be appended to the Traffic, Transport and Access EIA Chapter if deemed necessary following completion of the assessment. It will be the responsibility of the Principal Contractor (in agreement with the Applicant), to prepare a full CTMP, developing and refining the outline mitigation measures, and which will be agreed with THC.

10.6.21. The preparation of the CTMP will set out in full, the agreed mitigation measures which will be implemented during construction. Until the Principal Contractor for the construction period is appointed, it will not be possible to finalise the CTMP and for this reason it is common for such documents to be secured by an appropriate Planning Condition.

11 ACOUSTICS

11.1 INTRODUCTION

11.1.1. This chapter considers the potential noise and vibration effects that could arise from the Proposed Development during the construction, operational and de-commissioning phases.

11.1.2. Where there is the potential for an effect to be significant, it has been 'scoped-in', and the proposed assessment methodology is presented. Where an effect would be not significant, it has been 'scoped-out' of the assessment with justification presented.

11.1.3. This chapter (and its associated figures) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development.**

11.2 CONSULTATION

11.2.1. Initial consultations took place in 2020 as part of pre-application discussions with THC (as shown in **Appendix 4**). This Scoping Report will form the basis for further consultation with the Environmental Health Department of THC.

11.2.2. During consultation, agreement will be sought from THC, including those elements that have been scoped-in and scoped-out, the assessment methodologies to be followed, the proposed approach to the cumulative operational noise assessment, and the proposed baseline noise survey.

11.3 STUDY AREA

11.3.1. For construction noise and vibration, the adopted Study Area will be 300m around construction activities with the potential to generate noise and/or vibration. Beyond that distance, construction noise and vibration levels are expected to be sufficiently low that significant effects would not arise. The construction Study Area will be applied to construction activities on the site and across the wider area, e.g. where road or junction upgrade works are required.

11.3.2. Where blasting may be required at proposed borrow pits, the adopted Study Area for blast induced vibration and air overpressures will be 1km from that works. Beyond that distance, blast induced vibration and air overpressures are expected to be sufficiently low that significant effects would not arise.

11.3.3. For operational noise, the adopted Study Area will be 5km around the proposed wind turbines. This is considered sufficient to encompass all potentially significant cumulative noise effects, i.e. the combined effect of noise from the Proposed Development when operated simultaneously with any other wind farm developments. The potential impacts from the Proposed Development operating in isolation are expected to be contained within a smaller area.

11.3.4. If necessary, the operational noise assessment will extend to include a representative sample of receptors in proximity to both the Proposed Development and the other identified wind farms such that all locations of potential cumulative effects are fully accounted for. The cumulative wind farm developments identified to fall within this Study Area are defined below and shown on **Figure 11.1** (**Appendix 1**).

11.4 BASELINE CONDITIONS

DATA SOURCES

Desk Study

11.4.1. A review of the following data sources has been undertaken to inform determination of the existing baseline conditions:

- Ordnance Survey (OS) AddressBase Plus database;
- publicly available online satellite/aerial imagery;
- THC's wind turbines GIS open data[131];
- THC's planning portal[132];
- Scottish Government Wind Farm Proposals Maps[133]; and
- Scottish Government Energy Consents Unit (ECU) web portal[134].

11.4.2. THC's wind turbines GIS open data, THC's planning portal and The Scottish Government ECU sources are used to identify proposed and existing wind farm developments within the operational Study Area and beyond. Proposed wind farms include developments at scoping stage, in planning or approved. Existing windfarms include developments that are either under construction or constructed.

Field Surveys

11.4.3. A review of the following data sources has been undertaken to inform determination of the existing baseline conditions:

- A WSP general walkover survey completed on 18 September 2024.

NOISE AND VIBRATION SENSITIVE RECEPTORS

11.4.4. The primary data source used to identify noise and vibration sensitive receptors is the OS AddressBase Plus database. OS AddressBase Plus contains property and address information and incorporates a four-level classification scheme that explains the function of each property and identifies the geographic location.

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131 Highland Council wind turbines GIS open data:
Highland Council Open Map Data [accessed Sep 2024]

132 Highland Council planning portal:
Planning Simple Search [accessed Sep 2024]

133 Wind Farm Proposals Scotland - data.gov.uk [accessed Sep 2024]

134 The Scottish Government Energy Consents Unit
Energy Consents Unit [accessed Sep 2024]

11.4.5. The OS AddressBase Plus database has been supplemented based on the results of field survey information, satellite/aerial imagery and client information.

11.4.6. Noise and vibration sensitive receptors identified in the Study Area are detailed in **Table 11-1** and are shown on **Figure 11.2**. All receptors are residential except for Loch More Boathouse which has been classified as a community facility.

Table 11-1 - Noise and Vibration Sensitive Receptors

Sensitive receptor name	X	Y	Closest Altnabreac wind turbine	Distance to closest wind turbine*
Lochdhu Lodge	301120	944211	#01	802m
Keeper's House	300283	945298	#01	948m
Old School House	300375	945623	#01	1,017m
Langa Cottage	300186	945251	#01	1,028m
Station Cottage	300357	945670	#01	1,060m
Dalnawillan Cottage**	303057	940819	#13	1,126m
Dalnawillan Lodge†	302967	940739	#13	1,219m
Dalnaha	306695	943869	#17	1,848m
Badnaheen	299360	944369	#01	1,935m
Dalganachan	300666	939985	#13	3,193m
Backlass	308037	942348	#15	3,450m
Loch More Boathouse	308310	946048	#17	3,913m

* Distance is calculated between the receptor (OS AddressBase Plus database) and the proposed wind turbine locations.

** Dalnawillan Cottage does not appear in the OS AddressBase Plus database, it has been manually added to the dataset based on satellite/aerial imagery, and it is understood to be occupied based on client information.

† Dalnawillan Lodge is understood to be derelict based on client information. But given its inclusion in the OS AddressBase Plus database it has been included as a residential receptor to represent a worst case.

11.4.7. The level of sensitivity for all residential receptors is 'High'. Loch More Boathouse, a community facility, is classified as 'Medium'.

11.4.8. In addition to Dalnawillan Lodge being derelict (see **Table 11-1**), a small number of other properties in the operational Study Area have been identified to be derelict. They are considered not sensitive. Those properties are:

- Unnamed property (XY: 300700, 945266)
  Property is inside the site boundary, approximately 550m north-west of proposed turbine #01. This property is the ownership and control of the landowner. It does not appear in the OS AddressBase Plus database and therefore does not have a postal address. It was identified as vacant in the 2017 field survey and derelict in the 2024 field survey. It has no live or consented planning or building applications for redevelopment.
- Dalnagleton (XY: 305001, 942437)
  Property is approximately 600m south-east of proposed turbine #14. The property does not appear in the OS AddressBase Plus database and therefore does not have a postal address, It was identified as derelict in the 2017 field survey. It has no live or consented planning or building applications for redevelopment.

11.4.9. The above are show on **Figures 11.2** and **11.3** as 'Derelict (not sensitive)'.

CURRENT AND HISTORICAL BASELINE

11.4.10. The Proposed Development is in a sparsely populated area, there are several isolated properties and small property groupings in the Study Area. The noise environment at these properties is expected to include manmade and natural sources. Manmade noise sources include vehicles on local minor roads, train movements on the Far North Line, private generators providing power to properties, and potential forestry operations within and around the Site. Regarding noise from other wind energy developments, just two constructed wind turbines have been identified within the 10 km of the proposed Altnabreac turbines. These are a pair located within the site boundary at Lochdhu Lodge (hub height 15m, blade tip 17.4m, THC planning reference: 08/00530/FULCA).

11.4.11. These turbines have the potential to affect the prevailing local background sound levels in their immediate vicinity and are scoped-in for inclusion in the cumulative operational turbine noise assessment. These turbines are shown on **Figure 11.2**.

11.5 SCOPE OF ASSESSMENT

LIKELY SIGNIFICANT EFFECTS

Construction

11.5.1. The shortest distance between a proposed wind turbine location and a sensitive receptor is approximately 800m (Altnabreac wind turbine #01 and residential property Lochdu Lodge). As such, no significant noise or vibration effects are anticipated to arise from turbine construction. The location of borrow pits, site access tracks / other infrastructure is yet to be finalised, but it is expected that these can be located at a sufficient distance from receptors to avoid the potential for significant noise and vibration effects to arise. Assessments of onsite construction noise and vibration are therefore scoped-out, but where such works are found to be required within 300m of sensitive receptors, this will be reversed.

11.5.2. Localised road or junction improvement works may also be required to facilitate the delivery of turbine components to the site. Where such works are proposed within 300m of noise and vibration sensitive receptors, an assessment of construction noise and vibration will be scoped-in.

11.5.3. Construction traffic to and from site will be required to deliver plant and materials. The increase in road traffic movements has the potential to temporarily increase road traffic noise. The construction traffic numbers, and access routes are yet to be finalised. An assessment of construction traffic noise is scoped-in.

11.5.4. On site borrow pits (locations where materials are excavated from the ground for use on site) may be used. However, their need and location are yet to be determined. Where included, borrow pits may require blasting to be undertaken, which has the potential to generate noise, vibration and air overpressures. Where they are proposed within 1km of a sensitive receptor, an assessment of groundborne vibration and air overpressures from blasting will be scoped-in. Noise from blasting is short term, temporary and instantaneous, so an assessment of blast induced noise is scoped-out.

Operation

11.5.5. Development generated traffic to and from site is anticipated to be low, it will include routine maintenance and service visits. The traffic numbers would not be sufficient to give rise to a significant effect. An assessment of operational traffic noise is scoped-out.

11.5.6. Fixed plant proposals are not currently confirmed, but it is expected that these can be located at a sufficient distance from receptors to avoid the potential for a significant noise effect to arise. Assessments of fixed plant noise is therefore scoped-out, but where fixed plant are proposed within 300m of sensitive receptors, this will be reversed.

11.5.7. Wind turbine noise has the potential to adversely affect noise sensitive receptors. There is flexibility in the final turbine locations and the turbine model to be installed. These parameters allow operational noise to be controlled. Whilst the final applicable noise level limits will depend upon the results of a detailed baseline noise survey, it is anticipated that with consideration to appropriate noise mitigation measures (where required), such limits are likely to be achievable. An assessment of operational turbine noise has therefore been scoped-in.

