Harestanes West

Scoping Report

March 2023

SCOTTISHPOWER RENEWABLES

Table of Contents

Figures

Figure 4.5	Cumulative Windfarms
Figure 5.1	Ornithological Designations
Figure 6.1	Ecological Designations
Figure 8.1	Noise Study Area
Figure 9.1	Cultural Heritage Inner Study Area
Figure 9.2	Cultural Heritage Outer Study Area
Figure 14.1	Shadow Flicker

Abbreviations

AD	Air Defence
AIL	Abnormal Indivisible Load
amsl	Above Mean Sea Level
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
ASA	Archaeologically Sensitive Area
ATC	Air Traffic Control
ATS	Air Traffic Services
AWI	Ancient Woodland Inventory
BBPP	Breeding Bird Protection Plan
BGS	British Geological Survey
BS	British Standard
CAA	Civil Aviation Authority
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologist
CNS	Communication, Navigation, and Surveillance
CoPA	Control of Pollution Act
CTA	Controlled Area
ECU	Energy Consents Unit
EIA	Environmental Impact Assessment
DECC	Department for Energy and Climate Change
DGC	Dumfries & Galloway Council
DGRSG	Dumfries and Galloway Raptor Study Group

DWPA	Drinking Water Protected Area
EHO	Environmental Health Officer
FL	Flight Level
FLS	Forestry and Land Scotland
ft	Feet
GCR	Geological Conservation Review
GDL	Garden and Designed Landscape
GIS	Geographic Information System
GPG	Good Practice Guide
GLVIA3	Guidelines for Landscape and Visual Impact Assessment: Third Edition
GW	Gigawatt
GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectare
HER	Historic Environment Record
HES	Historic Environment Scotland
HGV	Heavy Good Vehicle
HSE	Health & Safety Executive
IEA	Institute of Environmental Assessment
IEMA	Institute for Environmental Management and Assessment
IFP	Instrument Flight Procedure
IOA	Institute of Acoustics
IOF	Important Ornithological Features
JNCC	Joint Nature Conservation Committee
JRC	Joint Radio Company Ltd
km	Kilometre
LCT	Landscape Character Type
LCU	Landscape Character Unit
LDP	Local Development Plan
LGV	Light Good Vehicle
LMP	Land Management Plan
LNR	Local Nature Reserve
LUPS	Land Use Planning System
LVIA	Landscape & Visual Impact Assessment

LWS	Local Wildlife Site
m	Metre
MOD	Ministry of Defence
MW	Megawatt
NATS	comprising NATS (En Route) plc (NERL) and NATS (Services) Limited
NCAP	National Collection of Aerial Photography
NCI	Nature Conservation Importance
ND3	National Development 3
NERL	NATS (En Route) plc
NFI	National Forestry Inventory
NHZ	Natural Heritage Zone
NIDL	Non-Inventory Designed Landscape
nm	Nautical Miles
NNR	National Nature Reserve
NPF	National Planning Framework
NRFA	National River Flow Archive
NRHE	National Record of the Historic Environment
NRTF	National Road Traffic Forecast
NoSR	Noise Sensitive Receptor
NSR	Non-Statutory Register
NTS	Non-Technical Summary
NVC	National Vegetation Classification
NVQ	National Vocational Qualification
NWSS	Native Woodland Survey Scotland
OIA	Ornithological Impact Assessment
OPEN	Optimised Environments Ltd
OS	Ordnance Survey
OWPS	Onshore Wind Policy Statement
PAC	Pre-Application Consultation
PAN	Policy Advice Note
PLHRA	Peat Landslide Hazard and Risk Assessment
PMP	Peat Management Plan
PPG	Pollution Prevention Guidelines

PSR	Primary Surveillance Radar
PWS	Private Water Supply
RLoS	Radar Line of Sight
RSA	Regional Scenic Area
RSPB	Royal Society for the Protection of Birds
RVAA	Residential Visual Amenity Assessment
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SEPA	Scottish Environment Protection Agency
SERAD	Scottish Executive Rural Affairs Department
SF	Scottish Forestry
SGLH	Scotland's Garden and Landscape Heritage
SINC	Sites of Interest for Nature Conservation
SNH	Scottish Natural Heritage
SPA	Special Protected Area
SPR	ScottishPower Renewables (UK) Ltd
SSR	Secondary Surveillance Radar
SSSI	Site of Special Scientific Interest
SWSEIC	South West Scotland Environmental Information Centre
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
VP	Vantage Point
WCA	Wildlife and Countryside Act
WHS	World Heritage Site
WLA	Wild Land Area
ZTV	Zone of Theoretical Visibility

1. Introduction

1.1. BACKGROUND AND CONTEXT

1. ScottishPower Renewables (UK) Ltd (SPR) (hereafter referred to as "the Applicant") intends to apply to the Scottish Ministers for permission to construct and operate Harestanes West Windfarm (hereafter referred to as the "proposed Development"), in Dumfries and Galloway. The proposed Development application boundary (hereafter referred to as "the Site") is located approximately 13 km north of Dumfries, at site centre NX 96009 91271 (refer to Figure 1.1).
2. The proposed Development is to the west of the adjacent operational Harestanes Windfarm and the proposed Harestanes South Windfarm. The proposed Development would make a meaningful contribution to Scotland's national targets to reach Net Zero by 2045 through the generation of renewable energy and reduction in greenhouse gas emissions, and will contribute towards sustainable economic growth in Dumfries and Galloway and Scotland as a whole.
3. The Applicant intends to submit an application for the proposed Development to the Scottish Ministers via the Scottish Government Energy Consents Unit (ECU) under Section 36 of the Electricity Act 1989. The application will be supported by an Environmental Impact Assessment Report as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (the EIA Regulations). This document forms the Scoping Report submitted to the ECU in order to request a Scoping Opinion from the Scottish Ministers, on the content of the Environmental Impact Assessment (EIA) of the proposed Development.
4. The proposed Development will consist of up to approximately 13 wind turbines with up to 220 m height from ground to blade tip, as well as an associated on-site energy storage system. The total generating capacity of the turbines is anticipated to be approximately 78 megawatts (MW) in total. The associated infrastructure will include site access, internal access tracks, crane hardstandings, underground cabling, on-site substation and maintenance building, temporary construction compound(s), laydown areas, borrow pit search areas and a meteorological mast. In addition, the proposed Development may include an energy storage system within the Site and the Applicant will investigate the potential for electric car charging facilities.

1.2. NEED FOR DEVELOPMENT

5. The science behind climate change is well established and points strongly towards a need to reduce our reliance on fossil fuels in order to avoid negative economic, environmental and social effects. International and European commitments to reducing CO_2 and tackling climate change have been made by all major economies. In response to these issues the UK has made significant, legally binding commitments to increase the use of renewable energy. In September 2019 the Scottish Government passed The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 which set a legally binding goal to achieve net-zero greenhouse gas emission by 2045 at the latest, with interim targets to reduce emissions by 75% by 2030 (Scottish Government, 2019). This was recently reinforced by the Scottish Government's aim set out in the Onshore Wind Policy Statement in December 2022, to achieve a minimum installed capacity of 20 gigawatts (GW) of onshore wind in Scotland by 2030 (Scottish Government, 2022).

1.3. THE APPLICANT

6. The Applicant is part of the Iberdrola Group, one of the world's largest integrated utility companies and a world leader in wind energy. SPR only produce 100% green electricity with a focus on wind energy, smart grids and driving the change to a cleaner, electric future. They are investing over £4m every working day to make this happen. They are committed to speeding up the transition to cleaner electric transport, improving air quality and, over time, driving down bills to deliver a better future quicker, for everyone.

7. SPR is at the forefront of the development of the renewables industry through pioneering ideas, forward thinking and outstanding innovation. Their ambitious growth plans include offshore windfarms in East Anglia with teams also leading the Group's international offshore development in Germany, France and the USA. With over 40 operational windfarms, SPR manage all of their sites through their world leading Control Centre at Whitelee Windfarm, near Glasgow.

8. SPR currently have three operational windfarms within the Dumfries and Galloway region; Whether Hill, Harestanes, and Ewe Hill. A further two windfarms are in planning within Dumfries and Galloway: Euchanhead, and Harestanes South.

1.4. ITPENERGISED

9. ITPEnergised have been commissioned by the Applicant to coordinate the EIA Scoping process for the proposed Development. ITPEnergised has been supported by a team of technical specialists and the project team has excellent experience undertaking EIA work for wind energy developments across Scotland.

1.5. THE PURPOSE OF EIA SCOPING REPORT

10. The purpose of the EIA Scoping Report, as per Regulation 12 (1) of the EIA Regulations, provides the opportunity for the Applicant to ask Scottish Ministers for an opinion as to the scope and level of detail of information to be provided within the EIA Report. The 'Scoping Opinion' is to be provided following discussion with the relevant consultation bodies. Those consultees identified at Scoping are set out within Appendix A. The Applicant recognises the value of the scoping approach, and the purpose of this report is to ensure that relevant issues are identified and to confirm that the assessment process described will meet legislative requirements.

11. In accordance with Regulation 12 (2) of the EIA Regulations, this EIA Scoping Report provides a description of the location of the proposed Development, its nature and purpose, and its likely significant effects on the environment.

1.6. ENVIRONMENTAL IMPACT ASSESSMENT

12. The EIA Regulations require that before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require EIA if they are above certain thresholds and are likely to give rise to significant environmental impacts (Schedule 2 development). The proposed Development falls within Schedule 2 of the EIA Regulations and has the potential to have some significant environmental effects. Therefore, it is the opinion of the Applicant that the proposed Development qualifies as "EIA Development" and therefore the Applicant will submit an EIA Report, as part of the Section 36 application to the Scottish Ministers.

13. EIA is an iterative process which identifies the potential environmental effects that in turn inform the eventual design of a proposed development. It seeks to avoid, reduce, offset, and minimise any adverse environmental effects through mitigation. It takes into account the effects arising during the construction, operational, and decommissioning phases. Consultation is an important part of the EIA process and assists in the identification of potential effects and mitigation measures. In addition, SPR hold an electricity generation licence and are required to comply with the requirements of Schedule 9 of the Electricity Act 1989. This places a duty on SPR to "*have regard to the desirability of preserving the natural beauty of the countryside, of conserving flora, fauna and geological and physiological features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest*".

14. The structure of the EIA Report will follow the requirements set out in Schedule 4 of the EIA Regulations and other relevant good practice guidance. The EIA Report will comprise up to five volumes:

- Volume 1 – Written Statement;
- Volumes 2 & 3 – Figures and Visualisations;
- Volume 4 – Technical Appendices; and
- Volume 5 – Confidential Appendices (if required).

15. A standalone Non-Technical Summary (NTS) will also be provided.

16. The introductory chapters of Volume 1 will comprise:

- an introduction;
- a description of the Site selection and design iteration process;
- a description of the Site and its context;
- a description of the proposed Development;
- information on the EIA approach, methodology and determination of significance of effects; and
- a summary of the relevant planning and energy policy considerations.

17. The remainder of Volume 1 will present an assessment of a range of environmental topics. Based on the available baseline environment information and the details of the proposed Development, the environmental topics have been scoped on the basis of the potential for significant environmental effects. This has determined the need to undertake impact assessment to investigate each potential effect. Each of the topics will be reported as a chapter of Volume 1. The EIA Report will reference figures and technical studies, which will be contained in Volumes 2 to 5.

18. The following technical topics will be considered:

- Landscape and Visual;
- Ornithology;
- Ecology;
- Geology, Soils and Peat, Hydrology & Hydrogeology;
- Noise and Vibration;
- Cultural Heritage;
- Transport & Access;
- Socio-Economics & Tourism;
- Aviation & Radar;
- Forestry;

- Shadow Flicker;
- Telecommunications; and
- Carbon Calculator.

19. An assessment of cumulative effects will be presented within each technical chapter, as well as an overall summary of cumulative and in combination effects, included in the EIA Report.

20. The EIA Report will also include a schedule of mitigation measures and a summary of residual effects.

21. A standalone Planning & Policy Statement assessing the proposed Development against all relevant planning and energy policy, along with a Pre-Application Consultation (PAC) Report explaining the consultation carried out with the local communities about the proposed Development, will also accompany the planning application.

22. Early consultation is key in the development process. It will ensure that local communities and stakeholders are given the opportunity to provide feedback to inform the development proposals. The Applicant will arrange further events and provide regular communication at key stages of the project.

23. Public consultation is an important element of the EIA and the overall planning process and can take many different forms. The Applicant will seek to use the most practical and effective form possible and will consider the following options:

- public information days, held in communities near to the Site;
- mail drops, posting information leaflets to each address near to the Site;
- providing a dedicated webpage for the Proposed Development which would host information;
- providing a mailbox and email address for the public to provide comment or ask questions; and
- phone meetings with community councils to get feedback on the proposal.

2. Proposed Development

2.1. SITE DESCRIPTION

24. The area within the Site Boundary, hereafter referred to as 'the Site' is situated north-west of the village of Ae, approximately 1.3 km to the Site Boundary and 2.5 km to the nearest proposed turbine, and approximately 13 km north of Dumfries. The Site is located wholly within the Dumfries and Galloway Council (DGC) administrative area. The Site lies to the west of the Water of Ae and the Windy Hill Burn runs through the centre of the Site from north-west to south-east. The Site is made up of undulating hills that form part of the upland plateau or range of hills between Annandale to the east and Nithsdale to the West.

25. The A76 lies approximately 4.5 km to the west of the Site and the A701 lies approximately 5 km to the south-east, which connects to a minor road that then runs north through the village of Ae and north to south through the centre of the Site.

26. The area of Forest of Ae within which the Site is located, is managed by Forestry and Land Scotland, and has recreational facilities including car parking facilities and the Forest of Ae Café and Bike Shop located on the outskirts of the village of Ae. There are several waymarked walking routes and mountain bike trails within the Forest of Ae. A number of core paths extend through the Site including one in the southern area which provides a circular walking path around Windy

Hill. There is also an outer bend of a mountain bike path called Andy Hopkins in the north-eastern section of the Site going around Morins Hill.

27. There are two designations within the Site; the Galloway and Southern Ayrshire UNESCO Biosphere Reserve which stretches along the western edge of the Site boundary and crosses into the Site in the north-west corner, and the Scheduled Monument designation for 'Poldivan Bridge, Cairn 70m ENE of' (SM 638) which is in the north of the Site.