11.5.8. Current national policy on wind turbine noise assessment is that the guidance in the Energy Technology Support Units R-97 document: *The assessment and rating of noise from wind farms*[135] (ETSU-R-97) should be applied in conjunction with the Institute of Acoustics': *A good practice guidance to the application of ETSU-R-97 for the assessment and rating of wind turbine noise*[136] (IoA GPG). Assessments of turbine generated vibration, infrasound, low frequency noise and excess amplitude modulation (AM) all fall outside the scope of an ETSU-R-97[134] compliant assessment. These have therefore been scoped-out of the of the assessment.

[135] The Energy Technology Support Units: R-97 document. The assessment and rating of noise from windfarms. 1996. ETSU-R-97

[136] Institute of Acoustics. A Good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise. 2013. (also including its Supplementary guidance notes): IoA GPG and SGNs

11.5.9. Notwithstanding this, the separation distances between the proposed turbines and receptors are sufficient that groundborne vibration from the turbines would not be perceptible. Furthermore, with regard to infrasound and low frequency noise, in December 2022, WSP published their report: *A review of noise guidance for onshore wind turbines* for the then Department for Business, Energy and Industrial Strategy[137] (The BEIS report). That report confirms that:

> "*…the weight of evidence appears to indicate that wind turbine infrasound has no adverse effects on human health at typical exposure levels…"*
>
> and that;
>
> "*…due to the inherent characteristics of wind turbine sound, suitable controls on A-weighted sound levels are expected to also provide sufficient control for the potential impact of low frequency noise*".

11.5.10. With regards to AM (the variation in noise level associated with the wind turbine operation at the rate at which turbine blades pass a fixed point), the ETSU-R-97[135] assessment method accounts for this, up to a stated degreed, it being a component part of typical wind turbine noise. The remaining potential issue is therefore only that associated with possible 'excess' AM, i.e. at a level above that already accounted for in the ETSU-R-97[135] assessment method. However, there is currently no reliable or recognise means to predict the likely occurrence of AM. There are reported recommendations for its measurement and quantification, but at the time of writing there has been no endorsement of those approaches from any Scottish Minister or Departments. Assessments of turbine generated groundborne vibration, infrasound, low frequency noise and excess amplitude modulation (AM) are therefore scoped-out.

Decommissioning

11.5.11. It is expected that any noise or vibration from decommissioning activities would be no greater than that generated during construction operations. As assessment of decommissioning noise and vibration is therefore scoped-out.

11.5.12. A summary of the potential noise and vibration impacts that are scoped-in and scoped-out of the assessment is presented within **Table 11-2**.

Table 11-2 - Elements Scoped In or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Construction noise and vibration (on site)	Construction		X	Existing receptors have been identified to be sufficiently removed from the wind turbine sites and it is

[137] WSP for the British Government Department for Business, Energy and Industrial Strategy. A review of noise guidance for onshore wind turbines. 2022. The BEIS Report

Element	Phase	Scoped In	Scoped Out	Justification
				expected that access tracks, borrow pits and other infrastructure can also be located as sufficient distances. An assessment of construction noise and vibration has therefore been scoped-out.
Construction noise and vibration (road and junction works)	Construction	X		Localised road or junction improvement works may be required. An assessment of construction noise and vibration is scoped-in where such works are within 300m of noise and vibration sensitive receptors.
Construction traffic noise	Construction	X		Construction traffic has the potential to increase noise at sensitive receptors adjacent to the local road network. An assessment of construction traffic noise is scoped-in.
Blast induced noise, vibration, air overpressures	Construction	X (groundborne vibration and air overpressures)	X (noise)	Assessment of blast induced vibration and air overpressures is scoped-in where blasting would be required at borrow pits within 1km of receptors. Noise from blasting is short term, temporary and instantaneous, so an assessment of blast induced noise is scoped-out.
Operational wind turbine noise	Operation	X		Wind turbine noise has the potential to cause significant adverse effects. A detailed assessment will be required to demonstrate compliance with applicable noise limits. An assessment of operational wind turbine noise is scoped-in.
Operational wind turbine generated vibration, amplitude modulation, low frequency noise and infrasound	Operation		X	Vibration, amplitude modulation, low frequency noise and infrasound are outside the scope of the assessment methodology required to be applied for compliance with national policy. Assessment of these elements has been scoped-out.
Operational fixed plant noise	Operation		X	It is expected that any fixed plant items can be located at sufficient separation distances (e.g. greater than 300m form receptors) that a significant effect would not arise. The final layout design will be checked, and this potential effect will be scoped

Element	Phase	Scoped In	Scoped Out	Justification
				back in if distances are found to be less than 300m.
Operational traffic noise	Operation		X	Traffic movements to and from the site once operational would be minimal and not sufficient to give rise to significant changes in road traffic noise levels along the existing local road network.
Decommissioning noise and vibration	Decommissioning		X	Noise and vibration from decommissioning activities would be no greater than that generated during construction operations. An assessment of decommissioning noise and vibration is therefore scoped-out.

OPPORTUNITIES FOR ENHANCING THE ENVIRONMENT

11.5.13. The prevailing local background noise levels are anticipated to be a combination of natural sources such as the wind, rustling vegetation and water courses, as well as manmade sources such as vehicles on local minor roads, train movements and private generators. There is no potential or desire to control the existing noise sources.

11.5.14. No potential sources of groundborne vibration have been identified within the site boundary. Where there are no current levels of groundborne vibration, there is no potential for further enhancement.

11.6 PROPOSED ASSESSMENT METHODOLOGY

RELEVANT LEGISLATION AND GUIDANCE

11.6.1. To assist in determining the appropriate assessment methodologies, consideration has been given to relevant legislation, policy and guidance.

Legislation

- Control of Pollution Act 1974 (CoPA)[138];

Policy

- National Planning Framework 4 (NPF4)[139];

[138] Control of Pollution Act 1974. HM Government, The Stationery Office. Control of Pollution Act 1974

[139] National Planning Framework 4. 2024. Scottish Government. National Planning Framework 4

- Onshore Wind Policy Statement 2022 (OnWPS)[140]
- The Highland Council - Highland-wide local development plan (HwLDP)[141];
- The Caithness and Sutherland Local Development Plan (CaSPlan)[142].

Guidance

- Planning Advice Note 1/2011: Planning and noise (PAN 1/2011)[143];
- Planning Advice Note 50: Controlling the environmental effects of surface mineral workings[144] including Annex D: The Control of Blasting at Surface Mineral Workings[145];
- Assessment of noise: Technical advice note (TAN)[146];
- Onshore wind turbines: Planning advice (OWPA)[147];
- The Highland Council - Onshore wind energy supplementary guidance (OWSG)[148];
- BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Noise (BS 5228-1)[149];
- BS 5228-2:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Vibration (BS 5228-2)[150];
- ETSU-R-97[134];
- IoA GPG including Supplementary Guidance Notes (SGNs)[135];
- Calculation of road traffic noise[151] (CRTN);

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[140]Onshore Wind Policy Statement 2022. 2022. Scottish Government Onshore Wind Policy Statement

[141] Highland-wide Local Development Plan. 2012. The Highland Council

[142] Caithness and Sutherland Local Development Plan Caithness and Sutherland Local Development Plan

[143] Planning Advice Note 1/2011: planning and noise. 2011. Scottish Government. Planning Advice Note 1/2011: planning and noise

[144] Planning Advice Note 50: controlling the environmental effects of surface mineral workings. 1996. Scottish Government. Planning Advice Note 50: controlling the environmental effects of surface mineral workings

[145]PAN 50: Controlling the environmental effects of surface mineral workings. Annex D: The control of blasting at surface mineral workings. 2000. Scottish Government. PAN 50 Annex D The control of blasting at surface mineral workings

[146] Assessment of noise: technical advice note. 2011. Scottish Government Assessment of noise: technical advice note

[147] *Onshore wind turbines: planning advice*. 2014. Scottish Government Onshore wind turbines: planning advice

[148] Onshore Wind Energy Supplementary Guidance. 2016 (with addendum 2017). The Highland Council. Development guidance - Onshore wind energy

[149] British Standard BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Noise

[150] British Standard BS 5228-2:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Vibration

[151] Calculation of road traffic noise memorandum. 1988. Department of Transport and Welsh Office. HMSO

- Design Manual for Roads and Bridges. LA 111. Noise and vibration[152] (LA 111).

National Planning Policy

National Planning Framework 4[139] (NPF4)

11.6.2. NPF4 sets out the national spatial strategy for Scotland. Sections of policies relevant to noise and vibration are reproduced below.

> Policy 11: *Energy*
>
> *"… e) In addition, project design and mitigation will demonstrate how the following impact are addressed:*
>
> > *i) impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker."*
>
> Policy 23: *Health and safety*
>
> *"… e) Development proposals that are likely to raise unacceptable noise issues will not be supported. The agent of change principle applies to noise sensitive development. A Noise Impact Assessment may be required where the nature of the proposal or its location suggests that significant effects are likely."*

Onshore Wind Policy Statement[140] 2022

This document sets out the national policy for onshore wind development. Section 3.7 is concerned with noise and states:

> *"3.7.1. 'The Assessment and Rating of Noise from Wind Farms' (Final Report, Sept 1996, DTI), (ETSU-R-97) provides the framework for the measurement of wind turbine noise, and all applicants are required to follow the framework and use it to assess and rate noise from wind energy developments.*
>
> *3.7.2. The Institute of Acoustics (IOA) Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise was published in May 2013 to support the use of ETSU-R-97 when designing potential windfarm schemes, and the monitoring of noise levels from generating sites. The Scottish Government recognises this guide as a useful tool which developers can use in conjunction with ETSU-R-97."*

It goes on to state that ETSU-R-97 should continue to be applied until such time that new guidance is produced.

[152] Design Manual for Roads and Bridges. LA 111 Noise and vibration. Revision 2. 2020.LA 111 - Noise and vibration

Planning and Advice Note (PAN) 1/2011: Planning and noise[143]

11.6.3. Published in March 2011, PAN 1/2011: *Planning and noise* provides advice on the role of the planning system in helping to prevent and limit adverse effects of noise. Information and advice on noise assessment methods are provided in the accompanying Technical Advice Note (TAN): *Assessment of noise*[146]. With regards to noise from wind turbines, paragraph 29 of PAN 1/2011 states the following:

> "*There are two sources of noise from wind turbines – the mechanical noise from the turbines and the aerodynamic noise from the blades. Mechanical noise is related to engineering design. Aerodynamic noise varies with rotor design and wind speed, and is generally greatest at low speeds. Good acoustical design and siting of turbines is essential to minimise the potential to generate noise. Web based planning advice on renewable technologies for onshore wind turbines provides advice on 'The Assessment and Rating of Noise from Wind Farms' (ETSU-R-97) published by the former Department of Trade and Industry (DTI) and the findings of the Salford University report into Aerodynamic Modulation of Wind Turbine Noise.*"

11.6.4. With regards to appropriate assessment methods, the 'web-based planning advice' referred to in PAN 1/2011 is contained in the online planning resource entitled 'Onshore wind turbines: *Planning advice*'[147]. This guidance references the use of ETSU-R-97[135] for the assessment of noise from wind farms and confirms that the IoA GPG[136] provides significant support on technical issues for all users of ETSU-R-97[135]. It is also confirmed that the Scottish Government accepts that use of this guidance represents current industry good practice.

11.6.5. The accompanying TAN[146] to PAN 1/2011[143] also refers to ETSU-R-97[135], including a summary of the associated assessment approach.

11.6.6. With regards to the assessment and control of noise and vibration from construction sites, the use of BS 5228-1 and BS 5228-2 1997 is discussed. This version of BS 5228 was superseded in 2009 and amended in 2014[149 & 150].

11.6.7. PAN 50: *Controlling the effects of surface mineral workings*[144], including Annex D: *The control of blasting at surface mineral workings*[145] includes consideration to potential noise, vibration and air overpressure impacts that can arise as a result of blasting works associated with minerals extraction. It also includes a summary of good practice measures that can be employed to minimise potential effects and references the use of BS 5228[150] for the prediction of blast induced vibration.

Local Planning Policy

Highland-wide Local Development Plan[141] (HwLDP)

11.6.8. The HwLDP[141] sets out a spatial strategy for the Highland area. Sections of policies relevant to noise and vibration are reproduced below.

> Policy 67: *Renewable Energy Developments*

"… the Council will support proposals where it is satisfied that they are located, sited and designed such that they will not be significantly detrimental overall, either individually, or cumulatively with other developments … having regard in particular to any significant effects on… the safety and amenity of any regularly occupied buildings, and ground that they occupy", because of noise.

Policy 72: *Pollution*

"Proposals that may result in significant pollution such as noise… will only be approved where a detailed assessment report on the levels, character and transmission and receiving environment of the potential pollution is provided by the applicant to show how the pollution can be appropriately avoided and if necessary mitigated."

The Caithness and Sutherland Local Development Plan[142] (CaSPlan)

11.6.9. The CaSPlan[142] was prepared to guide development and investment within these areas and was adopted in August 2018. The are no noise, vibration or onshore renewable energy related policies presented within this document, or policies specific to the area within which the Proposed Development is located.

Guidance

11.6.10. There are several national and local guidance documents which provide advice on assessment, good practice and relevant information to wind farm developments. These include the TAN[146] and PAN 1/2011[143] as discussed above.

11.6.11. The Highland Council's *Onshore Wind Energy Supplementary Guidance*[148] (OWSG) identifies that wind farm noise assessments should be undertaken in accordance with ETSU-R-97[135] and the IoA GPG[136], and that those documents contain the guiding principles upon which the Council will base their assessment.

11.6.12. The OWSG[148] highlights that when assessing proposals THC will focus on four principles:

- THC's expectations are that all proposals will seek to achieve noise limits at sensitive receptors that are at the lower end of the range indicated in the national guidance.
- That the selection of proxy measurement locations should account for guidance whilst ensuring that the selected locations have similar characteristics to the properties that they are selected to represent. Where such proxy locations are not available, then the lowest measured background noise levels will be applied. Applicants are advised to liaise with the Council to discuss monitoring locations prior to the installation of equipment.
- Assessment must adequately account for potential cumulative noise impacts accounting for predicted and consented developments.
- That research into Amplitude Modulation (AM) is ongoing and currently there is no accepted best practice for measuring, monitoring or setting limits. Should any such guidance become available, Highland Council will expect developers to follow its recommendations.

SURVEY METHODOLOGY

11.6.13. The noise sensitive receptors closest to the Proposed Development have been grouped based on their location and the findings of the desk study. The desk study included consideration to existing local noise sources. Four groups have been identified as presented in **Table 11-3**. Prevailing baseline noise levels are proposed to be recorded at four monitoring locations, a single measurement location is representative of each group. The measurement locations / receptor groups are detailed in **Table 11-3** and in **Figure 11.3**. **Figure 11-3** also presents indicative representative measurement locations for each group.

Table 11-3 – Proposed Property Groups / Baseline Noise Surveys Measurement Locations

Measurement Location / Receptor Group	X	Y	Representative Receptors
01	299360	944336	One residential property: Badnaheen
02	300375	945623	Four residential properties: Old School House; Station Cottage; Keeper's House; Langa Cottage.
03	302967	940739	Two residential properties: Dalnawillan Lodge; Dalnawillan Cottage.
04	306695	943869	One residential property: Dalnaha

11.6.14. A measurement location is not proposed in the vicinity of Lochdhu Lodge. The presence of the two existing Lochdhu Lodge turbines is expected to prevent the measurement of accurate baseline noise level data (which is required to be determined in absence of turbine noise), at that location.

11.6.15. The final measurement locations will be dependent upon obtaining landowner approvals. The final siting for equipment installation will be determined by the site engineer following a review of local conditions, including consideration to the presence of foliage, water courses and any other potential noise sources, as well as the orientation of buildings and the location of external amenity spaces. Where possible, all measurements will be undertaken under free-field conditions at a height of 1.5m above ground.

11.6.16. The noise survey will be undertaken to fulfil the requirements of ETSU-R-97[135] and the IoA GPG[136], including its associated SGNs[136]. The survey will be undertaken over a period of approximately three weeks to obtain the prevailing levels under the requisite range of wind speed conditions. The survey will be undertaken with simultaneous measurement of wind speed and direction on the site, obtained either through use of a LiDAR system or a meteorological mast. Rainfall measurements will also be obtained for the duration of the baseline noise survey.

11.6.17. The measured wind speed data will be corrected/standardised to a height of 10m above ground following current good practice, drawing upon guidance presented within the IoA GPG[136] and associated SGNs[136]. This will allow due account of site-specific wind shear.

11.6.18. The baseline noise survey will be mostly unattended, as appropriate for long-term surveys, with all measurements carried out using sound level meters compliant with Class 1 specification, as set out in BS EN 61672-1[153], and using wind protection that conforms to the recommendations in ETSU-R-97[135] and the IoA GPG[136]. All measurement equipment will be installed by a consultant competent in environmental noise monitoring, in accordance with the principles of BS 7445-2[154].

MITIGATION

Construction

11.6.19. During the construction phase, Best Practicable Means (BPM), as defined in Section 72 of the COPA[138], will be adopted to reduce the impact of noise and vibration.

11.6.20. A scheme of BPM will be written into a Construction Environmental Management Plan (CEMP). Compliance with specific measures and the principles of BPM can be ensured through a planning condition.

11.6.21. Measures in compliance with BPM include the adoption of appropriate construction working hours, keeping residents informed about the works, the careful selection of construction plant and working methods and the careful programming and timing of deliveries.

Operation

11.6.22. For operational wind turbine noise, there are several mitigation measures that are available if required. These include flexibility on the turbine locations and the turbine model to be installed. An appropriate turbine selection may include a noise management system, which allows individual turbines to operate in reduced noise modes under prescribed meteorological conditions.

11.6.23. The development layout and design will be subject to an iterative design process allowing the incorporation of mitigation measures as necessary.

11.6.24. In addition, planning conditions can be used to specify derived noise level limits that shall not be exceeded once operational.

[153] British Standard BS EN 61672-1:2013: Electroacoustics. Sound level meters. Specifications

[154] British Standard BS 7445-2:1991: Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use

ASSESSMENT METHODOLOGY

Construction Noise

11.6.25. The locations at which the highway or junction improvement works will be necessary will be reviewed. Where noise-sensitive receptors are identified within 300m of these works areas, a series of noise level predictions will be carried out for the identified receptors. These will be completed accordance with the methodology presented in BS 5228-1[149]. Predictions will be undertaken for typical construction operations associated with the proposed improvement works and drawing upon the anticipated construction methodologies.

11.6.26. The predicted construction noise levels will be assessed by comparison against assessment criteria that will be determined following the guidance contained within BS 5228-1[155]. The assessment also will include account of the anticipated timing and duration of the works. The assessment results will form the basis of determining whether or not a significant effect would arise from the proposed works.

11.6.27. Where required, specific noise mitigation measures will be presented, and residual effects will be determined.

Construction Vibration

11.6.28. The assessment will be completed based on BS 5228-2[150]. A series of typical set back distances will be determined, at which different threshold vibration levels are likely to arise for typical highway and junction improvement works. The distance of the receptors to the working areas will then be compared against the derived separation distances to determine whether a significant effect would arise. The assessment will also include account of the anticipated timing and duration of the works.

11.6.29. Where required, appropriate vibration mitigation measures will be presented, and residual effects will be determined.

Construction Traffic Noise

11.6.30. The assessment will be completed based on the CRTN[151]. A series of noise level calculations will be undertaken for construction access routes to determine the Basic Noise Level (BNL) for scenarios both ‘with’ and ‘without’ construction traffic flows. The resulting noise level changes, identified to arise due to construction traffic, will be assessed with reference to the impact magnitude scales detailed within DMRB LA 111[152], with the resulting effects determined.

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[155] British Standard BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Noise

Blast Induced Vibration and Air Overpressures

11.6.31. Where blasting may be required within 1km of receptors, the potential for significant blast induced vibration and air overpressure effects will be considered following the guidance contained within BS 5228-2[150], PAN 50[144] and PAN 50 Annex D[145] . This assessment will consider the likelihood of impacts arising with reference to the location of any proposed on-site borrow pits, and the mitigation measures that would be available for incorporation into the working methods.

11.6.32. Where required, appropriate noise and vibration mitigation measures will be presented, and residual effects will be determined.

Operational Turbine Noise

11.6.33. A detailed assessment of operational turbine noise levels will be undertaken in accordance with ETSU-R-97[135] and the IoA GPG[136].

11.6.34. The results of the baseline noise survey, and simultaneously obtained meteorological measurements will be analysed and assessed in accordance with ETSU-R-97[135] and the IoA GPG[136], to determine the applicable daytime and night-time noise level limits. This process will also draw upon the detail of local planning policy / guidance as outlined above.

11.6.35. A detailed scheme noise model will be prepared to reflect the final proposed scheme layout design and selected candidate turbine for the Proposed Development.