28. There are no Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), or Listed Buildings within the Site. The following designations are within 10 km of the Site (all distances are approximate and measured to the closest point of the Site);

- SSSI Black Loch, 2.4 km to the south-east;
- SSSI Shiel Dod, 5.1 km to the north;
- SSSI Carron Water and Hapland Burn, 7.8 km to the north-west;
- SSSI Locharbriggs Quarry, 8.3 km to the south;
- 66 Scheduled Monuments;
- 37 Ancient Woodland Inventory sites;
- four Garden and Designated Landscape sites, the closest being Dalswinton which lies 4.5 km to the south; and
- Glenkiln Burn, Geological Conservation Review site 3.6 km to the south-east.

29. The Site comprises an area of approximately 1,115 hectares (ha), with the Site location and wider context shown in Figure 2.1.

2.2. PROPOSED DEVELOPMENT DESCRIPTION

30. The proposed Development is at an early stage in its design and will continue to be developed through the EIA process as further environmental and technical studies are completed. The proposed Development will comprise approximately 13 turbines with a tip height of up to 220 m. The total capacity of the proposed Development is expected to be approximately 78 MW, based on an individual turbine capacity of 6 MW. Indicative turbine locations are noted in Table 2.1 and shown on Figure 2.2.

Table 2.1 Indicative Turbine Locations

TURBINE ID	EASTING	NORTHING
1	295690	589387
2	295328	589916
3	295961	590127
4	295505	590535
5	295525	591177
6	295250	591856
7	295173	592549
8	295525	593103
9	296233	593738

TURBINE ID	EASTING	NORTHING
10	295481	593907
11	296380	594373
12	295415	594538
13	294846	594846

31. The parameters of the EIA will be such that an appropriate level of assessment is undertaken for an indicative hub height and rotor diameter of a candidate turbine model, within the envelope of a maximum tip height. At this stage of the design process, the indicative rotor diameter being considered is up to 162 m, with an indicative hub height in the region of 139 m – 150 m. The turbine locations will evolve in response to the ongoing detailed assessment work, taking consideration of the environmental effects, terrain, current land use, technical, and health and safety issues. The parameters of the proposed Development for which consent will be sought will be explicitly identified in the EIA Report. The final locations of the turbines will be 'frozen' at an appropriate time in order to enable the EIA Report to describe fully the proposed Development for which consent is sought.

32. Whilst the location of the infrastructure will be determined through an iterative environmental based design process, there is the potential for these exact locations to be further optimised through micrositing allowances prior to construction. An appropriate micrositing allowance will be sought in all directions in respect of each turbine and the associated infrastructure in order to address any potential difficulties which may arise in the event that preconstruction surveys identify unsuitable ground conditions or environmental constraints that could be avoided. Consent will be sought for operation in perpetuity, however for the purposes of the EIA, and to ensure the potential worst-case scenario is assessed, an operational life of at least 40 years from the date of commissioning will be considered where relevant.

33. The Site is also considered to have potential for an associated energy storage facility. This would involve the installation of batteries and inverters in a self-contained building which will be located on a hard standing area adjacent to the substation. The building would house the battery storage components contained in sealed units, associated air conditioning systems, an electrical room and a maintenance room. The building, housing the storage equipment itself, would be designed to reflect the vernacular architecture of agricultural farm buildings in the area and would be of similar appearance to the substation. An underground cable will connect the battery storage facility to the onsite substation. If this is to be taken forward within the proposed Development, details of the anticipated technology and location will be provided and assessed within the EIA Report.

2.3. CUMULATIVE DEVELOPMENTS

34. Regulation 5 and Schedule 4 of the EIA Regulations detail the information for inclusion in EIA Reports. Schedule 4, paragraph 5 requires an EIA Report to include a description of the likely significant effects of the development on the environment. With respect to cumulative effects, paragraph 5(e) requires an assessment of the likely significant effects resulting from *"the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources"*.

35. Consultation and discussion with DGC, NatureScot and other bodies (as required) will be carried out to determine which nearby windfarms have the potential to cause significant cumulative effects and therefore should be included within the EIA. The approach taken to identify the nearby windfarms that should be included in the baseline for the cumulative impact assessment will be tailored so that it is appropriate to each topic under consideration.

36. As shown on Figure 4.5, there are numerous existing and proposed windfarms within 45 km of the Site. Windfarm developments of relevance within 10 km of the Site are listed in Table 2.2. A historic submission of an EIA Scoping application to the south of the Site (Duncow Common) has had no activity since the formal Scoping Opinion was issued in 2013, therefore is not considered relevant to the cumulative assessment.

Table 2.2 Relevant Cumulative Developments

DEVELOPMENT	STATUS	TURBINES	DISTANCE TO SITE
Dalswinton	Operational	15	650 m south-west
Harestanes	Operational	68	2.5 km north-east
Harestanes South Windfarm	Planning	8	4 km east
Minnygap	Operational	10	6.2 km north-east
Daer	Planning	17	9 km north
Rivox	Planning	31	9.5 km north-east

37. All windfarm developments of relevance will be considered in the cumulative assessment. The methodology to be adopted for assessing the cumulative effects of wind energy developments will be in accordance with the NatureScot Guidance 'Assessing Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments' (NatureScot, 2021). The scope of the cumulative assessment will be agreed through consultation with DGC and NatureScot as required.

38. It should be noted that this record will be updated throughout the EIA process, up to an agreed point prior to submission of the application. We welcome any further information from stakeholders on additional proposed windfarm developments that should be considered.

3. Planning and Energy Policy Context

3.1. INTRODUCTION

40. This section presents a summary of relevant policies that will be taken into consideration to help inform the design of the proposed Development.

41. The EIA Report will set out the relevant policies that have been considered as part of the assessments undertaken throughout the EIA. A separate Planning Statement will provide a detailed appraisal of the proposed Development against the relevant Development Plan policies, national planning policy and other material considerations.

42. The EIA Report will also concisely reference climate change policy and the contribution of proposed Development to the UK and Scottish Government's climate change goals and policy targets.

3.2. NATIONAL PLANNING POLICY & THE DEVELOPMENT PLAN

3.2.1. The National Planning Framework 4 (2023)

43. National Planning Framework 4 (NPF4) came into force on 13th February 2023. Annex A of the document explains how NPF4 is to be used. It states:

"The purpose of planning is to manage the development and use of land in the long-term public interest … Scotland in 2045 will be different. We must embrace and deliver radical change so we can tackle and adapt to climate change, restore biodiversity loss, improve health and wellbeing, reduce inequalities, build a wellbeing economy and create great places."

44. It states that NPF4 is required by law to set out the Scottish Ministers' policies and proposals for the development and use of land. It adds:

"It plays a key role in supporting the delivery of Scotland's national outcomes and the United Nations Sustainable Development Goals. NPF4 includes a long-term spatial strategy to 2045."

45. Annex A adds that NPF4 is required by law to contribute to six outcomes. These relate to meeting housing needs, health and wellbeing, population of rural areas, addressing equality and also "*meeting any targets relating to the reduction of emissions of greenhouses gases, and, securing positive effects for biodiversity*".

46. Page 97 of NPF4 sets out that 18 national developments have been identified. These are described as "*significant developments of national importance that will help to deliver the spatial strategy … National development status does not grant planning permission for the development and all relevant consents are required*".

47. It adds that "*Their designation means that the principle for development does not need to be agreed in later consenting processes, providing more certainty for communities, businesses and investors. … In addition to the statement of need at Annex B, decision makers for applications for consent for national developments should take into account all relevant policies*".

48. Annex B of NPF4 sets out the various national developments and related statements of need.

49. National Development 3 (ND3) is "*Strategic Renewable Electricity Generation and Transmission Infrastructure*".

50. Page 103 of NPF4 describes ND3 and it states:

"This national development supports renewable electricity generation, repowering, and expansion of the electricity grid.

A large and rapid increase in electricity generation from renewable sources will be essential for Scotland to meet its net zero emissions targets. Certain types of renewable electricity generation will also be required, which will include energy storage technology and capacity, to provide the vital services, including flexible response, that a zero carbon network will require. Generation is for domestic consumption as well as for export to the UK and beyond, with new capacity helping to decarbonise heat, transport and industrial energy demand. This has the potential to support jobs and business investment, with wider economic benefits.

The electricity transmission grid will need substantial reinforcement including the addition of new infrastructure to connect and transmit the output from new on and offshore capacity to consumers in Scotland, the rest of the UK and beyond. Delivery of this national development will be informed by market, policy and regulatory developments and decisions."

51. The location for ND3 is set out as being all of Scotland and in terms of need it is described as:

"Additional electricity generation from renewables and electricity transmission capacity of scale is fundamental to achieving a net zero economy…"

52. Reference is made in NPF4 to the designation and classes of development, and it states in this regard:

"A development contributing to 'Strategic Renewable Electricity Generation and Transmission' in the location described, within one or more of the Classes of Development described below and that is of a scale or type that would otherwise have been classified as 'major' by 'The Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009', is designated a national development:

(a) on and off shore electricity generation, including electricity storage, from renewables exceeding 50 megawatts capacity…"

53. The proposed Development would therefore have national development status.

54. NPF4 contains new national planning policy. Relevant policies include the following:

- Policy 1: Tackling the Climate and Nature Crisis;
- Policy 3: Biodiversity;
- Policy 4: Natural Places;
- Policy 5: Soils;
- Policy 6: Forestry, Woodland and Trees;
- Policy 7: Historic Assets and Places; and
- Policy 11: Energy.

55. NPF4 now forms part of the statutory Development Plan and will be a key policy consideration for the determination of the proposed Development.

3.3. THE LOCAL DEVELOPMENT PLAN

56. The Local Development Plan element of the statutory Development Plan applicable to the proposed Development is:

- The Dumfries and Galloway Local Development Plan 2 (LDP2) (adopted September 2019); and

- LDP2 'Wind Energy Development: Development Management Considerations' Supplementary Guidance (February 2020). The Supplementary Guidance contains at Appendix C, the 'Dumfries and Galloway Wind Farm Landscape Capacity Study'.

57. Key LDP2 policies will include Policy IN1 'Renewable Energy' and Policy IN2 'Wind Energy'.

58. Other LDP2 policies that will be considered include policies HE1, HE2, HE3, HE4, NE7, NE8, NE11, NE14, CF4, IN7, T1 and T2.

3.4. CLIMATE CHANGE AND ENERGY POLICY

59. The burning of fossil fuels to produce electricity is a major contributor to climate change through the release of atmospheric carbon dioxide and other harmful gases known collectively as greenhouse gases.

60. The proposed Development relates to the generation of electricity from renewable energy sources and comes as a direct response to national planning and energy policy objectives. The clear objectives of the UK and Scottish Governments will be summarised, in relation to encouraging increased deployment and application of renewable energy technologies, consistent with sustainable development policy principles and national and international obligations on climate change.

61. The Scottish Government's Energy Strategy (2017) set a target for the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources by 2030. As heat and transport become decarbonised, demand for electricity from renewable sources can be expected to increase.

62. Further deployment of renewable energy generating technology will be required throughout the 2020s in order to meet targets. As a mature technology onshore wind has a continuing and important role to play, as confirmed by national planning and energy policy and most recently in NPF4.

63. Scotland's overarching statutory target is to achieve a 100% reduction in greenhouse gas emissions to net-zero by 2045, with interim targets of 75% by 2030 and 90% by 2040, now provided for in the Climate Change (Scotland) Act 2009 as amended by the Climate Change (Emissions Reductions Targets) (Scotland) Act 2019 ("2019 Act") which came into force in March 2020.

64. The Scottish Government declared a climate emergency on 14 May 2019. The declaration of an "emergency" is a reflection of both the seriousness of climate change and its potential effects and the need for urgent action to cut carbon dioxide emissions. The declaration is a material consideration which will be referenced within the proposed Development application.

65. A large increase in the deployment of this renewable energy technology is supported through a number of UK level policy documents including the UK Energy White Paper (2020) and Net Zero Strategy (2021). Scottish Government policy commitments are also clear – most recently expressed in NPF4 and the new Onshore Wind Policy Statement both of which will be material to the energy and national planning policy positions to be considered for the determination of the application.

66. The Scottish Government's Onshore Wind Policy Statement (2022) sets a new target for Scotland to have a minimum of 20 GW of onshore wind installed by 2030.

67. The proposed Development would clearly make a contribution to the attainment of renewable energy and electricity targets and emissions reduction at both the Scottish and UK levels and the quantification of this contribution would be described.

3.5. CONCLUSION

68. The proposed Development will clearly make a contribution to the attainment of renewable energy and electricity targets and emissions reduction at both the Scottish and UK levels and the quantification of this contribution would be described in the EIA Report.

69. The EIA Report will summarise the renewable energy policy framework, but the detail will be provided in a supporting Planning Statement to accompany the Section 36 application which will also make reference to key policy documents as referenced above.

4. Landscape and Visual

4.1. INTRODUCTION

70. This section of the Scoping Report sets out the proposed methodology and approach to be applied in the production of the Landscape and Visual Impact Assessment (LVIA) to accompany the application for the proposed Development and presents the suggested scope of the LVIA in terms of those landscape and visual receptors to be scoped in and scoped out of the LVIA process based on a preliminary assessment of relevant receptors to the proposed Development.

71. The purpose of the LVIA is to identify and record the potential significant effects that the proposed Development may have on physical elements of the landscape; landscape character; areas that have been designated for their scenic or landscape-related qualities; and views from various locations such as settlements, routes, hilltops, and other potentially sensitive locations. The cumulative effects that may arise from the addition of the proposed Development in addition to other wind farms are also considered.

72. The LVIA will consider the potential effects of the proposed Development during the following development stages:

- Construction and decommissioning of the proposed Development; and
- Operation of the Development.

73. Receptors may not be affected at all three development stages.

4.2. STUDY AREA

74. In accordance with guidance and with a proposed turbine height of up to 220 m, the study area for the LVIA of the proposed Development will cover a radius of 45 km from the nearest turbine, as shown in Figure 4.1. This is considered to be the maximum radius within which a significant landscape and / or visual effect could arise given the height of the turbines that are being considered.

75. Following an initial review of the Zone of Theoretical Visibility (ZTV) analysis on Figures 4.2 and 4.3 respectively it is proposed that the LVIA will primarily focus on the area within 20 km of the Site in relation to landscape character effects as it is considered significant effects on landscape character would not occur beyond this range due to the existing windfarm influence within this area.

76. A review of the broad windfarm context within a 60 km radius has been undertaken, based on the latest NatureScot mapping of large-scale windfarm development.

77. Known cumulative windfarms within a 45 km study area are shown for scoping purposes in Figure 4.5. This shows locations of windfarms that are operational, under construction, consented or which are at application stage, where turbines are greater than 50 m to blade tip and at distances of over 20 km where windfarms include two or more turbines rather than just single turbines. This shows a wide distribution of windfarms to the west, north and east of the Site particularly at ranges of over 20 km from its boundary. This suggests that cumulative effects, as a result of the proposed Development, are unlikely to arise due to windfarms located at substantial distances from the proposed Development site.