11.6.36. The noise model will also include the two existing turbines at Lochdhu Lodge which have been scoped-in to the cumulative assessment. The developments of Forsinain Forest Wind Farm (Scoping Stage), Baldigle Wind Farm (Scoping Stage) and Tormsdale Wind Farm (Application submitted) have all been scoped-out of the cumulative assessment based on distance and will not be included in the noise model.

11.6.37. The noise model will be used to determine the operational noise levels that would arise at each of the receptors listed in Table 11-1 from a range of wind speed from cut-in to 12m/s. The calculation will apply the prediction method detailed in ISO 9613-2: 1996: Acoustics — *Attenuation of sound during propagation outdoors*[156], as recommended for use in the IoA GPG[136], and also applying the adaptations included in that guide (acoustic screening cap and valley corrections).

Proposed Development in Isolation

11.6.38. The predicted operational noise levels for the development operating in isolation will be compared against the derived noise levels limits. Separate daytime and night-time assessments will be undertaken for each receptor.

156 ISO 9613-2: Acoustics - Attenuation of sound during propagation. Part 2: General method of calculation. International Standards Organisation. ISO. 1996.

Cumulative Turbine Noise

11.6.39. It is recognised that the ETSU-R-97[135] noise level limits apply cumulatively, so the results of the cumulative noise assessment will be used to determine whether or not a significant effect would arise.

11.6.40. The noise model will be used to determine the operational noise levels arising from the two existing Lochdhu Lodge turbines. Predictions will be based upon the turbine type as installed, but will also account for whether that development could reasonably generate higher noise levels in the future whilst still operating within its planning consent.

11.6.41. Where available, the planning consent for the Lochdhu Lodge turbines will be reviewed to establish if there are any noise limits or other noise controls to which it must comply. Where such limits apply, the prediction results will be capped to be no greater than the imposed limits. Where there are no noise related planning controls, an addition margin of conservatism will be included in the prediction results (e.g. +2dB above the normally applied uncertainty corrections).

11.6.42. The predicted levels will then we used to determine the Remaining Noise Budget (RNB) that is available to the Proposed Development. The RNB will be set either a) by subtracting the prediction Lochdhu Lodge turbine noise levels from the cumulative noise limits (but with the result set to be no more than 10dB below the cumulative limits), or b) set at 10dB below Lochdhu Lodge turbine predicted levels (but determined without including the addition prediction conservatism).

11.6.43. This approach is such that compliance with the RNB by the Proposed Development, will ensure that either a) the cumulative noise level limits will not be exceeded, or b) noise from, the proposed development will not give rise to a significance increase over that already permitted by the generated by the Lochdhu Lodge turbines.

11.6.44. Where an exceedance of the noise level limits / RNB is identified, consideration will be given to the measures available to reduce noise levels from the Proposed Development such that the cumulative noise limits / RNB are achieved. This may include consideration to direction corrections and use of a noise management scheme.

11.6.45. Residual effects will then be determined. Compliance with the cumulative noise limits or RNB will indicate a not significant effect.

ASSUMPTIONS AND LIMITATIONS

11.6.46. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- This scoping chapter is based on the proposed wind turbine locations, as shown on **Figure 11.3**.
- The selection of baseline survey monitoring locations is dependent on landowner approvals. If these are not forthcoming, it will be necessary to adopt proxy measurement locations selected as representative of identified receptors. This approach is in accordance with current best practice.
- It is anticipated that the final construction working methods will not be known at the point of undertaking the assessment work. If required, the construction assessment would be based on assumed plant, plant number and plant percentage on-times. Plant selections will be based upon the types of activities typical of the proposed construction works.

- The assessment of construction traffic noise will draw upon the results of the transportation assessment, in particular the local road traffic flow information and projected construction traffic trip generation data.
- The final turbine model to be installed at the Proposed Development would be the subject of a tender process which will not progress until after consent. The operational noise assessment will therefore be based on the noise emission data for a candidate turbine type that fits within the proposed physical parameters (e.g. max tip height).

12 CLIMATE CHANGE

12.1 INTRODUCTION

12.1.1. The Climate Change Resilience (CCR) chapter considers the potential impacts of climate change on the Proposed Development across the construction, operation and decommissioning phases which may result in likely significant effects. The CCR chapter is different from other environmental topics, as the receptor is the Proposed Development and therefore considers the impact of climate change on the components of the development. These components include the temporary and permanent assets and the workforce.

12.1.2. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented **in Chapter 2: Site Context and Proposed Development Description** and with respect to relevant parts of other technical chapters, such as **Chapter 9: Hydrology, Hydrogeology and Peat.**

12.1.1. CCR interfaces with all other topic chapters through the In-combination Climate Impacts (ICCI) assessment. The ICCI is undertaken by assessing how identified receptors in the surrounding environment are affected by future climate parameters, informed by the future climate baseline. Inclusion of an ICCI assessment has been scoped in, but this will be addressed within the relevant chapters of the EIA Report as part of the assessments for their environmental topics. The ICCI assessment will identify if any reported effects will be exacerbated or ameliorated by the effects of climate change and identify further mitigation where required. It will also assess whether the embedded measures will continue to be effective considering changes to climate.

12.2 CONSULTATION

12.2.1. No specific consultation is anticipated with external stakeholders at this stage nor has consultation been undertaken to inform the production of this chapter and in determining the baseline information, which has been based on publicly available data and follows good practice guidance.

12.3 STUDY AREA

12.3.1. The scope for the CCR assessment relates to the impact of climate on the Proposed Development (rather than the impact of the Proposed Development on climate). As such, the Study Area for the Proposed Development is defined as the Site Boundary.

12.4 BASELINE CONDITIONS

12.4.1. The IEMA Guidance[157] identifies the need for the baseline to consider:

[157] IEMA Climate Change Adaption Practitioner Guidance https://www.iema.net/resources/blogs/2022/11/11/iema-publishes-guidance-on-climate-change-adaptation/ November 2022

- the current climate baseline (defined by historic climate conditions) to provide an indication of past vulnerability; and
- the future climate baseline (short term extremes and long-term variation) to assess a Proposed Development's vulnerability to climate change.

12.4.2. This section provides an overview of the current baseline conditions for the Study Area using weather station data, and the projected future changes in the climate for the Study Area.

DATA SOURCES

Desk Study

12.4.3. This section provides an overview of the current baseline conditions and the projected future changes in climate variables for the Study Area, which has been undertaken using publicly available data sources outlined in **Table 12-1**.

Table 12-1 - Data sources

Source	Summary	Coverage of Study Area
Met Office records for UK Climate averages[158]	Provides historical observed climate data.	Data captured from the Kinbrace climate station located approximately 11 km from the Site Boundary.
State of the UK Climate Report 2023[159]	Provides a summary of the observed UK climate trends.	Applicable to the UK.
Met Office Northern Scotland: Climate[160]	This document describes the main features of the climate for the region over a 30-year average period of 1981 – 2010.	Applicable to the region where the Site is situated.

[158] Met Office. (2021). UK Climate Averages - Kinbrace (Online). Available online: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfm5qbgxz

[159] Kendal et al., (2023). State of the UK Climate 2022. International Journal of Climatology, 43(S1), 1-82. https://rmets.onlinelibrary.wiley.com/doi/10.1002/joc.8553

[160] Met Office (2016). Northern Scotland: Climate (Online). Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/weather/regional-climates/northern-scotland_-climate-met-office.pdf

Source	Summary	Coverage of Study Area
UK Climate Projections 2018 (UKCP18)[161]	Provides climate change projection data for the 25km grid square for probabilistic projections.	The Climate Risk Indicators and UKCP18 websites were used to extract projection data for Caithness and Sutherland, as the Local Authority where the Proposed Development resides. This is representative of the entire Study Area. Where quantitative data is unavailable, UKCP18 Factsheets have been used.
UK Climate Risk Indicators[162]	Provides climate change projection data and indicators.	
UKCP18 Derived Projections of Future Climate over the UK[163]	Describes derived projection trends where 25 km data is unavailable.	
UKCP18 Fact Sheet: Soil Moisture and the Water Balance[164]	Summarises UKCP18 data over land for soil moisture.	
UKCP18 Fact Sheet: Wind[165]	Summarises UKCP18 data over land for wind metrics.	
UKCP18 Fact Sheet: Snow[166]	Summarises UKCP18 data over land for snow metrics.	

[161] Met Office (2018). UKCP18 Derived Projections of Future Climate over the UK (Online). Available at: https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Derived-Projections-of-Future-Climate-over-the-UK.pdf

[162] Nigel Arnell et. al., (2021). The Climate Risk Indicators (Online). Available at: https://uk-cri.org/

[163] Met Office (2018). UKCP18 Derived Projections of Future Climate over the UK (Online). Available at: https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Derived-Projections-of-Future-Climate-over-the-UK.pdf

[164] Pirret, J.S.R., Fung, F., Lowe, J.A., McInnes, R.N., Mitchell, J.F.B. and Murphy, J.M. (2020). UKCP Factsheet: Soil Moisture. Met Office. Available from: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_factsheet_soil_moisture.pdf

[165] Fung F, Bett P, Maisey P, Lowe J, McSweeney C, Mitchell JFB Murphy J, Rostron J, Sexton D and Yamazaki K. UKCP18 Factsheet: Wind. Met Office Hadley Centre, Exeter Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-derived-projections.pdf

[166] Pirret JSR, Fung, F, Kendon E, Lowe J (2021). UKCP18 Factsheet: Snow. Met Office Hadley Centre, Exeter. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_factsheet_snow_jul-2021.pdf

CURRENT AND HISTORICAL BASELINE

12.4.4. This section provides a summary of the climate trends over the past three decades for precipitation (rain and snow), temperature, relative humidity, wind and sea level for the Study Area. This is presented against the UK context as well as the regional climate, as represented by the Northern Scotland region. Due to the availability of sources of information, the climate period considered for the baseline can vary.

UK Context

12.4.5. According to the latest State of the UK Climate Report 2023, the UK's climate is changing, with recent decades warmer, wetter, and sunnier than the 20th century on a national and local scale. This report highlights that the UK land temperatures have warmed by 1.25°C compared to 1961-1990, which is at a broadly consistent, though slightly higher, rate than the observed change in global mean land temperatures (1.15°C). The key findings from the report are:

- Six of the 10 years in the most recent decade (2014–2023) have been in the top-ten warmest for the UK.
- 2023 was the second warmest year on record; the mean temperature for 2023 was 9.97°C, which is 0.83°C above the 1991–2020 long-term average.
- In terms of the highest maximum temperatures, the most recent decade (2014–2023) was 35.6°C, 2.1°C higher than 1991–2020 and 4.3 °C higher than 1961–1990, showing greater increases in extremes than when comparing the changes in annual means.
- The UK's average lowest minimum temperature for the most recent decade 2014–2023 was −14.6°C, 0.9°C higher than 1991–2020 and 4.4°C higher than 1961–1990.
- The number of ‘warm days’ (daily maximum temperatures above 25°C) have increased by 63% for the most recent decade (2014 – 2023) compared to 1961-1990 and ‘very hot days’ (daily maximum above 30°C) have trebled, again showing greater increases in the trends for extreme events.
- The most recent decade (2014-2023) has had six fewer days of air frosts and 11 fewer days of ground frosts when compared with 1991-2020 and 17/28 fewer air/ground frost days when compared to 1961-1990.
- The UK’s annual precipitation shows large annual variability inherent to the UK climate, with some decadal variability. Two years in the most recent decade (2014–2023) have been in the top-ten wettest, and there has been a marked increase in winter rainfall in the last few decades coupled with a slight increase in autumn rainfall.
- The number of days of rain greater than or equal to 10 mm (‘very wet days’) for the UK during 2023 was 41 days. This was six days more than the 1991–2020 long term average. This suggests an increase in the number of days of widespread heavy rain in the last few decades; however, caution is needed in this interpretation due to the large annual and decadal variability in UK rainfall.
- Summer rainfall has increased, coupled with a slight increase in spring rainfall. There is no obvious reducing trend in the occurrence of top-ten driest months, seasons or years in the last three decades.
- Three years in the most recent decade 2014–2023 have been in the top-ten sunniest in the UK series; and this is the sunniest 10-year period.

- Despite the warming climate, impactful snow events are still to be expected but their number and severity have declined since the 1960s.
- There is a downward trend of annual mean wind speeds, falling from ~18.5 km/h in 1970 to ~17 km/h in 2023.
- The most recent two decades have seen fewer occurrences of max gust speeds above these thresholds than during the previous decades, particularly comparing the period before and after 2000. The number of station-days recording gusts exceeding 40/50/60 Kt in 2023 was broadly comparable to the period after 2000. However, there are considerable year-to-year and decadal variations in these series, and they are relatively short.

Regional Climate

12.4.6. Northern Scotland, as defined within the Met Office regional climate summary[167], has extensive areas of high ground and includes the highest point in the UK - Ben Nevis (1344 m). Mean annual temperatures over the region at low altitude vary from about 9°C close to the Moray Firth and on the westernmost isles to about 7°C on Shetland, but over the higher ground temperatures are generally lower so that at Cairngorm Summit the annual mean is just below 1°C. Much of Northern Scotland is exposed to the rain-bearing westerly winds, particularly the Western Isles and the west coast. As a result, most of the western half of the region has an average annual rainfall of at least 1700mm.[167]

12.4.7. Key features of the climate that have defined the area over the last 30-year period (1981-2010) include:

- January or February is the coldest month, with mean daily minimum temperatures varying from about 2°C on west-facing coasts and in the Western and Northern Isles, to less than -1°C over higher ground. Extreme minimum temperatures can occur in winter; examples include -27.2°C at Altnaharra (Highland) on 30 December 1995 (the UK record low temperature, shared with Braemar, Grampian). Conversely, occasionally to the lee of high ground temperatures can reach up to 15°C in winter when a south or SW airstream warms up after crossing upland - an effect known as a fohn wind.
- July or August is the warmest month, with mean daily maximum temperatures at low levels around 19°C in areas close to the Moray Firth. Elsewhere in northern Scotland the mean daily maxima are somewhat lower and are less than 16°C over the higher ground and the islands. Extreme maximum temperatures can occur in July or August and are usually associated with heatwaves. On the larger Western Isles and in sheltered places, temperatures can exceed 28°C.
- Rainfall is generally well-distributed throughout the year. The frequency of Atlantic depressions is normally greatest during the autumn and winter but, unlike other parts of the UK, Scotland tends to remain under their influence for much of the summer too. In the western and northern areas

[167] Met Office (2016). Northern Scotland: Climate (Online). Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/weather/regional-climates/northern-scotland_-climate-met-office.pdf

there is an autumn/early winter maximum, whereas places close to the Moray Firth tend to have a more even distribution through the year. Late spring and early summer are normally the driest periods of the year.

- Periods of prolonged rainfall can lead to widespread flooding, especially in winter and early spring when soils are usually near saturation and snowmelt can be a contributing factor. There have been a number of severe flooding events over this period.
- On average, the number of days with snow falling varies from less than 30 per year along the west coast to over 100 days over the Grampians. The number of days with snow lying has a similar distribution, with less than six over the westernmost islands, about 20 in Shetland and more than 50 days over the higher ground. On the highest summits, such as Ben Nevis, snow cover typically persists for six or seven months each year.
- The western and northern parts of Northern Scotland are, on average, the windiest in the UK, being fully exposed to the Atlantic and closest to the passage of areas of low pressure. The frequency and depth of these depressions is greatest in the winter half of the year, especially from December to February, and this is when mean speeds and gusts (short duration peak values) are strongest.

Local Climate

12.4.8. The nearest Met Office climate station to the Site Boundary is Kinbrace.[168] The data has been used to understand historic baseline conditions associated with the Study Area (1981 – 2010) and how climate change has already impacted the Study Area by comparison with the current data (1991 – 2020).

Precipitation – rainfall

12.4.9. Average seasonal rainfall recorded at Kinbrace climate station, the Northern Scotland region, and the UK for the periods 1981 – 2010 and 1991–2020 are presented in **Table 12-2**. For the current baseline it demonstrates that the local weather is drier than the regional and UK year-round average. The data shows a small increase in average precipitation for both the summer and winter seasons at the Study Area from the historic baseline to the current baseline. This is also reflected at the regional level. There are several recorded instances of flooding and landslides that have closed the nearby railway line[169][170].

[168] Met Office. (2021). UK Climate Averages - Kinbrace (Online). Available online: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfm5qbgxz

[169] The Northern Times (2020). Rail services on the Far North Line are cancelled and revised after flooding at Ardgay, Sutherland, ScotRail announces. Available at: https://www.northern-times.co.uk/news/far-north-line-flooding-sparks-rail-cancellations-215784/

[170] BBC News (2017). Flooding disrupts Inverness to Wick train services. Available at: https://www.bbc.co.uk/news/uk-scotland-highlands-islands-42150509

Table 12-2 - Average Seasonal Rainfall (mm)

Season	Average Seasonal Rainfall (1981-2010) (mm)			Average Seasonal Rainfall (1991-2020) (mm)		
	Kinbrace Climate Station	Northern Scotland	UK	Kinbrace Climate Station	Northern Scotland	UK
Summer (June, July, August)	180.8	305.3	238.0	183.9	316.4	253.4
Winter (December, January, February)	280.7	534.9	328.4	283.0	553.1	345.8

Precipitation – snow

12.4.10. Snowfall is closely linked with temperature, with snowfalls rarely occurring if the temperature is higher than 4 °C. On average, the number of days with snow falling varies from less than 30 per year along the west coast to over 100 days over the Grampians.[171]

Temperature

12.4.11. **Table 12-3** shows the long-term average seasonal mean temperature for Kinbrace climate station, the Northern Scotland region, and the UK for 1981 – 2010 and 1991–2020. It shows that the Study Area is on a par with the regional average and cooler than the UK average.

Table 12-3 - Average Seasonal Temperature (°C)

Season	Average Seasonal Temperature (1981-2010) (°C)			Average Seasonal Temperature (1991-2020) (°C)		
	Kinbrace Climate Station	Northern Scotland	UK	Kinbrace Climate Station	Northern Scotland	UK
Summer (June, July, August)	12.8	12.2	14.4	12.9	12.3	14.6

[171] Met Office (2016). Northern Scotland: Climate (Online). Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/weather/regional-climates/northern-scotland_-climate-met-office.pdf

Season	Average Seasonal Temperature (1981-2010) (°C)			Average Seasonal Temperature (1991-2020) (°C)		
	Kinbrace Climate Station	Northern Scotland	UK	Kinbrace Climate Station	Northern Scotland	UK
Winter (December, January, February)	2.2	2.6	3.7	2.6	2.9	4.1

12.4.12. There are no significant heatwave events recorded at the site. However, a number of wildfires have impacted the northeast of Scotland including a significant event in the Flow Country in 2019.[172]

Relative humidity

12.4.13. The average relative humidity can be inferred for the Study Area from the average maps at Kinbrace.[173] For the summer months, the Study Area has experienced an average relative humidity of approximately 78-80% and in winter the average relatively humidity is approximately 82-84%. Both are typical for the wider region.

Wind

12.4.14. The western and northern parts of Northern Scotland are, on average, the windiest in the UK, being fully exposed to the Atlantic and closest to the passage of areas of low pressure[174]. The Study Area experiences average windspeeds of between 8-15 knots.[175] In general, the strongest winds are associated with the passage of deep depressions across or close to the UK. The frequency and strength of these depressions is greatest in the winter, especially from December to February, and this is when mean speeds and gusts (short duration peak values) are strongest.[176]

[172] BBC News (2019). Huge Flow Country wildfire 'doubled Scotland's emissions'. Available at: https://www.bbc.co.uk/news/uk-scotland-50435811

[173] Met Office. (2021). UK Climate Averages - Kinbrace (Online). Available online: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfm5qbgxz

[174] Met Office (2016). Northern Scotland: Climate (Online). Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/weather/regional-climates/northern-scotland_-climate-met-office.pdf

[175] Met Office. Where are the windiest parts of the UK? Available at: https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/wind/windiest-place-in-uk

[176] Fung F, Bett P, Maisey P, Lowe J, McSweeney C, Mitchell JFB Murphy J, Rostron J, Sexton D and Yamazaki K. UKCP18 Factsheet: Wind. Met Office Hadley Centre, Exeter Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-derived-projections.pdf

12.5 SCOPE OF ASSESSMENT

12.5.1. The spatial scope of the assessment is defined in **Section 12.3**. The receptors considered within the assessment are in **Section 12.6**.

12.6 SENSITIVE RECEPTORS

The project components (receptors) that will be considered in the climate change resilience assessment are detailed below.

CONSTRUCTION PHASE

12.6.1. It is expected that the construction period of the Proposed Development will be up to 2 years. The sensitive receptors during this construction phase include:

- Construction site and laydown;
- Construction workers
- Construction materials and equipment (such as vehicles, plant, cranes and high structures and ancillary features such as fencing, drainage, freshwater supply, and lighting)

OPERATION PHASE

12.6.2. The Proposed Development is expected to have an operational period of 40 years. The sensitive receptors during the operation phase are permanent assets. These include:

- Up to 17 wind turbines with tip heights up to 200 m;
- Access tracks and hard standing;
- Control building, battery storage facility area, at least one anemometer mast substation and electrical cabling between this and the turbines.
- Site staff.