78. It is considered that any cumulative effects that would occur, would arise as a result of the pattern of development within the 45 km study area radius,

79. DGC and NatureScot will be consulted on the final list of sites to be considered within the detailed cumulative assessment. Exceptionally, scoping stage sites may also be included, at the request of the Council or NatureScot, where they are considered to be of specific relevance to the cumulative effect of the Development. Notably Duncow Common to the south of the proposed Development has not progressed beyond a scoping since its submission a number of years ago. We would welcome agreement that this project can be excluded from the cumulative assessment.

4.3. BASELINE DESCRIPTION

4.3.1. Site

80. The Site is in Dumfries and Galloway in the western part of the Forest of Ae, one of the largest forests in the UK. It consists of a conglomeration of coniferous, plantation covered hills, which together form part of an area of forested upland plateau when viewed from the wider area between Annandale to the east and Nithsdale to the west. The Site lies to the west of the minor road and the valley of the Water of Ae/Capel Water and its tributary Windyhill Burn. The highest point on the Site is Windyhill Rig at 318 m Above Ordnance Datum (AOD).

81. The forest area is characterised by normal forest management practices of clear fell and replanting once individual 'coups' are sufficiently mature. Coup boundaries are, in places, geometrically defined and this accentuates the fact that this is not a naturally occurring landcover but one of human intervention. A network of forest roads facilitates access within the forest area and one of these forms part of the route of the Romans and Reivers long distance route. There are also some small parcels of open rough grassland. A minor road runs through the Site from the village of Ae in the south, initially following the valley of Windyhill Burn and thereafter rising between areas of higher ground to where it meets a further minor road just to the east of Loch Ettrick. These roads are the routes to several residential and farm properties with some located along the open valley floor near Burnfoot and further properties around Mitchellslacks. There are also several properties on the slopes to the south-east and south-west of the Site. The closest settlement is the village of Ae which has a school and a shop. It is also home to Forestry and Land Scotland offices and a café and mountain biking hub that provides access to a network of trails as part of the 7 Stanes Mountain Biking facilities in Southern Scotland.

82. Also, of relevance to the character of the Site is the relatively close proximity of the operational Harestanes Windfarm to the east, also in the Forest of Ae, and Dalswinton Windfarm to the south-west of the Site. Minnygap Windfarm is also located on the east side of Harestanes.

4.3.2. Site Context

83. The Site is located across foothills within the western part of the Forest of Ae. These coniferous forestry-clad foothills are found south of the Lowther Hills that curve to the north-west. They sit between the River Annan to the east and River Nith to the west, tributaries of which form a criss-crossing network of glens within the foothills and uplands. The two rivers run largely parallel from the northwest to the south-east down to the Solway Firth.

84. South of the Forest of Ae the upper dales associated with the Rivers Nith and Annan open out to become mid-dales and later wide dales as the rivers flow out to the firth. Agricultural landscape dominates these dales utilising the fertile riverbanks and gentler gradients. Riparian vegetation, policy woodland, hedges with occasional hedgerow tress and small blocks of coniferous woodland break up the field pattern. It extends westwards in a broad band along the coast joining the open dales associated with the Water of Urr and the River Dee to the far west cross through this landscape before emptying out into the sea.

85. Between the mouth of the Water of Urr and the River Nith the broad Dalbeattie headland extends into the sea with large sandbanks on either side. The Criffle (589 m AOD) and Boreland Hill (497 m AOD) are the highest two hills of the Dalbeattie hills and form an import landmark in views south. These hills have large tracts of coniferous forestry particularly on their northern slopes.

86. West of the Lowther Hills and River Nith rise the Dalmacallan Forest lowlands that give rise to Carsphairn Forest uplands to their north-west. Tributaries of the Water of Urr flow from these lowlands. West of these hills the river and loch system that includes Loch Ken later become the River Dee. West of these the Glenkens rise, a mountainous area includes the Rhinns of Kells, and Cairnsmore of Fleet which form part of the Galloway Forest Dark Skies Park. The Merrick is further east and outwith the study area.

87. These bands of lowlands transition to become uplands to their north-west and are generally clad in coniferous forestry where the gradient allows and grass and heather covered moorland at upper elevations. The highest points are found to the west, with peaks within the Carsphairn Forest ranging between 650 m and the highest Cairnsmore of Carsphairn 797 m AOD. The Lowther Hills are slightly lower in elevation with the highest peak Green Lowther being 732 m AOD. East of the Lowther Hills and the River Annan, the Eskdalemuir Forest lowlands are located that rise to become the Talla-Heart uplands. The Southern Upland Way winds through these hill systems.

88. Major transport routes align along the Rivers Nith and Annan: the A74(M) and the main west coast (Carlisle to Glasgow) railway line run through Annandale, and the A76 and Carlisle to Kilmarnock railway line through Nithsdale. Smaller A-and-B-roads run east and west through smaller glens. Dumfries, the largest settlement within the study area, through which the A76 runs is found close to the River Nith estuary. The A75 connects Stranraer to the west outside of the study area with Gretna Green east of the study area, running east-west largely parallel to the Solway Firth coastline and crossing through Dumfries. All other settlements within the study area are small towns and villages, notably Thornhill north-west of the study area, Lockerbie to the south-east and Castle Douglas to the south-west.

4.3.3. Landscape Character

89. In early 2019, NatureScot published an update to the characterisation of Scotland's landscape as a digital resource. The information builds on the characterisation studies published in the 1990's. NatureScot describe the recent publication as now superseding the 1990s landscape character descriptions and mapping adding that "*Where there are topic-specific landscape capacity or sensitivity studies, they would take precedence for informing that development type, e.g. windfarms*."

90. Given the existing baseline of windfarm development within the immediate context of the Site, effects on landscape character are likely to occur within the baseline context of other large scale wind development. As a result of this and the well contained ZTV of the proposed Development as shown on Figure 4.2a, the potential for significant effects is considered to be limited in extent and would not occur beyond approximately 20 km. It is proposed therefore that the assessment of the effects on landscape character should focus on the area lying within a 20 km radius of the proposed Development. The assessment would provide more detail within 20 km of the Site where any significant effects would have the potential to impact on landscape character areas. In addition to NatureScot's 2019 data, 'topic specific' characterisation studies within this focused area are:

- DGC Local Development Plan 2 Part 1 Wind Energy Development: Development Management Considerations Appendix 'C' Dumfries & Galloway Wind Farm Landscape Capacity Study Supplementary Guidance (Feb 2020); and
- South Lanarkshire Landscape Capacity Study for Wind Turbines (Feb 2016).

91. These sources of information form the most up to date characterisation studies within 20 km of the Site, as such, form the basis of character assessment that will be undertaken in the LVIA.

92. NatureScot's dataset and the capacity studies divide the landscape into areas of distinctive character which are generally referred to as Landscape Character Types (LCTs). Many of these LCTs are extensive, sometimes covering several areas that are geographically separate. In order to distinguish between different areas of the same LCT and identify these areas in respect of their specific location, a sub classification of Landscape Character Units (LCUs) would be applied where relevant to the detailed assessment.

93. The Dumfries and Galloway Capacity Study shows the Site to be located fully within and close to the northern edge LCT18a Foothills with Forest (LCU Ae). LTC19 Southern Uplands (LCU Lowthers) lies just north of the Site (refer to Figure 4.2).

94. Agreement from the Council and NatureScot to the proposed scope for the LVIA is sought through this scoping exercise in order to enable the LVIA to be focussed on key considerations.

4.3.4. Landscape Planning Designations and Wild Land Areas

95. All Landscape Designations within the 45 km study area will be considered in the LVIA. In the first instance, a preliminary assessment will be carried out to establish which Landscape Designations have the potential to experience a significant effect as a result of the proposed Development. Following this initial assessment, detailed assessments will be carried out for each of the Landscape Designations where the potential for a significant effect has been identified. To provide an initial understanding of the potential effect at this stage, Figure 4.3: Landscape Planning Designations and ZTV shows national and regional landscape designations and Wild Land Areas (WLAs) overlain with the ZTV of the scoping layout.

96. The Site is not covered any national designations; however, the north-west part of the Site sits within a Regional Scenic Area (RSA) (Dumfries and Galloway). The Thornhill Uplands (RSA 8) is one of seven RSAs within the study area, as defined in the DGC LDP 2 Regional Scenic Areas Technical Paper (January 2018). All of these have theoretical visibility of the proposed Development and are listed below along with the distance and direction from the proposed Development:

- Galloway Hills (RSA 4) 29 km west;
- Solway Coast (RSA 5) 15 km south-west;
- Terregles Ridge (RSA 6) 10 km south;
- Torthorwalk Ridge (RSA 7) 7 km south-east;
- Moffat Hills (RSA 9) 14.5 km north-east; and
- Langholm Hills (RSA 10) 34 km east.

97. In addition to the RSAs, three National Scenic Areas (NSA) are found within the study area (Upper Tweeddale, East Stewartry Coast, and Nith Estuary). The initial ZTV shows that there is no visibility within the Upper Tweeddale NSA (39 km north-west), and limited visibility within the East Stewarty Coast NSA (30 km south-east). There is extensive theoretical visibility from within the Nith Estuary NSA (17 km south).

98. The study area includes the Solway Coast Area of Outstanding Natural Beauty (AONB) with the initial ZTV showing extensive theoretical visibility from across the Solway Firth. It is located 35 km south-east of the proposed Development.

99. Two World Heritage Sites (WHS) are found within the study area. New Lanark WHS is found just at the northern edge of the 45 km study area and has no theoretical visibility of the proposed Development. The Hadrian's Wall WHS is found approximately 35 km south-west of the Proposed Development and the initial ZTV shows extensive theoretical visibility from across the Solway Firth. WHS status is not a landscape planning designation but one denoting cultural heritage interest. The value associated with this designation will be considered when assessing the effects on viewpoints and other landscape and visual receptors located within it.

100. There are 13 Gardens and Designed Landscapes (GDLs) within the study area, the closest of which is Dalswinton to the south at 4.5 km and shown to have some theoretical visibility of the proposed Development. Drumlanrig Castle (GDL00143) is located at 6.5 km to the north-west and has extensive theoretical visibility of the proposed Development. GDLs are sites of national importance as identified by Historic Environment Scotland (HES). There are also 121 Non-Inventory Gardens within the study area. These have regional and local significance and are identified by Scotland's Garden and Landscape Heritage (SGLH) supported by DGC.

101. The Galloway Forest Dark Sky Park Buffer area is approximately 34 km west of the proposed Development and has some theoretical visibility concentrated around high points, mostly across areas of coniferous forestry plantation. A small part of the Core of the Park extends just into the edge of the 45 km study area.

102. East Ayrshire Council has identified three non-statutory Sensitive Landscape Areas in its LDP (2017) all of which are found within the study area. Only the easternmost area has any theoretical visibility of the proposed Development and this is extremely limited. It is located approximately 30 km north-west of the Site.

103. There are four non-statutory Special Landscape Areas as identified by South Lanarkshire Council in Validating Local Landscape Designations (2010) and confirmed in LDP2 (2021). There is very limited visibility within the southernmost area (Leadhills and the Lowther Hills) located 6 km north from the proposed Development and within Upper Clyde Valley and Tinto area 29 km to the north-east. There is no theoretical visibility within the remaining areas.

104. WLAs are not a landscape designation but a Mapped Interest, defined and described by NatureScot and considered to be of national importance. Talla-Hart fell (WLA 02) is found within the 45 km study area, as shown in Figure 4.3. It is located approximately 22 km north-east of the Site and the preliminary ZTV shows there is theoretical visibility within the south-western part of the WLA. However, a review of wirelines shows that the Development would be seen behind the operational Harestanes Windfarm.

4.3.5. Visual Receptors and Visual Amenity

105. The LVIA will undertake an assessment of the likely visual effects of the proposed Development through consideration of the specific visual effects at a selection of representative viewpoints and by considering the wider effects on visual amenity with reference to principal visual receptors (principal visual receptors are shown on Figure 4.4a with blade tip ZTV, viewpoints shown on 1:50k Ordnance Survey mapping on Figure 4.4b).

4.3.6. Residential Visual Amenity Assessment

106. There are several residential properties in the vicinity of the Site. Those on the south-western side of the Site may gain visibility of the proposed turbines in the context of the existing Dalswinton Windfarm whilst for others windfarm visibility may be a new feature of views from the property.

107. While effects on individual properties will not be assessed in the LVIA, those that lie within a 2 km radius of the proposed Development will be included in the Residential Visual Amenity Assessment (RVAA). The RVAA will be prepared in accordance with the Landscape Institute's Technical Guidance Note 2/19 'Residential Visual Amenity Assessment'. This guidance sets out the 'Steps' to be followed when undertaking a RVAA and highlights how it should be informed by the principles and processes of GLVIA3. The purpose of the RVAA is to identify those properties where the effect of the proposed Development leads to the 'Residential Visual Amenity Threshold' being reached or, in other words, where the effect could be described as overwhelming or overbearing. The study area is set at a 2 km radius in line with the maximum radius recommended in the technical guidance. The RVAA will consider the effect on views from each property, as well as views from the associated garden grounds and access drives/tracks. Field work will be undertaken from publicly accessible locations, and considered in conjunction with aerial photography, in order to ascertain these potential effects.

4.3.7. Cumulative Windfarms

108. Figure 4.5 shows the cumulative windfarms within a 45 km radius of the proposed Development and their current status.

109. Windfarms in the immediate area include the following:

- Operational - Dalswinton Wind Warm (15 turbines at 125 m to tip) approximately 650 m to the south-west;

- Operational - Harestanes Wind Farm (68 turbines at a maximum of 121.5 m to tip) 2.9 km to the north-east;
- Operational - Minnygap (10 turbines at 125 m to tip) 6.2 km to the north-east; and
- Application stage - Harestanes South (8 turbines at 200 m to tip) 4 km east is at application stage.

110. It is notable that there are numerous consented but as yet unbuilt windfarms and large numbers of sites at the scoping and application stages that may never come forward to application forming a large arc around the proposed Development. This as-yet unbuilt or consented wind infrastructure would emphasise and extend the reach of the existing development pattern that is concentrated on the lowlands and uplands that surround the Site.

4.4. GUIDANCE AND LEGISLATION

111. The LVIA will follow Optimised Environment Ltd's (OPEN) methodology devised specifically for the assessment of windfarm developments and generally accords with 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' (Landscape Institute and IEMA, 2013) ('GLVIA3'), the key source of guidance for LVIA.

112. Other sources of guidance that will be used and referenced in the LVIA include the following:

- Visual Representation of Wind Farms Version 2.2 (Scottish Natural Heritage (SNH), February 2017);
- Assessing impacts on Wild Land Areas - Technical Guidance. (NatureScot, 2020);
- Technical Guidance Note 02/19 Residential Visual Amenity Assessment. (Landscape Institute, 2019);
- Technical Guidance Note 02/21 Assessing landscape value outside national designations (Landscape Institute, 2021);
- Guidance – Assessing the cumulative landscape and visual impact of onshore wind energy development. (NatureScot, 2021);
- Landscape Character Assessment Guidance for England and Scotland (SNH and TCA, 2002);
- Siting and Designing of Windfarms in the Landscape: Version 3 (SNH, 2017);
- Policy Statement No 02/02: Strategic Locational Guidance for Onshore Windfarms in Respect of the National Heritage (SNH, 2009);
- Spatial Planning for Onshore Wind Turbines – Natural Heritage Considerations Guidance (SNH, 2015); and
- Good Practice During Windfarm Construction, Version 4 (Scottish Renewables et al., 2019).

4.5. ASSESSMENT METHODOLOGY

4.5.1. Desk Study

113. The assessment has been initiated through a desk study of the Site and the 45 km radius study area, combined with a good working knowledge of this area. This study has identified aspects of the landscape and visual resource that will need to be considered in the LVIA, including:

- Landscape character typology;
- Landscape-related planning designations;

- WLA;
- Potential cumulative windfarms;
- Routes (including roads, National Cycle Routes and long-distance walking routes); and
- Settlements.

114. The desk study has also utilised Geographic Information System (GIS) software to explore the potential visibility of the scoping layout for the proposed Development. The resultant ZTV diagrams (Figures 4.2 to 4.4a and b) have provided an indication of which landscape and visual receptors are likely to have key sensitivities to the proposed Development.

4.5.2. Categories of Effects

115. The LVIA is intended to determine the significant effects that the proposed Development would have on the landscape and visual resource. For the purpose of assessment, the potential effects on the landscape and visual resource are grouped into the following categories:

- Physical effects: physical effects are restricted to the area within the Site and are the direct effects on the existing fabric of the Site. This category of effects is made up of landscape elements, which are the components of the landscape such as rough grassland and forestry that may be directly and physically affected by the proposed Development;
- Effects on landscape character: landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements or through visibility of the proposed Development that may alter the way in which the pattern of elements is perceived. This category of effects is made up of landscape character receptors, which fall into two groups; landscape character types and landscape-related designated areas;
- Effects on the special qualities of the NSA and AONB: a Special Landscape Qualities Impact Assessment is carried out to cover the potential for significant effects on the landscape qualities as identified in the NatureScot published report for each NSA in Scotland and as included in the Solway Coast AONB Management Plan.
- Effects on wild land: the assessment of the effects on the wild land qualities of the WLAs through consideration of the impacts on the physical attributes and perceptual responses identified as identified in NatureScot's WLA Descriptions;
- Effects on views: the assessment of the effects on views is an assessment of how the introduction of the proposed Development would affect views throughout the study area. The assessment of effects on views is carried out in relation to representative viewpoints and principal visual receptors;
- Effects on views from properties: RVAA is carried out for properties within 2 km in line with Landscape Institute (LI) technical guidance;
- Effects of Turbine Lighting: should visible aviation lighting be required, a night time visual impact assessment is prepared to assess the potential visual impact of the turbine lights with specific reference to the Dark Sky Park; and
- Cumulative effects: cumulative effects arise where the study areas for two or more windfarms overlap so that both of the windfarms are experienced at a proximity where they may have a greater incremental effect, or where windfarms may combine to have a sequential effect. In accordance with guidance, the LVIA assesses the effect arising from the addition of the proposed Development to the cumulative situation.

4.5.3. Assessment Approach

116. The objective of the assessment of the proposed Development is to predict the likely significant effects on the landscape and visual resource. To meet the requirements of the EIA Regulations, the LVIA effects are assessed to be either significant or not significant.

117. The significance of effects is assessed through a combination of two considerations: the sensitivity of the landscape receptor or view and the magnitude of change that would result from the addition of the proposed Development.

118. The geographic extent over which the landscape and visual effects would be experienced is also assessed, which is distinct from the size or scale of effect. This evaluation is not combined in the assessment of the level of magnitude but instead is used in determining the extent in which a particular magnitude of change is experienced and the extent of the significant and non-significant effects. The extent of the effects would vary depending on the specific nature of the development proposed and is principally assessed through analysis of the geographical extent of visibility of the proposed Development across the visual receptor.

119. The duration and reversibility of effects on views are based on the period over which the proposed Development is likely to exist and the extent to which the proposed Development will be removed, and its effects reversed at the end of that period. Duration and reversibility are not incorporated into the overall magnitude of change and may be stated separately in relation to the assessed effects.

120. The 'nature of effects' relates to whether the effects of the proposed Development are adverse, neutral or beneficial. Guidance provided in GLVIA3 states that "*thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity*" but does not provide an indication as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and reasoned professional opinion.

121. A precautionary approach will be adopted which assumes that significant landscape and visual effects will be weighed on the negative side of the planning balance, although positive or neutral effects may arise in certain situations.

4.6. PROPOSED MITIGATION

122. Embedded mitigation has already been factored into the layout presented at the scoping stage as follows:

- No turbines are proposed in the Thornhill Uplands Regional Scenic Area in the north-western part of the site;
- Turbines set back from the settlement of Ae;
- Turbines set back from residential properties by over 1 km; and
- Steeply sloping areas avoided so that earthworks are minimised.

123. The design and layout of the proposed turbines and associated infrastructure is a vital part of the EIA process and is the stage where the biggest contribution can be made to mitigate potential landscape and visual effects. A key design objective will be creating a windfarm which is appropriate for the existing landscape character and visual features of an area. The design of the proposed Development will evolve as part of an iterative process, which aims to provide an optimal design in environmental, as well as technical and economic terms and the mitigation of landscape and visual effects will be a central consideration in this process.

124. Forestry areas may be retained for longer than was originally set out in the Forest Design Plan in order to maintain a screening effect.

125. Mitigation of aviation lighting will be investigated and, if deemed necessary, agreed with the Civil Aviation Authority.

4.7. POTENTIAL IMPACTS

4.7.1. Effects on Physical Fabric of the Site

126. The Site is covered by coniferous forestry. The assessment will consider the impact of any forestry removals to accommodate the proposed Development.

4.7.2. Effects on Landscape Character

127. The removal of forestry cover and the addition of the proposed Development turbines and ancillary infrastructure may all have a direct effect on character of the site and the surrounding area as a result of their visibility.

128. Effects on landscape character will be assessed within a 20 km radius from the Site for the reasons set out in Section 4.3.

4.7.3. Effects on Landscape Planning Designations and Wild Land Areas

129. Effects on landscape planning designations and WLAs may arise as a result of visibility of the proposed Development. Such effects will be considered in relation to published citations or identified Special Qualities.

4.7.4. Effects on Visual Amenity

130. Effects on visual amenity may only occur in areas within the ZTV of the proposed turbines. Effects on visual amenity will be assessed primarily in relation to a series of representative viewpoints that are selected to illustrate the views of the proposed Development from a variety of locations and distances so that the likely effects can be understood. Effects on people at principal visual receptors will also be assessed where there may be a significant visual effect.

4.7.5. Zone of Theoretical Visibility

131. The ZTV is shown to be well contained within the 45 km radius study area due to the incidence of higher, screening landform to the west, north and east of the Site at a range of 20-30 km. Within these areas of higher ground it is the from the slopes that face towards the Site and further high points that people may gain visibility. At more distant ranges there are patches of ZTV on high points to the west and east.

132. To the south of the Site the lower ground towards and around Dumfries, the valley of the River Nith and the Solway Firth beyond means that the ZTV is shown to be widespread within the southerly part of the study area. The ZTV spreads further south to the Cumbrian Coast across part of Allerdale and Carlisle Districts at ranges of 30-45 km.

133. Whilst the ZTV shows theoretical visibility this does not necessarily translate into actual visibility. The ZTV does not take into account the screening effect of vegetation, buildings or other structures. This is particularly important with regard to actual visibility from within settlements which is markedly reduced due to the screening effect of intervening buildings and vegetation. Notably, within the landscape of this study area higher ground is in many areas covered in coniferous forestry so that whilst there are patches of theoretical visibility coniferous forestry would reduce actual visibility from these locations.

134. The ZTV provides a starting point for the assessment of landscape and visual effect however it does not account for distance or the degree of visibility of the turbine only how many may be visible. It does not take into account that visibility may just be of blade tips. It is therefore not an indicator or magnitude of change.

135. Another factor that effects magnitude of change and that is not taken into account in the ZTV is the existing windfarm influence. This is an important consideration, particularly in areas to the east and south-west of the Site whereby the proposed Development would be seen behind existing turbines and, whilst visible it may not materially alter the baseline view.

4.7.6. Viewpoint Selection

136. A preliminary viewpoint list is shown in Table 4.1 below.

137. The final list will be established through further fieldwork and the scoping process and in agreement with DGC and NatureScot. The viewpoints were selected to represent sensitive visual receptors with the potential to undergo significant effects. They were also selected to represent landscape receptors and with consideration of the potential for cumulative effects to arise. The locations of the viewpoints are shown on Figure 4.4a and 4.4b.

Table 4.1 Preliminary Representative Viewpoint Locations

NO.	VIEWPOINT NAME	GRID REF.		DISTANCE NEAREST TURBINE (KM)	RECEPTORS REPRESENTED
1	Ae, Dulcrum Rise	298279	589255	2.5	People in settlement
2	Ae, Birkie Knowe	298505	589107	2.7	People in settlement
3	Minor Road near Burnfoot	297164	591818	1.8	People on minor road and in residential properties
4	Loch Ettrick	294330	593683	1.2	Visitors to Loch Ettrick
5	Minor Road near Mitchellslacks	296570	595900	1.5	People using minor road
6	A701, south of Ae Bridgend	300711	586333	5.9	People using minor road and within scattered settlement area
7	Minor Road north of Riddingwood House	298475	584120	6.0	People using minor road
8	A75, Dumfries	297467	578201	11.3	A75
9	A75, west of Brae	285673	573880	18.6	A75
10	A76, Closeburn	289761	592235	5.4	People within settlement
11	A76, near Portrack	292986	583127	6.8	People using road and within settlement
12	Thornhill	288043	595250	6.8	People within settlement
13	B7068 East of Lockerbie	314165	581369	16.9	People within settlement
14	Breckenry Road over A74 (M)	311980	584860	16.9	M74
15	Queensberry	298850	599510	5.7	Walkers

NO.	VIEWPOINT NAME	GRID REF.		DISTANCE NEAREST TURBINE (KM)	RECEPTORS REPRESENTED
16	Hart Fell[1]*	311332	613610	24.4	Talla-Hart Fell WLA 02, Regional Scenic Area
17	Criffel	295712	562007	27.4	Nith Estuary NSA, Walkers
18	Bowness on Solway, car park	321994	562649	37.5	Solway Firth AONB, settlement, routes
19	Drumlanrig Castle	285159	599279	10.7	Garden and Designed Landscape, visitor attraction
20	Annandale Way, Monument	308914	575828	18.9	Regional Scenic Area, Annandale Way,

4.7.7. Visualisations and Figures

138. Visualisations and figures will be produced to NatureScot standards as set out in 'Visual Representation of Wind farms: Version 2.2' (February 2017). NatureScot guidance suggests that photomontages should be prepared for viewpoints where they are located within a 20 km radius of the outermost turbines. However, given the scale of the turbines proposed, in this instance photomontages will be prepared for viewpoints out to a 30 km radius.

4.7.8. Night Time Effects of Aviation Lighting

139. A key factor in the development of turbines greater than 150 m in height is the likely requirement for them to have visible red, medium intensity (2,000 candela) lights fitted to the turbine hubs in accordance with Civil Aviation Authority guidance. The details of the lighting requirements for the proposed Development will be defined for the assessment along with potential mitigation measures.

140. If required, a night-time impact assessment section and visualisations illustrating turbine lighting at night will be prepared for inclusion in the LVIA. The hub height ZTV will be used to identify where there would be direct line of sight of the lights from the surrounding area. The approach to assessment of turbine lighting will be informed by night-time lighting assessments and visualisations which have been undertaken on other windfarm projects across the UK, and on the basis of professional judgement about the level of effect arising from the proposed lighting.

141. In order to inform this assessment, photographs will be taken from three readily accessible viewpoints at dusk (photographs to be taken after the period of civil twilight) and visualisations will be prepared to represent the effects of lighting on these views. Night-time visualisations will be prepared in accordance with NatureScot guidance.

142. The proposed Development lies at a distance of over 34 km from the Galloway Forest Dark Sky Park Buffer area and is approximately 45 km to the west of the Dark Sky Park Core area. The effects of turbine lighting on the Dark Sky Park will be considered in the night time assessment.

[1] **cumulative wireline only to be provided to illustrate limited visibility of proposed Development from this viewpoint ie. no baseline photograph or photomontage.*

4.7.9. Cumulative

143. Significant cumulative effects may arise as a result of the addition of the proposed Development to a context containing other existing, under construction, consented or application stage windfarms.

144. In accordance with NatureScot and Scottish Government guidance it is not usual to assess scoping stage sites unless they are of particular relevance to the proposed Development, where sufficient detail is available to inform the assessment and where they are likely to come forward to application.

4.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

Table 4.2: Potential landscape and visual impacts/receptors scoped in (✓) and scoped out (X)

POTENTIAL EFFECTS/ RECEPTORS	CONSTRUCTION	OPERATION
Landscape character within 20 km	✓	✓
Landscape character outwith 20 km	X	X
Gardens and Designed Landscapes within 45 km	✓	✓
Non-Inventory Gardens (Dumfries and Galloway) within 10 km	✓	✓
Non-Inventory Gardens (Dumfries and Galloway) outwith 10 km	X	X
Visual impacts of turbine lighting at night	X	✓
Residential visual amenity effects on properties within 2 km	✓	✓
Upper Tweeddale NSA	X	X
East Stewartry Coast NSA	X	X
Solway Firth AONB	✓	✓
WLA 02: Talla-Hart Fell	X	X
Dumfries and Galloway Regional Scenic Areas	✓	✓
South Lanarkshire Special Landscape Areas	X	X
East Ayrshire Sensitive Landscape Areas	X	X
Dumfries	✓	✓
Lockerbie	✓	✓
Thornhill	✓	✓

POTENTIAL EFFECTS/ RECEPTORS	CONSTRUCTION	OPERATION
Ae	✓	✓
All other settlements in the study area	X	X
A74(M)	X	X
A76	✓	✓
A702	✓	✓
A701	✓	✓
All other roads in the study area	X	X
Southern Upland Way	✓	✓
Annandale Way	✓	✓
.Allerdale Ramble	X	X
Romans and Reivers Route	X	X
River Ayr Way	X	X
Hadrians Wall Path	X	X
Cumbria Coastal Way	X	X

4.9. SCOPING QUESTIONS TO CONSULTEES

145. The following questions are directed to consultees:

- Do consultees have any comments on the proposed approach and methodology?
- Are consultees in agreement with the proposed study areas?
- Are consultees in agreement that the assessment of the effects on landscape character receptors (except landscape planning designations) should focus on areas within a 20 km radius?
- Do consultees have any comments or suggestions in relation to the Preliminary Representative Viewpoint Locations shown in Table 4.1 and illustrated on Figures 4.4a and 4.4b?
- Do consultees have any comments on the landscape and visual effects of turbine lighting?
- Do consultees have any comments on the proposals to scope in and scope out effects/ receptors as set out in Table 4.2?
- Do consultees have any comments or suggestions on the approach to cumulative landscape and visual assessment?