DECOMMISSIONING PHASE

12.6.3. At the end of the Proposed Development's operational life, there are two options available:

- To re-power the Development Site with new turbines, which would require a new application and environmental assessment; or
- Removal of the wind turbines, battery storage facility, 'permanent' anemometry mast and control building and reinstate the Development Site to its former condition.

12.6.4. The latter option of decommissioning at the end of the Proposed Development's life will form part of the application and will inform the EIA. It is generally proposed that above ground structures would be removed (as per any condition relating to this topic on the grant of consent) and the hardstanding areas re-instated where appropriate.

CLIMATE VARIABLES

12.6.5. The changes in climate variables identified in **Section 12.4** could lead to the components (receptors) of the Proposed Development becoming vulnerable to climate change, due to sensitivity of the components to the change or the extent of exposure throughout the operational design life.

12.6.6. **Precipitation** – All aspects of the Proposed Development have the potential to be sensitive to high and low rainfall. Given that most of the infrastructure will be located externally, drying out and cracking of materials may affect structural stability and composition of the ground conditions. Prolonged dry periods can lead to cracking and more rapid deterioration of materials. Increased precipitation is likely to cause increased frequency and intensity of pluvial and fluvial flooding. High ground water levels may also cause pollutants in the soil to be mobilised, potentially affecting the stability of the Proposed Development assets. Snow and ice also have the potential to cause damage to all above-ground infrastructure.

12.6.7. **Temperature** –The majority of infrastructure will be located externally. For this reason, infrastructure may be sensitive to high and low temperature extremes through:

- Overheating of infrastructure, leading to greater demand for cooling;
- Overheating of electronic equipment;
- Deterioration of material structure and fabric;
- Damage to paved surfaces, including potential melting and deformation of surface asphalt.

12.6.8. Increasing temperatures coupled with decreasing precipitation could lead to increased wildfire events in those areas more prone to these conditions, such as peat bog and heathland.

12.6.9. **Wind and storms** – High winds and storms could affect the stability of larger pieces of infrastructure such as buildings and hasten material degradation. High winds can also cause wind-driven rain infiltration into plant, building materials and surfaces affecting all aspects of the Proposed Development's above-ground infrastructure, which can increase maintenance costs and operational disruption. It is important to note that whilst the short-term consequences of wind-related disruption are large, repairs may usually be carried out quickly.

12.6.10. **Relative humidity –** An increase in relative humidity in the winter has the potential to increase condensation, corrosion and decay of metal surfaces as well as mould growth, mildew and staining.

12.7 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

12.7.1. Embedded mitigation measures have been identified and are proposed to be adopted as part of the evolution of the design (embedded into the Proposed Development design). These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation and regulatory requirements.

12.7.2. Specific embedded mitigation measures relevant to CCR are listed in **Table 12-8**. Embedded mitigation measures related to flood risk and surface water can be found in **Chapter 9 Hydrology, Hydrogeology and Peat.**

13 AVIATION, TELECOMMUNICATIONS & SHADOW FLICKER

13.1 INTRODUCTION

13.1.1. This chapter details potential effects which may occur on aviation, telecommunications and shadow flicker as a result of the Proposed Development.

13.1.2. Specific Advice Sheet Onshore Wind Turbines (Scottish Government, May 2014)[177] identifies that wind turbines might impact on infrastructure, telecommunications, utilities and air safeguarding issues. Effects may, for example, include disruption of microwave rebroadcast links or local radio communication systems. The quality of television reception may also be affected, though to a lesser extent than prior to the switchover to digital transmissions, and viewers may suffer reduction of picture quality and acoustic interference.

13.2 EXISTING INFRASTRUCTURE, TELECOMMUNICATIONS AND BROADCAST SERVICES

13.2.1. A range of investigations will be undertaken to establish the presence of existing infrastructure associated with utilities such as water, gas, electricity and telecommunications links to establish either the absence of effects or to identify appropriate mitigation to overcome any effects. These matters would be addressed through consultation with the relevant system operators.

13.2.2. TV interference is now considered to be a low risk due to analogue TV signals no longer being in use and so this aspect is proposed to be scoped out. In the unlikely instance that TV interference occurs, it is considered that this can be appropriately covered by a suitably worded planning condition and complaints procedure to implement any necessary mitigation.

13.3 SHADOW FLICKER

13.3.1. Shadow Flicker is a phenomenon that can occur in sunny weather when turbines are operating, and the rotating blades cause a flickering effect inside a building where sunlight passes through an opening such as a window or door.

13.3.2. For shadow flicker to occur, the receptor must be directly in line with the wind turbines when the sun is low in the sky and, to meet the THC requirements, within 11 rotor diameters of a turbine[178] where they are located within 130 degrees either side of north of any turbine. In these circumstances, the moving turbine blade briefly blocks / reduces the intensity of light entering an opening to a room on each rotation, causing a flickering to be perceived. In the open, shadow flicker is generally not perceived as light outdoors is reflected from all directions.

[177] PP003 - Onshore Wind Turbines Online Guidance, Scottish Government, May 2014, https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=125 (Accessed September 2024)

[178] The Highland Council (2016) Onshore Wind Energy Supplementary Guidance.

13.3.3. Where properties meet both of the criteria for there to be a potential shadow flicker effect, the seasonal duration of this effect will be calculated from the geometry of the turbine and the latitude of the Proposed Development site, to assess potential impacts upon the amenity of local residents. Mitigation measures will be proposed in the EIA Report should they be necessary.

13.3.4. Potentially sensitive receptors within 2km of a nearest turbine include:

Table 13-1 - Closest Potentially Sensitive Receptors

Sensitive Receptor	Nearest Turbine No.	Distance from Nearest Turbine (m)
Lochdu Lodge	01	802
Keeper's Cottage	01	948
Old School House	01	1,017
Langa Cottage	01	1,028
Station Cottage	01	1,060
Dalnawillan Cottage[179]	13	1,126
Dalnawillan Lodge	13	1,219
Dalnaha	17	1,848
Badnaheen	01	1,935

13.3.5. If, after design development, these or other potentially sensitive receptors are within a 130-degree segment either side of due north, relative to the turbines and within ten rotor diameters of a turbine (as per guidance) they will be assessed for shadow flicker.

[179] Dalnawillan Cottage does not appear in the OS AddressBase Plus database, it has been manually added to the dataset based on satellite/aerial imagery.

13.4 AVIATION

13.4.1. Wind turbines within radar Line of Sight (LoS), and therefore detectable by radar systems, reflect radio waves that can interfere with the system. Turbine induced radar clutter appearing on radar displays can affect the safe provision of Air Traffic Services as it can mask unidentified aircraft from the air traffic controller and/or prevent the accurate continued identification of aircraft under control. In some cases, radar reflections from the turbines can affect the performance of the radar system itself. Additionally, due to their height, wind turbines could also potentially present a collision risk to low flying aircraft, therefore affecting military low-level training flights.

13.4.2. Consultations will be undertaken with aviation stakeholders as part of this Scoping Opinion request to identify if the Proposed Development is likely to cause any problems in relation to their operations. If any issues are identified, negotiations would be undertaken to seek and agree appropriate mitigation.

14 SOCIO-ECONOMICS, TOURISM & RECREATION

14.1 INTRODUCTION

14.1.1. This chapter considers the impacts of the Proposed Development on socio-economic, recreation and tourism receptors during the construction and operational phases, and any potential significant effects.

14.1.2. The Chapter sets out those impacts that will be further assessed and presented in the Environmental Impact Assessment (EIA) Report as well as the proposed methodology for assessing these impacts.

14.1.3. The chapter (and its associated figures and appendices) should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Site Context and Proposed Development Description** and with respect to relevant parts of other technical chapters, such as **Chapter 7: Landscape and Visual, Chapter 11: Acoustics** and **Chapter 10: Traffic, Transport and Access**.

14.2 CONSULTATION

14.2.1. At this stage, no consultation has been undertaken for socio-economics, recreation and tourism.

14.3 STUDY AREA

14.3.1. There are no recognised standards or methodologies for assessing the socio-economic, recreation and tourism effects of windfarms, and the Study Areas have been defined based on professional judgement.

14.3.2. As shown on **Figure 14-1 (Appendix 1)**, the 'local level' Study Area for the socio-economic assessment is the administrative area of THC. Scotland is the ‘national level' Study Area for the assessment of socio-economics impacts.

14.3.3. The tourism and recreation assessments focus on a 5km Study Area, in order to capture the receptors most likely to be affected by the Proposed Development. The Study Area is based on the distance between the Site Boundary and receptor. Receptors outside these Study Areas have been considered in the scoping exercise if a significant effect on tourism and recreation was anticipated. The tourism and recreation Study Area is shown on **Figure 14-1 (Appendix 1)**.

14.4 BASELINE CONDITIONS

DATA SOURCES

14.4.1. A desk-based baseline data collection exercise has been undertaken, which included a review of available information in order to determine baseline conditions. The following data sources have been reviewed:

- Office for National Statistics (ONS) Nomis data[180];
- Scottish Index of Multiple Deprivation (SIMD)[181];
- THC Core Paths Map[182];
- ScotWays[183];
- Sustrans[184];
- Country Sport Scotland[185];
- River Thurso;[186]
- Visit Scotland[187]; and
- Birding Places[188].

CURRENT AND HISTORICAL BASELINE

Socio-economic

Population

14.4.2. As shown in **Table 14-1**, the total population in THC area was 235,900 in 2021. Of this, 60.6% were of working age (aged between 16 and 64). This is a lower proportion of the population than in Scotland, where out of a population of 5,418,400, 63.5% were of working age. Despite this, economic activity was marginally higher in THC area at 78.5% compared to 77.1% across Scotland[180].

[180] Office for National Statistics (2021) 'Labour Market Statistics.' Available at: https://www.nomisweb.co.uk/reports/lmp/la/contents.aspx.

[181] Scottish Index of Multiple Deprivation 2020 (2020). Available at: https://simd.scot/#/simd2020/BTTTFTT/12/-4.5555/55.3135/

[182] The Highland Council (nd) Available at: https://highland.maps.arcgis.com/apps/webappviewer/index.html?id=2fd3fc9c72d545f7bcf1b43bf5c8445f

[183] Scottish Rights of Way & Access Society (nd) Available at: https://scotways.com/heritage-path/#zoom=17&lat=58.3902&lon=-3.7204

[184] Sustrans. (2023). National Cycle Network routes in North and North East Scotland. Available online at: https://www.sustrans.org.uk/find-a-route-on-the-national-cycle-network/national-cycle-network-routes-in-north-and-north-east-scotland

[185] Country Sport Scotland (nd) Available at: https://countrysportscotland.com/provider-28-badanloch-estate/

[186] River Thurso (nd) Available at: https://riverthurso.com/river-overview

[187] Visit Scotland (nd) Available at: https://www.visitscotland.com/info/see-do/rspb-scotland-forsinard-flows-nature-reserve-p246951

[188] Birding Places (2020) Available at: https://www.birdingplaces.eu/en/birdingplaces/united-kingdom/puffin-cove

Table 14-1 - 2021 Population[180]

Population Group	Highland	Scotland	Great Britain
Total Population	235,900	5,418,400	65,078,900
Working Age (aged between 16 and 64)	60.6%	63.5%	62.9%
Economically Active	78.5%	77.1%	78.6%

Economy and Employment

14.4.3. The Nomis Job Densities Report is available on a local-authority wide and sub-regional level and indicates the availability of employment and labour demand. As displayed below in **Table 14-2**, job density levels in THC area (i.e. the ratio of total jobs to the working age population) indicates that there are 0.94 jobs available for each working age resident in the area in 2022. This was higher than the Scotland and Great Britain job densities of 0.81 and 0.87 respectively[180].

Table 14-2 - 2022 Job Density Rates (Number of Jobs per Working Age Resident)[180]

Highland	Scotland	Great Britain
0.94	0.81	0.87

14.4.4. **Table 14-3** shows a breakdown of the proportion of employee jobs in THC area, Scotland and Great Britain in 2022. There was a broadly similar breakdown of full time and part time jobs across all geographies, with a lower proportion of THC population in full time work when compared to the Scotland and Great Britain figures. Conversely, part-time working is 3.3% and 4.8%[180] higher in THC area than in Scotland and Great Britain respectively.

Table 14-3 – 2022 Proportion of Employee Jobs[180]

Employee Jobs	Highland (%)	Scotland (%)	Great Britain (%)
Full time	64.9	67.3	68.8
Part time	36.0	32.7	31.2

14.4.5. **Table 14-4** shows the proportion of total employees working in each industry sector in 2022. The three largest employment sectors in THC area were human health and social work activities (17.1%), wholesale and retail trade; repair of motor vehicles and motorcycles (14.4%), and accommodation and food services (13.5%). There were some broad similarities in the industry sectors across all geographies. For example, employment in the transport and storage sector accounted for between 4.1 and 5% of jobs across all geographies, and in the real estate activities sector between 1.3 and 1.9% of jobs across all geographies. However, differences were visible in the human health and social work activities sector, with 17.1% of THC population working in the sector compared to a lower proportion for Scotland (15.7%) and Great Britain (13.5%). Conversely, THC population had a lower proportion of workers in both the professional, scientific and technical activities sector and the administrative and support services activities sector at 5.4% each compared to 7.4% and 8.1% respectively for Scotland, and 9.1% and 9% for Great Britain.

Table 14-4 – 2022 Overview of Jobs by Industry Sector[180]

Industry	Highland (%)	Scotland (%)	Great Britain (%)
B: Mining and Quarrying	0.4	1.0	0.2
C: Manufacturing	5.4	6.9	7.6
D: Electricity, gas, steam and air conditioning supply	0.9	0.8	0.4
E: Water supply; sewerage, waste management and remediation activities	2.0	0.7	0.7
F: Construction	7.2	5.7	4.9
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	14.4	12.9	14.0
H: Transportation and storage	4.1	4.1	5.0
I: Accommodation and food service activities	13.5	8.4	8.0
J: Information and communication	2.3	3.2	4.6
K: Financial and insurance activities	0.8	3.3	3.3
L: Real estate activities	1.4	1.3	1.9
M: Professional, scientific and technical activities	5.4	7.4	9.1
N: Administrative and support service activities	5.4	8.1	9.0

Industry	Highland (%)	Scotland (%)	Great Britain (%)
O: Public administration and defence; compulsory social security	5.4	6.5	4.7
P: Education	8.1	8.8	8.6
Q: Human health and social work activities	17.1	15.7	13.5
R: Arts, Entertainment and Recreation	3.6	3.0	2.4
S: Other service activities	1.4	1.6	2.0

Deprivation

14.4.6. The SIMD is a tool for identifying the places in Scotland where people are experiencing disadvantage across different aspects of their lives[181]. SIMD ranks 6,976 small areas, or data zones, covering the whole of Scotland with 1 being the most deprived and 6,976 the least deprived area. The SIMD reports statistics on income, employment, health, education, access to services, crime and housing.

14.4.7. The Proposed Development is located within the Caithness North West (S01010796) area, which has an overall rank of 3,994, placing it in the sixth decile for overall rank. When looking at the individual domains that form the overall rank, the access domain has a particularly low rank (208) indicating a high degree of remoteness, and the crime domain a particularly high rank (5,041), indicating high crime rates. The neighbouring area of Caithness South is placed in the fourth decile with an overall rank of 2,298[181].

Recreation

14.4.8. Core paths and other walking routes are important for recreational purposes. Core Path CA01.01: Loch More to Altnabreac runs through the north of the Site Boundary. A section of Core Path CA01.04: Altnabreac to Dalnawillan also intersects the Site Boundary to the west. Beyond this, a number of additional Core Paths are present within the Study Area. These include CA01.03: Loch More to Dalnawillan immediately to the southeast of the Site Boundary, and CA01.02: Dalnawillan to Glutt to the south. Further south, CA01.05: Glutt to Braemore is also present within the Study Area. SU19.02 Sletill Hill, Forsinain – Altnabreac – Loch More is also situated within the Study Area, to the northwest of the Site Boundary[182]. There are also a number of non-designated paths within the Site Boundary and Study Area. The Core Paths are shown on **Figure 14-1 (Appendix 1)**.

14.4.9. The Ca na Catanach heritage path is located within the northern extent of the Site Boundary. The route starts at Dorrery Lodge and finishes north of Achentoul and is 35km in length. Two other heritage paths are located within the Study Area: Old Road to Thurso which is located south of the Site Boundary; and Old Tracks to Backlass and Thulachan which is also located south of the Site Boundary[183].

14.4.10. In accordance with the Land Reform (Scotland) Act (2016)[192] (see **Table 14-2**), walkers, horse-riders and cyclists are able to access most areas within Scotland, including the area within the Site Boundary and wider Study Area. Due to this, wild camping could also occur within the Site Boundary and Study Area.

14.4.11. There are no National Cycle Network Routes located within the Study Area[184]. The nearest route is Inverness to John O' Groats which runs to the west and north of the Site Boundary, approximately 16km from the Site Boundary at its closest point. There are no long-distance routes within the Study Area.

14.4.12. The North Coast 500 (NC500) road route brings together a route of approximately 500 miles of the Scottish Highlands. The route passes 20km to the north of the Site Boundary at Sutherland and Caithness. Here, puffin watching is available at Puffin Cove, where approximately 3,500 pairs of puffins were recorded in 2019[188].

14.4.13. Deer staking is a century old tradition in the Highlands, attracting visitors throughout the year to hunt various species of deer. There is potential deer stalking and shooting activity in the area surrounding the Site as well as deer shooting within the Site as part of routine land management activities. Deer stalking is also present 22km to the south-west of the Site Boundary at Badanloch Estate, Sutherland. Here, red stags and red hinds are stalked between the months of July and October and October and February respectively[185].

14.4.14. Scotland also provides a diverse range of fishing opportunities, in particular, the chance to fish for migratory sea trout and Atlantic salmon. The River Thurso, which passes through the Site Boundary, is a key salmon river in Scotland, which has a productive season from January to October. The river runs for approximately 26 miles from Loch More and is split into 13 beats. Beat 1 is held for local anglers and members of the Thurso Angling Association, and the other 12 are available to let[186]. At its closest point, Beat 13 is located approximately 3.4km to the east of the Site Boundary. A series of smaller River Thurso fisheries lochs are also present within the Study Area, including Loch a'Mhulinn to the south, and Loch Caise and Skyline Loch to the north.

14.4.15. As shown on **Figure 14-1 (Appendix 1)**, Forsinard Flows RSPB Scotland Nature Reserve is present within the Study Area and is located immediately north of the Site Boundary. The Forsinard Flows RSPB Scotland Nature Reserve has two marked trails for visitors to explore the peatland habitat and view wildlife including breeding waders, hunting hen, and red deer[187].

Tourism

14.4.16. As shown on **Figure 14-1 (Appendix 1)**, tourist attractions are located in the Study Area including:

- Dalnawillan Graveyard, which is a possible broch from the iron age and burial ground, is located 850m southwest of the Site Boundary;
- Strathmore Burial Ground which is situated approximately 1.5km east of the Site Boundary; and
- Dirlot Castle which is located approximately 3.5km east of the Site Boundary.

14.4.17. Tourist accommodation present within the Study Area includes two small cottages available to hire through AirBnB, as shown on **Figure 14-1 (Appendix 1)**. Immediately beyond the Study Area to the west of the Site Boundary some tourist accommodation is available in Forsinard, including Forsinard Lodge and Forsinard Suites.

14.4.18. Altnabreac Railway Station is located within the Site Boundary; the railway station is currently closed but there is potential it could re-open in the near future.

14.4.19. THC's draft Sustainable Tourism Strategy was launched for a six-week period of consultation which closed on 25th June 2024. The strategy puts forward an opportunity to shape management and investment into the tourism sector across THC area, ensuring it has the ability and resources available to maintain and enhance the services visitors rely on[189]. The aim is for THC is to enhance its built and natural environment, whilst continuing to offer visitors authentic experiences. In particular, the strategy focuses on place, people, and economy. An important part of the strategy is the vision to improve the quality of assets and associated infrastructure as well making them more accessible, doing so in a way that supports a thriving visitor economy.

14.5 SCOPE OF ASSESSMENT

LIKELY SIGNIFICANT EFFECTS

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

SOCIO-ECONOMICS

1.1.2. There is the potential for direct and indirect beneficial impacts on the local and regional economy during the construction and operation of the Proposed Development. The Proposed Development would generate short term and long-term job opportunities and Gross Value Added (GVA) contributions.