5. Ornithology

5.1. INTRODUCTION

146. This section of the Scoping Report sets out the proposed approach to the assessment of potential effects on ornithology, during both construction and operation of the proposed Development.

147. The assessment will be undertaken in line with best practice and relevant legislation, policy, and guidance.

5.2. STUDY AREA

148. The EIA Report will consider the following study areas:

- Designated sites – up to 20 km study area (SNH 2016);
- Collision modelling – the results of the flight activity surveys will be used to inform collision modelling;
- Scarce breeding birds – 2 km study area (SNH 2017);
- Black grouse – 1.5 km study area (SNH 2017);
- Breeding upland waders, nightjar and wintering waders, raptors, owls, and wildfowl – 500 m study area (SNH 2017); and
- Cumulative assessment – as per SNH (2018b), the Natural Heritage Zone (NHZ) level is considered practical and appropriate for breeding species of wider countryside interest.

5.3. BASELINE DESCRIPTION

5.3.1. Designated Sites

149. There are no statutory designations with ornithological features within the Site. The proposed Development is within 20 km of two sites which are overlapped by four statutory designations that include ornithological features (Figure 5.1):

- Castle Loch, Lochmaben SPA and Ramsar site; and
- Upper Solway Flats and Marshes SPA and Ramsar.

150. Castle Loch, Lochmaben SPA and Ramsar site is approximately 13.5 km south-east of the Site boundary. It is designated as an SPA for supporting Icelandic/Greenlandic pink-footed geese (*Anser brachyrhynchus*) and a nationally important wintering population of goosander (*Mergus merganser*), and as a Ramsar site for supporting non-breeding pink footed geese (see Table 6.1).

151. NatureScot guidance on assessing connectivity between protected sites and a selection of species (SNH, 2016) outlines a connectivity distance of up to 20 km for pink-footed geese. However, given the afforested nature of the majority of the habitat within the Site boundary, it is considered that these habitats are unsuitable for foraging or roosting geese and the that any pink-footed geese in the area are likely to only be passing over the Site during migration; therefore, connectivity between the proposed Development and the Castle Loch, Lochmaben SPA and Ramsar site is considered unlikely.

152. The SNH (2016) guidance does not outline a connectivity distance for goosander but for the similar-sized species red-throated diver (*Gavia stellata*) the core range is considered to be less than 8 km. Considering the lack of suitable wetland habitat within the Site for goosander, connectivity

between the proposed Development and the Castle Loch, Lochmaben SPA for goosander is considered unlikely. It is therefore proposed that the Castle Loch, Lochmaben SPA and Ramsar site are scoped out of the EIA.

153. Upper Solway Flats and Marshes SPA and Ramsar site is located approximately 17.2 km south of the Site boundary and is designated for supporting numerous species of wintering waterbirds, whose numbers reach 121,325 individuals and include the entire Svalbard breeding population of barnacle goose (*Branta leucopsis*). The SPA and Ramsar site is a vital estuary link used by various migrating waders, and the area is used for recreation, fishing, and grazing. On the basis of the SNH (2016) guidance which outlines the potential ranges for a number of breeding and wintering bird species, owing to the distances involved and the lack of suitable habitat for roosting and foraging wildfowl and wading species, there is considered to be no connectivity between the SPA and Ramsar site and the proposed Development. It is therefore proposed that the Upper Solway Flats and Marshes SPA and Ramsar site is scoped out of the EIA.

5.3.2. Completed Field Surveys and Summary of Findings

154. The following surveys (a full two years of survey) have been completed at the Site between September 2019 and August 2021 and no further ornithology survey work is proposed:

5.3.2.1. Vantage Point Surveys

155. A total of 36 hours of Vantage Point (VP) surveys were completed at each of 15 VP survey locations between September 2019 and February 2020. The 15 VP viewsheds covered the Site and a wider area. A further 108 hours of surveys were completed at eight VPs making a total of 144 hours across two breeding and two non-breeding season for the area covering the Site.

156. Overall, eight target Schedule 1 raptor and owl species were recorded, these are detailed below:

- Goshawk (*Accipiter gentilis*) and red kite (*Milvus milvus*) were frequently recorded;
- Hen harrier (*Circus cyaneus*); short-eared owl (*Asio flammeus*) commonly recorded; and
- Osprey (*Pandion haliaetus*), peregrine (*Falco peregrinus*), merlin (*Falco columbarius*), barn owl (*Tyto alba*) infrequently recorded.

157. Overall, three wildfowl species were recorded:

- Pink-footed geese (*Anser brachyrhynchus*) were frequently recorded on passage in non-breeding season; and
- Greylag geese (*Anser anser*) and whooper swan (*Cygnus cygnus*) were occasionally recorded on passage.

158. Four wader species were recorded during the VP surveys; snipe (*Gallinago gallinago*), lapwing (*Vanellus vanellus*), oystercatcher (*Haematopus ostralegus*) and curlew (*Numenius arquata*) most frequently during breeding season.

5.3.2.2. Breeding Raptor Surveys

159. Breeding raptor surveys (following methods outlined in Hardey *et al.*, 2013) were undertaken of the Site and a 2 km buffer. The surveys including four visits between April and August were undertaken in 2020 and 2021.

160. A total of three goshawk nests were recorded within the 2 km study area in both the 2020 and 2021 surveys. A single red kite nest that was abandoned was recorded in the 2020 surveys while in 2021 a nest was recorded outside the Site.

161. In 2020 a total of three possible short-eared owl territories were identified within 2 km of the Site of which one was located within the Site, but none were confirmed. No territories were located within the Site or the 2 km survey buffer in 2021.

5.3.2.3. Black Grouse Surveys

162. Black grouse (*Tetrix tetrix*) surveys were undertaken in both 2020 and 2021 following the methods outlined in Gilbert *et al*. (2011) and covered the Site and a 1.5 km survey buffer. A single lek was recorded outside the Site in year 1. In year 2, three different leks of one male were located outside the Site, it was unclear if the leks involved different individuals.

5.3.2.4. Nightjar Surveys

163. Nightjar (*Caprimulgus europaeus*) surveys were undertaken in both 2020 and 2021 following the methods outlined in Gilbert *et al.* (2011) and covered the Site and a 500 m survey buffer. No nightjar were recorded.

5.3.2.5. Moorland Breeding Bird surveys

164. The Site and a 500 m buffer were surveyed in 2020 and 2021 using the Brown and Shepherd (1993) survey method, which is designed for moorland/upland habitats. Target species recorded include crossbill (*Loxia curvirostra*), curlew, lapwing, and oystercatcher.

5.4. GUIDANCE AND LEGISLATION

165. The legislation and policies which are directly relevant to the assessment of ornithological effects have been summarised below.

166. The assessment will be undertaken in line with the following European legislation and guidance:

- Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive)[2];
- The Ramsar Convention on Wetlands 1976; and
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (Habitats Directive)

167. The following national legislation and policy will be considered as part of the assessment:

- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- Circular 1/2017; The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017; and
- Planning Advice Note PAN 1/2013 – Environmental Impact Assessment (Scottish Government 2013).

168. The following guidance will be considered as part of the assessment:

- Stanbury, A., Eaton,M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747;
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester;

[2] *Although the UK has now left the European Union, there has been no significant change in the wording of UK nature conservation legislation based on European Directives, and these are therefore considered to remain relevant to the present report.*

- SNH (2000) Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note;
- SNH (2009) Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees;
- SNH (2012) Post-construction management of windfarms on clear-felled forestry sites; reducing the collision risk for Hen Harrier, Merlin and Short-eared Owl from Special Protection Areas;
- SNH (2016) Assessing connectivity with Special Protection Areas (SPAs);
- SNH (2018a) Assessing Significance of Impacts from Onshore Wind Farms out-with Designated Areas;
- SNH (2018b) Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note;
- SNH (2018c) Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland;
- Scottish Renewables et al. (2019) Good Practice during Wind Farm Construction. Version 4;
- Scottish Executive Rural Affairs Department (SERAD) (2000). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('the Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995;
- The Dumfries and Galloway Local Biodiversity Action Plan (2009); and
- The Scottish Biodiversity List (2020).

169. Surveys completed at the Site followed the methodologies detailed in the guidance below:

- Gilbert, G., Gibbons, D. W. and Evans, J. (2011) Bird Monitoring Methods. RSPB, Sandy;
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). Raptors: a field guide for surveys and monitoring (3rd edition). The Stationery Office, Edinburgh;
- SNH (2007) Black grouse survey methodology; and
- SNH (2017) Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms.

5.5. ASSESSMENT METHODOLOGY

170. The assessment of ornithological effects will follow the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance (2018) ensuring a transparent and robust approach. These guidelines set out the process for assessment through the following:

- Collation of updated baseline ecological and ornithological information through desk study and field surveys;
- Identification of Important Ornithological Features (IOFs) including designated sites and protected / priority species;
- Identification and characterisation of effects on IOFs including positive or negative, extent, magnitude, duration, timing, frequency, and reversibility;
- Assessment of cumulative effects;

- If required, proposals for design and mitigation measures to avoid and / or minimise effects on IOFs;
- An assessment of residual effects following the implementation of design and mitigation measures; and
- If required, identification of appropriate compensation measures to offset significant residual effects and opportunities for ecological enhancement.

5.5.1. Desk Study

171. The following data sources will be consulted as part of the assessment:

- Dumfries and Galloway Raptor Study Group (DGRSG) – provision of historic raptor nest locations;
- South West Scotland Environmental Information Centre (SWSEIC);
- NatureScot, SiteLink website; for designated sites; and
- Any other relevant Environmental Statements/EIA reports or technical reports from other developments or proposed developments in the local area that are in the public domain.

5.5.2. Assessment Method

172. The assessment method will follow the process set out in the relevant provisions of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations') and guidance on implementation of the Birds and Habitats Directive (SERAD 2000; SNH 2018c).

173. The ways in which birds may be affected (directly or indirectly) by the construction and operation of the proposed Development are:

- Direct habitat loss through construction of the windfarm (e.g. turbine bases, tracks etc.).
- Collision of birds with operational turbines leading to injury and potentially mortality.
- Indirect habitat loss due to birds avoiding the windfarm and its surrounding area. This may occur as a result of disturbance during construction, operation and maintenance and also due to increased visitor disturbance.
- Habitat modification due to associated changes in land cover (e.g. tree felling or effects on hydrology leading to altered suitability for foraging, breeding, etc.).
- Barrier effects in which birds avoid the windfarm and are therefore forced to take alternative routes to feeding or roosting grounds.

174. Impacts during decommissioning are scoped out as this is considered likely to have similar effects as construction however reduced dur to less predicted groundworks.

5.5.2.1. Methodology for Assessing Ornithological Features

175. The EIA Report will include an Ornithological Impact Assessment (OIA). This will consider the potential direct, indirect, and cumulative effects that the construction and operation of the proposed Development could have on ornithology. It would also consider the potential effects on any scoped in statutory designated sites; however, as noted above, it is proposed that all statutory designated sites are scoped-out of the assessment. The OIA will be supported by a technical appendix that will include all outputs from any collision modelling.

176. Effects on potential IOFs will be assessed in relation to the species' reference population, conservation status, range, and distribution. The assessment of potential effects will follow guidelines published by CIEEM (2018) and NatureScot (SNH 2017, 2018a).

177. The assessment involves the following process:

- Identification of the potential effects of the proposed Development;
- Consideration of the likelihood of occurrence of potential effects where appropriate;

- Defining the Nature Conservation Importance (NCI) and Conservation Status of the bird populations present to determine overall sensitivity;
- Establishing the magnitude of the likely effect (both spatial and temporal);
- Based on the above information, a judgement is made as to whether or not the identified effect is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant, measures to mitigate or compensate the effect are suggested where required;
- Opportunities for enhancement are considered where appropriate; and
- Residual effects after mitigation, compensation, or enhancement are reported.

178. NCI is defined on the basis of the geographic scale, and it is necessary to consider alongside each feature's conservation status, its distribution and its population trend based on available historic records, to provide an overall level of sensitivity.

179. The significance of potential effects is determined by integrating the sensitivity and magnitude in a reasoned way.

180. A set of pre-defined significance criteria will be used in assessing the potential effects of the proposed Development. It is necessary to establish whether there will be any effects which will be sufficient to adversely affect the feature to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e. the 'do nothing' scenario). Furthermore, these predictions will be given with a level of confidence relative to the effect being assessed where required (in line with CIEEM 2018).

5.5.2.2. Cumulative Effects

181. An assessment of cumulative effects will be undertaken following published guidance (SNH 2018b). Cumulative effects on each feature relevant to this proposed Development will be assessed in relation to other projects and activities subject to the EIA process within a relevant search area, and their effects on a relevant reference population; for example, at a NHZ level for breeding species.

5.6. PROPOSED MITIGATION & ENHANCEMENT

182. Significant effects upon birds will be avoided/minimised where possible within the design process. Good practice during construction and operation of the proposed Development will also be implemented.

183. Where likely significant effects on IOFs are identified, measures to prevent, reduce and where possible offset these adverse effects will be proposed. In accordance with the requirements of the policies of NPF4, opportunities for biodiversity enhancement measures will also be identified.

184. Standard good practice measures (SNH 2015) will be applied to minimise any potential effects on breeding Schedule 1/Annex 1 raptors and owls within up to 800 m of the proposed Development, including appropriate mitigation/monitoring and license application/consultation with NatureScot. This would include (but is not limited to):

- Checks for breeding birds including raptors and owls by a suitably qualified ornithologist prior to works undertaken between March and July;
- Appropriate buffers applied to any breeding attempts located; and
- Additional mitigation and enhancement measures dependent on the outcomes of a risk assessment and site-specific conditions e.g. reduced speed limits and personnel to remain in vehicles along identified sections of tracks.

185. A Breeding Bird Protection Plan (BBPP) will be produced to ensure that all reasonable precautions are taken to ensure the relevant wildlife legislation is adhered to.

5.7. POTENTIAL IMPACTS

186. On the basis of the surveys undertaken at the Site and their respective conservation status, black grouse, curlew, goshawk, hen harrier, peregrine, red kite, and short-eared owl are considered to be the species most likely to be considered in the EIA Report as IOFs.

187. Cumulative effects will also be considered where relevant for all of the effects detailed below.

5.7.1. Construction Effects

188. Based on the available information to date from baseline surveys and the preliminary results from the desk-based study, the following construction effects are likely to be assessed:

- Habitat loss/alteration/fragmentation associated with the proposed Development, including loss of nesting habitat for target species, or any increased habitat suitability associated with any forest felling (e.g. for raptors, owls or black grouse); and
- Disturbance to target species (breeding raptors, owls and black grouse) associated with construction activities.

5.7.2. Operational Effects

189. Based on the available information to date from baseline surveys and the preliminary results from the desk-based study, the following operational effects are likely to be assessed:

- Displacement of target species (breeding raptors, owls and black grouse) around operational turbines; and
- Potential collision risks associated with operational turbines for target species (most likely to be wildfowl and raptors).

5.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

5.8.1. Species Scoped In

190. Based on the findings of surveys carried out to date, the following effects on the following species will be assessed:

- The effect of the proposed Development on breeding goshawk, red kite, short-eared owl, black grouse, and waders.
- The potential for collision risk of the proposed Development on goshawk, red kite, peregrine, and hen harrier.

5.8.2. Species Scoped Out of the Assessment

191. On the basis of experience from other relevant projects (other regional projects and other projects of similar habitat) and policy guidance or standards (e.g. SNH 2018a), from the results gathered to date, the following species are likely to be 'scoped out' since significant effects are unlikely:

- Common and/or low conservation species not recognised in statute as requiring special conservation measures, e.g. birds on Annex 1 to the EU Birds Directive or Schedule 1 to the Wildlife & Countryside Act 1981 (as amended);
- Common and/or low conservation species not included in non-statutory lists (e.g. Red and Amber-listed BoCC species), showing birds whose populations are at some risk either generally or in parts of their range; and

- Passerine species, not generally considered to be at risk from windfarm developments (SNH 2018, 2017), unless being particularly rare or vulnerable at a national level.

5.8.3. Impacts Scoped Out of the Assessment

192. Due to a lack of connectivity with the proposed Development, impacts on ornithologically designated sites are scoped out of the assessment.

193. The decommissioning phase of the proposed Development is scoped out as this is considered likely to have similar effects as construction (covered in Section 5.7 above) however reduced due to less predicted groundworks.

5.9. SCOPING QUESTIONS TO CONSULTEES

194. The following questions are directed to consultees:

- Confirmation that there is no connectivity between the proposed Development and the Castle Loch, Lochmaben SPA and Ramsar site and Upper Solway Flats and Marshes SPA and Ramsar site and that these designations can therefore be scoped out of the EIA Report.
- Do consultees agree that the range of completed surveys are sufficient and appropriate?
- Are there any other relevant consultees who should be contacted or other information sources referenced, with respect to the ornithology assessment?
- Confirmation of the approach to the ornithological assessment is requested. Do consultees believe that there are further species or designated sites which need to be considered in the assessment?
- Confirmation that the low conservation value species can be scoped out of the assessment is requested.
- Do consultees agree that the proposed mitigation is sufficient and appropriate?

6. Ecology

6.1. INTRODUCTION

195. This section of the Scoping Report details the proposed approach to the ecological surveys and assessment which will be undertaken in accordance with current best practice guidelines. The ecology chapter of the EIA will assess the potential effects on ecological features as a result of the proposed Development and will detail the proposed mitigation and/or compensation measures that will be implemented to prevent, reduce, or offset the effects.

6.2. STUDY AREA

196. A desk study will be undertaken, to obtain baseline historic information relating to protected flora and fauna on all habitats located within the Site, up to and including a 2 km buffer. This will be extended to 5 km for records of bat species (further extended to 10 km for bats considered of high risk). Data will be requested from the local records centre, South West Scotland Environmental Information Centre (SWSEIC).

197. The proposed study areas for field surveys for protected species and habitats will be determined in accordance with best practice guidelines. Details of the proposed study areas are provided in Table 6.1, below.

Table 6.1 Proposed Study Areas for Ecological Field Surveys

ECOLOGICAL FEATURES	BUFFER SIZE TO BE APPLIED TO SITE BOUNDARY	BUFFER AREA REFERENCE	SURVEY GUIDANCE
Habitats (Phase 1 habitat survey and National Vegetation Classification (NVC))	250 m	Habitat Survey Area	SEPA Land Use Planning System (LUPS) Guidance Note 31
Bats (***Chiroptera*** spp.)	200 m + rotor radius	Bat Survey Area	NatureScot (2021) Bats and Onshore Wind Turbines
Badger (***Meles meles***)	100 m	Badger Survey Area	Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines
Otter (***Lutra lutra***)	200 m	Otter Survey Area	SNH Protected Species Advice for Developers: Otter
Pine marten (***Martes martes***)	250 m	Pine Marten Survey Area	SNH Protected Species Advice for Developers: Pine marten

ECOLOGICAL FEATURES	BUFFER SIZE TO BE APPLIED TO SITE BOUNDARY	BUFFER AREA REFERENCE	SURVEY GUIDANCE
Water vole (*Arvicola amphibius*) Red squirrel (*Sciurus vulgaris*)	50 m	Water Vole and Red Squirrel Survey Area	SNH Protected Species Advice for Developers: Water vole SNH Protected Species Advice for Developers: Red squirrel
Fish	50 m upstream 100m downstream	Fish Habitat Survey	Scottish Fisheries Co-ordination Centre Habitat Surveys

198. Existing records will be reviewed for protected or otherwise notable species (e.g. SBL/LBAP priority species) from within 2 km of the Site boundary and dating from the last 10 years. Ecologically designated sites within up to 5 km will be considered. Any designated sites of ornithological features are considered within the ornithology assessment.

6.3. BASELINE DESCRIPTION

199. Based on a preliminary site walkover and using Ordnance Survey (OS) mapping and aerial photography, the Site is determined to comprise large blocks of plantation woodland of varying stages; including felled, re-planted and established woodland. A number of watercourses, and their associated tributaries, were identified within the Site, connecting to a number of waterbodies located in the local area.

6.3.1. Designated sites

200. Nature conservation designations within the following distances of the Site boundary are detailed below:

- International designations for habitats and non-avian species, i.e. Special Areas of Conservation (SACs), as well as national designations, such as National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs), within 5 km; and
- Local Nature Reserves (LNRs) and non-statutory designations such as Local Wildlife Sites (LWSs), Sites of Interest for Nature Conservation (SINCs) or woodland areas included on the Ancient Woodland Inventory (AWI), within 2 km.

201. The designations are shown on Figure 6.1.

202. The Site is partially located within the outer transition zone of the Galloway and Southern Ayrshire UNESCO Biosphere Reserve, a bio-geographic region centred on the Merrick Kells, working to demonstrate the importance of landscapes and ecosystems for the future of sustainable development in the region. The Biosphere Reserve covers a total area of 526,888 ha. The transition zone is defined as "*the part of the reserve where the greatest activity is allowed, fostering economic and human development that is socio-culturally and ecologically sustainable*".

203. Black Loch SSSI lies approximately 2.2 km south-east from Site. Black Loch lies 10 km north of Dumfries and is the best example within Nithsdale District of a basin fen. The site shows a transition from a central fen to drier moorland with a variety of vegetation types. The basin fen occupies the site of a drained loch.

204. A total of 37 areas of AWI-listed woodland were identified within the 2 km desk study search area, see Table 6.2 below. The nearest is Glenmaid Plantation located approximately 0.1 km west of the Site.

Table 6.2 Ancient Woodland within 2 km of the Site Boundary

NAME	DISTANCE TO SITE	SIZE (HA)	WOODLAND TYPE
Unnamed	1.9km E	9.48	Other (on Roy map)
Unnamed	1.1km E	6.39	Other (on Roy map)
Unnamed	1.4km E	4.77	Other (on Roy map)
Unnamed	1.7km E	1.77	Other (on Roy map)
Unnamed	1.7km E	5.94	Other (on Roy map)
Unnamed	1.6km E	1.24	Other (on Roy map)
Unnamed	1.3km E	2.35	Other (on Roy map)
Unnamed	1.9km W	9.18	Long-Established (of plantation origin)
Unnamed	1.3km W	3.78	Long-Established (of plantation origin)
Unnamed	1.3km W	3.95	Long-Established (of plantation origin)
Unnamed	1km W	9.8	Long-Established (of plantation origin)
Unnamed	1.1km SE	3.74	Long-Established (of plantation origin)
Unnamed	0.9km SE	1.92	Long-Established (of plantation origin)
Unnamed	1.9km W	11.8	Long-Established (of plantation origin)
Glenmaid Plantation	0.1km W	7.96	Long-Established (of plantation origin)
Unnamed	1km SE	4.57	Long-Established (of plantation origin)
Townburn Wood	1.6km W	16.88	Long-Established (of plantation origin)
Watchmanhill Wood	1.9km W	8.52	Long-Established (of plantation origin)

NAME	DISTANCE TO SITE	SIZE (HA)	WOODLAND TYPE
Hospital Wood	1.5km S	5.35	Long-Established (of plantation origin)
Unnamed	1.4km NW	3.58	Long-Established (of plantation origin)
Dalswinton Wood	1.8km SW	187.1	Long-Established (of plantation origin)
Unnamed	1.2km E	1.78	Ancient (of plantation origin)
Unnamed	0.6km E	1.33	Ancient (of plantation origin)
Unnamed	0.9km E	5.72	Ancient (of plantation origin)
Unnamed	1.5km E	10.74	Ancient (of plantation origin)
Unnamed	1.9km E	0.3	Ancient (of plantation origin)
Unnamed	0.5km E	2.38	Ancient (of plantation origin)
Unnamed	0.8km E	1.4	Ancient (of plantation origin)
Unnamed	0.9km NW	2.11	Ancient (of plantation origin)
Unnamed	1km W	13.19	Ancient (of plantation origin)
Unnamed	1.2km E	14.61	Ancient (of plantation origin)
Unnamed	1km E	4.24	Ancient (of plantation origin)
Unnamed	1.7km E	0.33	Ancient (of plantation origin)
Unnamed	1.5km E	13.64	Ancient (of plantation origin)
Unnamed	1.5km E	3.58	Ancient (of plantation origin)
Unnamed	1.7km E	2.42	Ancient (of plantation origin)
Unnamed	1.7km E	2.88	Ancient (of plantation origin)

6.4. GUIDANCE AND LEGISLATION

6.4.1. Guidance

205. All survey methods, in addition to assessment methods, will be undertaken in accordance with the following legislation and guidance:

- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora ("the Habitats Directive") as transposed into Scottish law through The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Conservation of Habitats and Species Regulations 2017, Regulation 89;

- The Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) (WANE) Act, 2011 (as amended);
- The Protection of Badgers Act 1992, as amended by the Wildlife and Natural Environment (Scotland) Act 2011;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- European Commission (2010) Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels;
- Policy Advice Note PAN 1/2013 – Environmental Impact Assessment (Scottish Government 2013);
- National Planning Framework 4 (Scottish Government, 2023);
- DGC Local Development Plan 2 (DGC, 2019);
- The Scottish Biodiversity List (NatureScot, 2020); and
- Relevant local development plans and structure plans.

206. The following technical guidance and reference documents will also be considered as part of the assessment:

- Bang, P., and Dahlstom, P., (2001) Animal Tracks and Signs. Oxford University Press, Oxford;
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, freshwater, coastal and marine. Chartered Institute of Ecology and Environmental Management, Winchester;
- Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologist: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London;
- Cresswell, W. J., Birks, J. D. S., Dean, M., Pacheco, M., Trewhella, W. J., Wells, D. and Wray, S. (2012) UK BAP Mammals: Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation
- Dean, M., Strachan, R., Gow, D., and Andrew, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Scheme). The Mammal Society, London;
- Harris, S., and Yalden, D., (2008) Mammals of the British Isles: Handbook. 4th edition;
- Hundt, L. (2012) Bat Surveys – Good Practice Guidelines. 2nd edition. Bat Conservation Trust, London;
- Joint Nature Conservation Committee (JNCC) (2004) Common Standards Monitoring Guidance for Reptiles and Amphibians. Version February 2004. JNCC, Peterborough;
- JNCC (2010) Handbook for Phase 1 habitat survey: a technique for environment audit. Peterborough;
- Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigations. The Mammal Society, Southampton;
- NatureScot (2021) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.;
- NatureScot (2022). Protected Species Advice for Developers.;
- Rodwell, J. S., (1991, 1992, 1998, 2000) British Plant Communities. Vol 1-5. JNCC, Cambridge;
- Rodwell, J. S., (2006) National Vegetation Classification: User's handbook. Peterborough;

- Sargent, G. and Morris, P., (2003) How to Find and Identify Mammals. The Mammal Society, London;
- Scottish Badgers (2018) Surveying for Badgers: Good practice guidelines. Version 1;
- Scottish Fisheries Co-ordination Centre (2007) Habitat Surveys Training Course Manual;
- Scottish Environment Protection Agency (SEPA) (2017) LUPS Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems;
- SEPA (2017) LUPS Guidance Note 4: Planning guidance on on-shore windfarm developments; and
- SNH (2016) Badgers. Scottish Natural Heritage.

6.5. ASSESSMENT METHODOLOGY

6.5.1. Desk Survey Methods

207. Organisations will be contacted with the aim of obtaining ecological records, located within the relevant study area, to provide wider context of the ecological value of the local area. The following organisations will be contacted:

- Local biological recording groups including bat, badger or squirrel, if present;
- Scottish Badgers; and,
- Forestry and Land Scotland.

208. Further to this, local records will be sought using freely available, online databases.

6.5.2. Field Survey Methods

6.5.2.1. Habitats

209. A Site walkover was undertaken in September 2022 which identified the habitats present as being suitable for pine marten and red squirrel with the fringes broadly suitable for badger. The watercourses within the Site appeared to be good for otter and water vole.