RECREATION

1.1.3. There is the potential for temporary adverse effects on the availability and accessibility to recreational destinations, recreational routes and activities during the construction of the Proposed Development. This is because the areas surrounding the construction and maintenance activities would be temporarily restricted with a forestry haulage route proposed for use as a primary access road. In addition, access to recreational destinations, recreational routes, and activities may be adversely affected by construction traffic and activities.

1.1.4. The Proposed Development could also have an adverse effect on amenity experienced by users of the recreational destinations and activities during construction and operation.

[189] Highland Council (2024) Available at: https://www.highland.gov.uk/news/article/16057/sustainable_tourism_strategy_launched_for_public_consultation_%E2%80%93_may_2024?fbclid=IwZXh0bgNhZW0CMTEAAR2sfkuideDK8gucPw5XZ4TUfR9yguOoXW_518gf1HthxK5jZN0C7pleuO0_aem_Adsd9vrMJtyhQkEu21pqPPO2s7eedrbDYzIUdObQzaLBymR55jaLhD2KjG7-qMyt6A6BUb0lLrRYBrMGUcC9m3Yf

TOURISM

1.1.5. There is the potential for temporary adverse effects on tourism during the construction and operation of the Proposed Development. The construction and operation of the Proposed Development could affect the accessibility and amenity experienced by users of tourist attractions. The construction of the Proposed Development could also affect the availability of tourist accommodation due to an influx of construction workers residing near the locality of the Proposed Development. Additionally, the Proposed Development could impact on the tourism economy during both the construction and operation phases of the Proposed Development.

SCOPING OF ASSESSMENT ELEMENTS

1.1.6. **Table 14-5** sets out the elements of the assessment that are proposed to be scoped in and out of the EIA Report.

Table 14-5 – Elements Scoped in or Out of Further Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Socio-economic - Employment generation and GVA	Construction and operation	X		The Proposed Development is anticipated to generate temporary employment opportunities and GVA during construction and permanent employment opportunities and GVA during operation.
Recreation - direct and indirect impacts on recreational destinations, recreational routes and activities	Construction	X		The construction of the Proposed Development could lead to adverse impacts on the availability, accessibility and amenity of users of recreational destinations, recreational routes and activities.
Recreation - direct and indirect impacts on recreational destinations, recreational routes and activities	Operation	X		The operation of the Proposed Development could lead to permanent adverse impacts on the amenity experienced by users of recreational destinations, recreational routes and activities.
			X	Due to the limited maintenance activities, it is anticipated that the operation of the Proposed Development would not lead to any significant impacts on the availability and accessibility of recreational resources (including recreational routes) and activities.

Element	Phase	Scoped In	Scoped Out	Justification
Tourism - Reduced tourist accommodation availability due to an influx of workers	Construction	X		The construction of the Proposed Development could also affect the availability of tourist accommodation due to an influx of construction workers in the area, particularly as there is limited tourist accommodation available in the area.
	Operation		X	Due to the limited maintenance activities associated with the development, it is anticipated that the operation of the Proposed Development would not lead to a significant reduction in tourist accommodation availability.
Tourism - Direct and indirect effects on tourism attractions	Construction	X		The construction of the Proposed Development could affect the accessibility and amenity experience by users of tourist attractions.
	Operation	X		The operation of the Proposed Development could affect the amenity experienced by users of tourist attractions.
			X	Due to the limited maintenance activities, it is anticipated that the operation of the Proposed Development would not lead to any significant impacts on the accessibility of tourist attractions.
Tourism - Direct and indirect effects on tourism economy	Construction and operation	X		The Proposed Development could impact on the tourism economy during both the construction and operation phase of the Proposed Development.

OPPORTUNITIES FOR ENHANCING THE LOCAL ECONOMY

14.5.1. The Applicant is committed to offering a package of community benefits to local communities. As well as the development of a Community Benefit Fund in consultation with local communities, the Applicant offers the opportunity for community organisations to invest in the Proposed Development once operational.

14.6 PROPOSED ASSESSMENT METHODOLOGY

1.1.7. The socio-economic, recreation and tourism assessment will establish the potential significant socio-economics, recreation and tourism effects associated with the Proposed Development. There is no established guidance for conducting a socio-economic, recreation and tourism assessment as part of the EIA process.

1.1.8. The assessment methodology will be based upon professional judgement and informed by desk-based information.

1.1.9. A review of local, regional and national socio-economic, recreation and tourism planning policies, legislations and strategies will be undertaken and considered as part of the EIA.

1.1.10. Socio-economic, recreation and tourism effects will be assessed for both the construction and operational phases of the Proposed Development.

1.1.11. The level of significance of an effect will take into consideration the sensitivity of the receptor and the magnitude of an impact. Specific values in terms of sensitivity will not be attributed to the resources/receptors due to their diversity in nature and scale, however the assessment instead takes account of the qualitative (rather than quantitative) 'sensitivity' of each receptor and, in particular, on their ability to respond to change. The magnitude of impact will consider the size of the impact on receptors in the context of the area in which the effects would be experienced. The effects will be described as either beneficial, negligible or adverse.

1.1.12. Assessments in **Chapter 7: Landscape and Visual, Chapter 11: Acoustics** and **Chapter 10: Traffic, Transport and Access** will inform the assessment of effects for recreational resources and activities as well as tourist attractions in the Study Areas.

SOCIO-ECONOMICS

1.1.13. An assessment of the generation of employment opportunities and GVA during construction and operation will be undertaken as part of the EIA. The employment opportunities figures will be based on the Applicant's professional experience and expertise or calculated using best practice and experience of other similar projects.

RECREATION

1.1.14. The EIA Report will include a qualitative assessment of the impacts of the Proposed Development on recreational destinations and activities, including designated routes, within the recreation Study Area. The assessment will consider changes in accessibility (including severance), availability, and amenity on recreational users during the construction and operation of the Proposed Development as appropriate.

1.1.15. For the purpose of the assessment, amenity is considered to be a combination of visual amenity, air quality and noise levels experienced by users of the recreational destination and activity.

TOURISM

1.1.16. A review of national and regional tourism strategies will be undertaken for the tourism Study Area. Tourist attractions will be identified using publicly available sources. A qualitative assessment will be undertaken based on changes in accessibility and amenity experienced by users of tourist attractions/activities during the construction and operation of the Proposed Development as appropriate.

1.1.17. For the purpose of this assessment, amenity is considered to be a combination of visual amenity, air quality and noise levels experienced by users of tourist attractions and activities.

1.1.18. An assessment will be undertaken to consider the availability of tourist accommodation as a result of an influx of construction workers in the locality of the Proposed Development. The assessment will consider the number and location of tourist accommodation in the Study Area and the number of construction workers that will be required to build the Proposed Development.

1.1.19. In addition, a qualitative assessment of the impacts of the Proposed Development on the tourism economy and visitors' decisions to holiday in the Study Area will be undertaken based on Scotland specific research.

RELEVANT LEGISLATION AND GUIDANCE

14.6.1. The following section details the legislation, national policy and local policy that is relevant to the assessment of the Proposed Development.

Policy/Legislation/Guidance	Description
Policy	
Fourth National Planning Framework[190]	The Fourth National Planning Framework (NPF4) is the national spatial strategy for Scotland. It sets out Scotland's spatial principles, regional priorities, national developments and national planning policy. The revised draft NPF4 and associated regulations were formally adopted by the Scottish Government in February 2023. The revised draft policies of relevance to the Socio-economics assessment are: ○ Policy 21: Play, Recreation and Sport; ○ Policy 25: Community Wealth Building; ○ Policy 26: Business and Industry; and ○ Policy 30: Tourism.

[190] Scottish Government (2020) Fourth National Planning Framework: Position Statement. Available at: https://www.gov.scot/publications/scotlands-fourth-national-planning-framework-position-statement/

Policy/Legislation/Guidance	Description
Highland-wide Local Development Plan[191]	The Highland-Wide Local Development plan sets out a strategy for the growth of all communities across THC area, whilst placing an emphasis on sustainability. The plan recognises the tourism sector's significant contribution to THC economy and considers tourism-related and business development throughout.
Caithness and Sutherland Local Development Plan (CaSPlan)[37]	The Caithness and Sutherland Local Development Plan sets the strategic direction for sustainable development within the Caithness and Sutherland regions, outlining policies and land use proposals to promote economic growth, environmental stewardship, and community development.The plan addresses critical areas such as housing, infrastructure, and renewable energy, ensuring alignment with regional priorities and the unique characteristics of Caithness and Sutherland.
Legislation	
Land Reform (Scotland) Act 2003 (as Amended 2016)[192]	The Land Reform Act provides a right of access for walkers, horse-riders and cyclists to most land and inland water. These legal rights are based on the principle of responsible access, with obligations both on the access users and on the managers of the land. The legislation also states that local authorities should develop a Core Paths plan to establish and designate a network giving the public reasonable access throughout their area. Such a system of paths may include footways, footpaths, cycle tracks and bridleways. Rights of access and Core Paths are considered as part of the recreation and tourism assessment within this chapter.

14.6.2. There is no specific guidance available on approaches to assessing the impacts of a proposed onshore windfarm development on socio-economics, tourism and recreation. The methodology used has been based on professional experience, accepted practice, and draws upon industry reports on the sector.

[191] Highland-wide Local Development Plan (2012) Available at: https://www.highland.gov.uk/info/178/development_plans/199/highland-wide_local_development_plan

[192] Gov UK (2016) Land Reform (Scotland Act 2016). Available at: https://www.legislation.gov.uk/asp/2016/18/contents

SURVEY METHODOLOGY

14.6.3. No field survey has been undertaken, nor is intended to be undertaken, as part of the socio-economic, tourism and recreation assessment due to the location and identified receptors within the vicinity of the Proposed Development.

MITIGATION

14.6.4. An Outdoor Access Management Plan for the management of public outdoor access will be agreed with THC prior to the commencement of the construction works.

14.6.5. Measures to provide employment opportunities in the local area will be provided as part of the Proposed Development.

14.6.6. Public notices would be issued prior to the construction and maintenance works to inform local recreational users of dates and durations of the works. During construction and maintenance, it is anticipated that access would be temporarily restricted for areas surrounding works and alternative paths or access routes would be provided if required.

14.6.7. The socio-economics, recreation and tourism assessment considers other environmental topics including landscape and visual, noise and vibration as well as traffic and transport. Therefore, the mitigation measures outlined in these chapters are also relevant for socio-economics, recreation and tourism.

14.6.8. The mitigation measures for socio-economics, recreation and tourism will be progressed and refined as part of the EIA Report.

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