210. A Phase 1 habitat survey will be undertaken of all habitats within the Habitat Survey Area, all habitats area will be mapped to the standard JNCC Phase 1 methodology (JNCC, 2010). The survey will aim to broadly map natural and semi-natural habitats with particular emphasis on identifying habitats of conservation interest (such as LBAP and Scottish Biodiversity List (SBL) priority habitats).

211. Where habitats of conservation interest are recorded, or wetlands with the potential be Groundwater Dependent Terrestrial Ecosystems (GWDTEs), further, more detailed National Vegetation Classification (NVC) surveys will be undertaken to provide an understanding of floral composition and characteristic of habitats. NVC surveys will be undertaken in accordance with published Rodwell guidance, making use of floristic tables where appropriate. Target notes, species lists and photographs will be taken to provide a visual context and to aid the analysis and assessment.

6.5.2.2. Bats

212. A suite of bat surveys is being undertaken on all habitats within the Bat Survey Area in accordance with the 2021 NatureScot Bats and Onshore Wind Turbines guidance. Surveys will include:

- Roost surveys: to identify key features which could support maternity roosts and significant hibernation and/or swarming sites. In the event that suitable roosting sites are identified, further surveys may be required to identify presence or absence, and species, numbers, roost function and flightlines, where presence is confirmed; and

- Ground-level static surveys: to be conducted using full spectrum automatic detectors throughout the developable area. Habitats within the developable area are considered of limited suitability to support bats, comprising coniferous plantation woodland. In addition, an initial desk study to obtain existing baseline bat records identified low levels of bat activity within 5 km of the Site. Therefore, the survey effort will reflect that of a low-risk site (i.e. one survey session per season). However, data will be analysed at the earliest opportunity with the aim of identifying high-risk species and/or high numbers of bat species, and amending the survey effort, where necessary. Surveys will comprise the deployment of detectors for a minimum of 10 nights during each survey season of spring (April-May), summer (June – mid-August) and autumn (mid-August – October) and will be focused on those parts of the Site where turbines are most likely to be located. Numbers of detectors will depend on number of turbines; a development of more than ten turbines will require ten detectors plus a third of additional potential turbine sites up to a maximum of forty detectors. Therefore for the proposed Development it is proposed to deploy a minimum of 11 detectors.

213. The emphasis of the NatureScot (2021) guidance is on a robust approach to static monitoring with transects no longer considered a requirement given they only provide bat activity as a snap-shot in time. If deemed a requirement transects may be used to complement the data gathered from the static surveys but due to the limited value transects add to the overall assessment, they have not been proposed within this Scoping Report. It is considered likely that the deployment of sufficient numbers of static detectors will enable a robust and accurate assessment of potential impacts to bats as a result of the development.

214. In addition, it is not proposed to undertake static surveys at height as it is unlikely to increase the number of bat species recorded from those recorded at ground level using automated/static detectors.

6.5.2.3. Badger

215. The survey will assess the suitability of habitats, located within the Badger Survey Area, to support the species in accordance with recognised best practice. Suitable habitat may comprise areas with shelter (such as scrub or woodland) located on free-draining soil, with connectivity to suitable foraging grounds (such as grazed/managed grasslands or arable fields). The badger survey will also aim to record evidence of badger including; sightings, foraging remains, hair and footprints, dung pits and latrines, and setts.

216. Where a badger sett is recorded, it will be classified into sett categories dependant on a variety of characteristics including number of entrances, recent use, and proximity to other setts in accordance with best practice.

6.5.2.4. Otter

217. The otter survey will aim to assess the suitability of all watercourses and waterbodies, located within the Otter Survey Area to support populations. Watercourses and waterbodies will be categorised into four suitability classifications based on a variety of characteristics including wet width, water depth, suitable foraging resources, suitable resting sites, and connectivity to suitable habitats. Descriptions of suitability are provided in Table 6.3, below.

Table 6.3: Otter Habitat Suitability Description

SUITABILITY	DESCRIPTION
Optimal	Typically larger, main watercourses (at least 1 m in wet width). These watercourses contain flow at all times of year (not just in spate) and will support foraging resources (such as amphibians and fish). Rocky banksides or vegetation overhangs will provide suitable resting places, and large boulders will provide ideal spraining sites.

Sub-optimal	Generally a substantial watercourse, greater than 0.5 m in width. These watercourses will comprise stone and rock substrate, with occasional boulders. There may be limited resting opportunities; however, vegetation overhangs, and occasional rocky crevices may be present.
Suitable	These watercourses may be sporadically used by otter, with connectivity to optimal or sub-optimal watercourses. These watercourses themselves will typically be no wider than 0.5 m, with a relatively shallow flow of water. Substrate may comprise stone and earth and banksides may comprise grassland.
Unsuitable	Generally will be a narrow channel, which may contain very little water. The channel may be very densely vegetated with limited suitability to support otter foraging resources.

218. Where habitats are considered suitable, these will be surveyed in detail to record the presence of otter. Surveys will be undertaken in accordance with recognised best practice and will aim to identify presence such as sightings, spraint, feeding remains, prints, tracks and slides, and resting sites. Where resting sites are recorded, these will be assessed for their potential to be used as a breeding or natal site in accordance with best practice.

6.5.2.5. Water Vole

219. The aim of the water vole survey is to assess the suitability for all watercourses within the Water Vole Survey Area to support populations of water vole. Watercourses will be classified into suitability depending on a variety of characteristics including bankside composition, substrate, water flow rate and bankside vegetation. Descriptions of watercourse suitability categories are detailed in Table 6.4, below.

220. Where watercourses are considered suitable, these will be surveyed with the aim of identifying and recording presence of water vole. Signs searched for will include feeding remains, footprints, tunnels, latrines and burrows.

Table 6.4: Water Vole Habitat Suitability Description

SUITABILITY	DESCRIPTION
Optimal	These watercourses will typically have a very slow flow rate, and will comprise peaty bankside and substrate. Banksides will also comprise tussocky vegetation, including rushes (a common food source of water vole). The watercourses will generally be deep to enable predatory escape.
Sub-optimal	Typically these watercourses will have a relatively slow flow rate. Banksides may be peaty however may not be very steep therefore not enabling burrows to account for varying water levels. Rushes will be present, providing foraging resource.
Suitable	Banksides may comprise earth allowing for some burrowing. Herbaceous vegetation will generally be lacking, and invertebrates, amphibians and fish will be sparse. Flow rate will be slow to moderate, however watercourse may comprise rocky substrate
Unsuitable	Watercourses will comprise rock and stone substrate and banksides. The flow rate will be moderate or fast flowing and rushes will be absent from bankside vegetation. Watercourses may also be heavily poached by livestock.

SUITABILITY	DESCRIPTION
	** Terrestrial populations of water vole have been recorded in habitats with no connectivity to wetland habitats. These habitats suitability classifications do not apply in these cases.*

6.5.2.6. Pine Marten

221. A pine marten survey will be undertaken on all habitats within the Pine Marten Survey Area in accordance with best practice guidance. The survey will assess habitat suitability to support populations of pine marten. Suitable habitat will include mature woodland and rocky crevices. Where suitable habitat is recorded, evidence of pine marten will be searched for including feeding remains, scat, footprints, and dens.

6.5.2.7. Red Squirrel

222. A red squirrel survey will be undertaken in accordance with best practice guidelines and aimed to assess suitability of habitats located within the Red Squirrel Survey Area to support the species. Suitable habitat includes cone-bearing coniferous plantation woodland located on free-draining soils, and connectivity to similarly suitable habitat. Where suitable habitat is recorded, this will be searched for evidence of red squirrel, including, sightings, feeding remains and dreys (resting sites).

6.5.2.8. Amphibians and Reptiles

223. An initial Site walkover and review of aerial imagery of the Site appears to show rough and tussock grassland and areas of clear-fell woodland which is considered suitable habitat for amphibians and reptiles. As a result, their presence on Site is assumed. A watching brief will be maintained throughout all field surveys to record direct observations of the amphibians and reptiles in accordance with current best practice.

6.5.2.9. Fish

224. An initial Site walkover and review of aerial imagery of the Site appears to show numerous small water ways running through the Site. A fish habitat survey will be undertaken 50 m up and 100m downstream of the Site on all watercourses within the Site and 50 m of the Site boundary. Areas of functional habitat will be identified and recorded. The local district salmon fishery board will be consulted through the EIA process.

6.5.3. Assessment Method

225. The assessment of potential effects on ecological interests will be based on CIEEM (2018) guidelines and will take into account relevant national and European legislation and policy. The assessment involves the following stages:

- Identifying the potential effects of the proposed Development;
- Accounting for potential effects in the design process as appropriate;
- Considering the likelihood of occurrence of remaining potential effects where appropriate;
- Defining the Nature Conservation Value of the important ecological features present;
- Establishing the magnitude of the likely effects (both spatial and temporal);
- Based on the above information, making a professional judgement as to whether or not the resultant effect is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant and cannot be avoided through design changes, measures to mitigate or compensate for the effect are suggested where required;
- If required, considering opportunities for enhancement; and,
- Considering residual effects after mitigation, compensation, or enhancement.

226. Nature Conservation Value is defined on the basis of the geographic scale and it is necessary to consider each receptor's conservation status, its distribution and its population trend (species)

based on available historical records. The significance of potential effects is determined by integrating the assessments of Nature Conservation Value and Magnitude in a reasoned way.

227. A set of pre-defined significance criteria will be used in assessing the effects of the proposed Development on ecology. It will be necessary to establish whether there will be any effects which will be sufficient to adversely affect the receptor to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e. the 'do nothing' scenario). Furthermore where required, these predictions will be given a confidence level relative to the effect being assessed.

228. An assessment of cumulative effects will be undertaken in accordance with CIEEM guidelines. Cumulative effects require the assessment of effects when the proposed Development is considered in combination with other windfarms. The context in which these effects are considered is heavily dependent on the ecology of the receptor assessed, but in all cases will involve consideration of the cumulative effects upon the receptor extents/populations relevant to that receptor.

6.6. PROPOSED MITIGATION & ENHANCEMENT

229. Significant effects upon ecological receptors will be avoided or minimised where possible through the conceptual design process. Good practice during construction and operation of the proposed Development would also be implemented. These may include protected species surveys, a Habitat Management and Enhancement Plan, Species Protections Plans, and Ecological Clerk of Works. In accordance with the requirements of the policies of NPF4, opportunities for biodiversity enhancement measures will also be identified.

230. Where likely significant effects cannot be mitigated against, measures to prevent and reduce these adverse effects will be proposed and set out in the EIA Report.

6.7. POTENTIAL IMPACTS

231. The assessment will concentrate on the effects of construction, and operation of the proposed Development upon those ecological receptors identified during survey work and as advised by consultees. In general, effects upon the following will be assessed:

- Terrestrial habitats: effects include direct (i.e. derived from land-take) and indirect (i.e. changes caused by effects to supporting systems such as groundwater or overland flow);
- Aquatic habitats: effects are limited to the ecological effects of changes in water conditions through potential pollution effects. Hydrological effects are considered in the appropriate Chapter;
- Protected species and bats: effects considered include direct (i.e. loss of life as a result of the proposed Development; loss of key habitat; barrier effects preventing movement to/from key habitats; and general disturbance) and indirect (i.e. loss/changes of/to food resources; population fragmentation; degradation of key habitat, e.g. as a result of pollution); and
- Ancient Woodland: effects are limited to impact on protected species within the ancient woodlands through potential pollution effects.

6.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

6.8.1. Species Scoped Out

232. Great crested newt (*Triturus cristatus*) surveys have been scoped out of the proposed assessment due to the upland nature of the Site and the acidic quality of the aquatic habitats which are considered unsuitable to support the species. Further to this, no records of great crested newt have been identified within 5 km of the Site during a high-level desk study. It is considered unlikely that the species will be present within the Site and the surrounding habitats.

6.8.2. Impacts Scoped Out

233. Due to the size of the Site, the distance of the designated sites from the boundary, with the exception of the Galloway and Southern Ayrshire UNESCO Biosphere, these are not considered to be impacted by the proposed Development and are therefore scoped out.

234. The decommissioning phase of the proposed Development is scoped out as this is considered likely to have similar effects as construction (covered in Section 6.7 above) however reduced due to less predicted groundworks.

6.9. SCOPING QUESTIONS TO CONSULTEES

235. The following questions are directed to consultees:

- Do consultees agree with the proposed survey approach to be undertaken?
- Do consultees agree with the proposed assessment of the potential effects as a result of the proposed Development?
- Do consultees agree with those surveys which have been scoped out?

7. Geology, Soils and Peat, Hydrology & Hydrogeology

7.1. INTRODUCTION

236. This section considers the potential for significant effects on hydrological, hydrogeological and geological resources. The potential effects of the proposed Development may include changes to quantity or quality of surface water and groundwater, potential effects associated with ground conditions include drying out of peatland and ground stability of the Site.

7.2. STUDY AREA

237. The study area for hydrological, hydrogeological, and geological impacts will primarily be land within the Site red line boundary but will extend to 10 km from the Site for designated sites.

238. The Private and Public Water Supply study area to define the search to be carried out with DGC, and Scottish Water, will be 2 km from the Site.

239. These study areas have been defined by professional judgement based on the upland location, nature and size of the proposed Development, and experience working on similar developments. Due consideration has been given to relevant guidance on hydrological and geological assessment.

7.3. BASELINE DESCRIPTION

7.3.1. Hydrology

240. The Site is located on undulating upland topography, with areas of steeply sloping ground. The Site is bound by White Hill, Great Hill, and Sowens Knowe to the west, and Glass Rig to the north. The Site is split by valleys which drain to the two larger catchments of River Annan and River Nith.

241. The Site is mostly located within the catchment of the Water of Ae which drains to the River Annan, with several tributaries within the Site, including Goukstane Burn to the south, Windyhill Burn in the centre, and Poldivan Lake and Capel Water to the north. There are several other named and unnamed tributaries within the Site. The north-west of the Site is located within the sub-catchment of the Crichope Linn and the larger Cample Water catchment. The Cample Water discharges to the River Nith. The Pennyland Burn to the south-west of the Site discharges directly to the River Nith, approximately 8.6 km south of the Site.

242. According to SEPA Water Classification Hub, the most recent condition recorded in 2020, records Water of Ae and its tributaries to be of 'Poor' condition. This includes Goukstane Burn (ID 10664), Capel Water / Garroch Water (ID 10663), and Water of Ae upstream (ID 10661) and downstream of Goukstane Burn (ID 10657). The condition of the tributaries of the River Nith had an overall status of 'Moderate' for Crichope Linn (ID 10631) and 'Poor' for Pennyland Burn (ID 10634).

7.3.2. Geology

243. British Geology Survey (BGS) data identified that the Site is underlain by sedimentary rock of the Queensberry Formation, part of the Gala Group. The Queensberry Formation consists of sandstone, mudstone, siltstone, and conglomerate. The Site is bound by thrust faults to the north and south, with additional faults present in the north of the Site. The Site is underlain by superficial deposits of till with isolated areas of peat.

244. The Site is not located within a Coal Mining Reporting Area and as such there are no identified mining constraints.

7.3.3. Peat and Soils

245. The National Soils Map of Scotland shows the Site to largely be underlain by peaty gleys, derived from Lower Palaeozoic greywackes and shales. Brown soils are present to the south and east of the Site associated with the steeper slopes at the valley sides.

246. The SNH Carbon and Peatland 2016 Map shows the Site to largely be underlain by Class 0 (mineral soil) and Class 4 and Class 5 peatland. There are isolated areas of Class 3 peatland present to the north and south. Class 1 and 2 peatland is considered nationally important priority peatland habitat, none of which is present onsite. Class 3 to 5 is not considered priority peatland, though Class 3 peatland is associated with carbon-rich soils, with some potential areas of deep peat.

7.3.4. Hydrogeology

247. The hydrogeology of the Gala Group is stated to be a Class 2C 'low productivity aquifer' where '*flow is virtually all through fractures and other discontinuities*'.

248. The groundwater underlying the Site largely consists of East Dumfriesshire (ID 150690) and along the Water of Ae the Annandale Sand and Gravel (ID 150739). Both underlying groundwater bodies are classified under the Water Framework Directive (WFD) to have an Overall Status of 'Good' in latest records from 2020.

7.3.5. Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

249. An NVC survey will be completed of the Site and surveys identified by the surveyor to be potential GWDTE will be assessed for their potential groundwater dependency.

7.3.6. Private and Public Water Supplies

250. Following Scoping, DGC will be consulted for records of Private Water Supplies (PWS) within 2 km of the Site. Following review of Scottish Water's Water Quality Map, the area surrounding the Site is only partly included within their records of properties supplied by mains water. Therefore, based on this information, and combined with the rural location of the Site, it is likely that PWS will be identified.

251. A review of Scottish Government online maps show a surface Drinking Water Protected Area (DWPA) is not located within hydrological connectivity to the Site. Consultation will be undertaken with Scottish Water to confirm this and the presence of any Scottish Water abstractions or assets in the surrounding area. Consultation will be undertaken with SEPA for registered water abstractions within 2 km of the Site.

7.3.7. Flood Risk

252. A review of the SEPA Flood Maps online indicate there are areas onsite with a high or medium risk of river or surface water flooding present at the Site. The risk of fluvial flooding is largely constrained to watercourse channels onsite. The risk of pluvial flooding is characterised by small, isolated areas widespread across the Site.

7.3.8. Designated Sites

253. Following a review of NatureScot SiteLink Map Search, the following designated sites have been identified within 10 km of the Site. Distance from the Site and the potential to be hydrologically connected to the Site has been summarised in Table 7.1.

Table 7.1 Designated Sites

DESIGNATED SITE	DISTANCE	DESCRIPTION	HYDROLOGICALLY CONNECTED?
Shiel Dod (SSSI)	5.1 km north	Upland assemblage	No, located upslope.
Black Loch (SSSI)	2.2 km south-east	Basin fen	No, disconnected by tributaries of Goukstane Burn
Carron Water and Hapland Burn (SSSI)	7.9 km north-west	Carboniferous – Permian Igneous, and Permian – Triassic.	No, disconnected by Cample Water
Locharbriggs Quarry (SSSI)	8.1 km south	Permian - Triassic	No, in separate sub-catchment to site

254. The Geological Conservation Review (GCR) sites identified within the wider study area include: Locharbriggs Quarry; Carron Water; and Hapland Burn. As none of these are located onsite, they will not be directly impacted by extraction.

7.4. GUIDANCE AND LEGISLATION

255. Relevant legislation documents have been reviewed and considered as part of this assessment, which include:

- Water Environment and Water Services (Scotland) Act 2003;
- Water Environment (Controlled Activities) (Scotland) Regulations (as amended);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Water Resources (Scotland) Act 2013;
- The Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017;
- Flood Risk Management (Scotland) Act 2009;
- Environmental Protection Act 1990;
- Environment Act 1995; and
- The Contaminated Land (Scotland) Regulations 2000 (as amended).

256. Relevant policy documents reviewed and accounted for as part of the assessment include:

- PAN 51: Planning, Environmental Protection and Regulation (Scottish Executive, 2006);
- PAN 61: Planning and Sustainable Urban Drainage Systems (Scottish Executive, 2001);
- Flood Risk: Planning Advice (Scottish Government, 2015); and
- PAN 79: Water and Drainage (Scottish Executive, 2006).

257. Relevant guidance documents have been reviewed and included within this assessment. Relevant guidance included:

- Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs);

- Land Use Planning System Guidance Note 4 (LUPS GU4) Planning guidance on onshore windfarm developments (SEPA, 2017);
- Land Use Planning System Guidance Note 31 (LUPS GU31) Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (SEPA, 2017);
- Supporting Guidance (WAT-SG-75) Sector Specific Guidance: Water Run-Off from Construction Sites (SEPA, 2021);
- Technical Flood Risk Guidance for Stakeholders, Version 12 (SEPA, 2019);
- Developments on Peat and Off-Site Uses of Waste Peat (SEPA, 2017);
- Guidance on Developments on Peatland (Scottish Government, SNH and SEPA, 2017).
- Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Scottish Renewables and SEPA, 2012);
- Groundwater Protection Policy for Scotland, Version 3 (SEPA, 2009).
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- CIRIA C532: 'Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors' (CIRIA, 2001);
- CIRIA C741: 'Environmental Good Practice on Site' (CIRIA, 2015);
- Good practice during windfarm construction, 4th edition (Scottish Renewables et al., 2019);
- The Conservation (Natural Habitats, & c.) Regulations (1994, as amended in Scotland);
- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017);
- The Scottish Soil Framework (Scottish Government, 2009); and
- BS5930:2015 - Code of Practice for Site Investigation (British Standards Institute, 2015).

7.5. ASSESSMENT METHODOLOGY

7.5.1. Desk-Based Assessment

258. A desk-based assessment will be carried out to confirm the baseline hydrological, geological, and hydrogeological conditions at the Site. The desk-based review of baseline information will comprise:

- Summary of underlying geology and hydrogeology from BGS GeoIndex online maps, Coal Authority Interactive Map Viewer and Scotland's environment maps.
- Summary of areas of peat and deep peat from Scotland's Soil Map and Carbon and Peatland Map 2016.
- Review of sources of data regarding hydrological conditions, including SEPA Water Environment and Classification Hubs, Scotland's environment maps, MetOffice and National River Flow Archive (NRFA) data.
- Consultation with DGC, SEPA, and Scottish Water to inform baseline information regarding private and public water supplies.
- Consideration of the findings of site investigative reports (where available), historical site uses, industrial land use and permits, areas of determined or potential contaminated land, soil type and permeability, and contamination status of the Site and surrounding area.

- A review of the development proposals and reports from other technical studies being undertaken, including ecology surveys which may identify areas of GWDTE.

7.5.1. Site-Based Assessment

259. The Site-Based Assessment will consist of peat probing survey, PWS visit, and a hydrological walkover.

260. The peat probing survey will confirm the depth and extent of peat that may be present onsite and which may influence the proposed Development design. The extent of peat probing surveys will take into account relevant SEPA guidance and access limitations within the forested area, and will be agreed in advance with SEPA. If required, a Phase II probing survey will be undertaken following 'design chill', with targeted probing beneath proposed infrastructure and will include peat probing along the infrastructure at 50 m centres and at 10 m interval crosshair at turbine locations to further assess ground conditions. If significant peat depths are found, a Peat Landslide Hazard and Risk Assessment (PLHRA) will be completed using the site survey data and slope analysis (using DTM data), highlighting areas that may be impacted by a peat slide so that appropriate mitigation measures can be identified and included in the Site design. Should the design be unable to avoid areas of peat, a site-specific Stage 1 (outline) Peat Management Plan (PMP) would be prepared to assess the potential volumes of peat excavation required and identify opportunities for re-use.

261. A hydrological walkover of the Site will be undertaken to ground-truth receptors identified during the desk-study, identify new receptors, and give understanding to the catchment characteristics. This will include a visual survey of watercourses and waterbodies to record key features and characteristics. The walkover will also include review of potential GWDTEs identified from the NVC survey. This will include visual survey of surrounding topography, ground conditions and surface water. The condition of the potential GWDTE will also be considered, with artificial drainage, forestry and man-made modifications noted.

262. Dependent on the results of consultation and the desk-study review, a visit to potential PWS may be required. This would include confirmation of its location, source and potential connectivity to the Proposed Development.

7.5.2. Assessment of Effects and Mitigation

263. Upon review of the baseline information gathered from the desk-based and site-based surveys, assessment of potential effects to identified receptors will be considered. Where there is an effect, required mitigation measures will be identified and any subsequent residual effects will be assessed.

7.6. PROPOSED MITIGATION

264. The proposed Development will undergo design iterations and evolution in response to constraints identified as part of the baseline studies and field studies to avoid and/or minimise potential effects on receptors where possible.

265. Proposed mitigation to limit the potential impacts of the proposed Development on hydrological, hydrogeological and geological receptors is anticipated to include:

- Implementation of a 50 m buffer around watercourses and waterbodies for the design of the proposed Development except where watercourse crossings are required;
- Best practice measures and mitigation, such as bunded chemical storage areas or silt fences, to prevent chemical pollution or sedimentation and erosion during construction;
- Drainage designed to maintain hydrological connection between upslope and downslope of the track;

- Best practice measures for the installation of turbine foundations, including dewatering for as short a time as practicable;
- Avoidance, where practicable, of areas of deeper peat by design;
- Developable area for the Proposed Development design based on slope and assessment of peat landslide risk; and
- Implementation of mitigation measures within a PMP to manage use and storage of excavated peat to prevent degradation.

266. Most or all potentially significant effects are anticipated to be mitigable through standard embedded mitigation measures including suitable site design (taking the findings of the above studies and surveys into account) and appropriate construction methods. Where additional site-specific mitigation is required, this will be clearly set out in the EIA Report and will be subject of ongoing consultation with relevant regulators and stakeholders.

7.7. POTENTIAL IMPACTS

267. Potential impacts from the construction, operation, and decommissioning of the proposed Development on hydrological, hydrogeological and geological receptors are anticipated to include:

- Changes to surface water quantity and quality;
- Changes to groundwater quantity and quality;
- Impediments to surface water flow;
- Impediments to groundwater flow;
- Changes to water quantity and quality of private or public water supplies;
- Excavation and drying out of peat;
- Ground instability; and
- Direct or indirect impacts to GWDTE.

268. The impacts will be assessed to determine potential magnitude and to establish the potential significance of effect. As noted, it is considered likely that significant effects can be avoided through standard embedded mitigation, including appropriate site design.

7.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

269. Receptors scoped into further assessment include:

- Surface watercourses and waterbodies, including coastal waters;
- Groundwater and near-surface water;
- Peat;
- GWDTEs; and
- Private and public water supplies.

270. Receptors scoped out of further assessment include flood risk, as identified risk of fluvial flooding is largely constrained to watercourse channels and would be mitigated by lack of infrastructure present within the 50 m watercourse buffers. Crossings of watercourses/ field drains, if required, will be designed to appropriately convey flows. Proposed watercourse crossings, if required, would be addressed within the schedule of watercourse crossings appendix. Increased risk of pluvial flooding is also considered to be mitigated by design of appropriate drainage and that there will

not be a significant increase in runoff from hardstanding compared with the largely impermeable peaty gleys onsite.

271. Coal mining impacts are scoped out of further assessment due to there being no risk of historic mining within the study area.

272. Designated sites are scoped out of further assessment as there are none present within the Site, and none within 10 km which are hydrologically connected to the Site.

7.9. SCOPING QUESTIONS TO CONSULTEES

273. Responses to the following Scoping questions by consultees would be appreciated:

- Do consultees agree with the topics scoped in and out of the assessment?
- Do consultees agree the methodology proposed for collation of baseline data and assessment is acceptable?
- Do consultees have any information not outlined in this Scoping Report which would be of relevance to this assessment?
- Is there any additional mitigation you would expect to be required in the design of the proposed Development?

8. Noise and Vibration

8.1. INTRODUCTION

275. This section of the Scoping Report considers the potentially significant effects of noise from the construction and operation of the proposed Development which will require further consideration within the EIA Report. It sets out the key issues identified and proposes a method and standards for the assessment of noise in the EIA Report. The potential for adverse effects of vibration is also considered in this section.

276. Consultation with DGC's Environmental Health Officers (EHOs) will be undertaken throughout the assessment process to agree the following:

- the status of identified potential Noise Sensitive Receptors (NoSRs);
- identification of potentially cumulative effects; and
- the derivation of appropriate ETSU noise limits, with apportionment for cumulative developments if appropriate.

8.2. STUDY AREA

277. The noise study area has been informed by preliminary modelling of the proposed Development Scoping turbine layout. The 35 dBL_{A90} noise contour is shown in Figure 8.1, for operation in isolation. The contour includes a +3 dB correction for concave ground, however, the applicability of this correction has yet to be confirmed; it therefore represents absolute worst-case operational noise levels.

278. A selection of representative NoSRs is shown based on a desk based study, but the final list of NoSRs will be agreed with the DGC EHO following a review of maps of the area, cumulative noise predictions, and a site visit.

279. Following a review of the potential cumulative developments, if applicable and in discussion with DGC, the study area will be extended beyond the 35 dBL_{A90} contour to consider NoSRs at which the difference between the proposed Development and cumulative schemes is less than 10 dB.

8.3. BASELINE DESCRIPTION

280. The Site and its surroundings mainly comprise forested hillsides and grazing land, with the nearest road being a minor road to the east of the Site which runs south to Ae Village. The noise environment is therefore likely to be dominated by wind and rustling of vegetation, small watercourses, wildlife and livestock, and light road traffic. The distance between the closest NoSR to turbines of the Proposed Development is approximately 1.3 km.

8.4. GUIDANCE AND LEGISLATION

281. Relevant legislation and guidance documents have been reviewed and considered as part of this assessment. Of particular relevance are:

- The Working Group on Noise from Wind Turbines: The Assessment & Rating of Noise from Wind Farms (ETSU-R-97)(1996);

- Institute of Acoustics (IoA) (2013): A good practice guide to the application of ETSU-R-97 for wind turbine noise assessment (IoA GPG) and associated Supplementary Guidance Notes (SGS);
- British Standard (BS) 5228 (2009) + A1 (2021) Parts 1 and 2: Codes of practice for noise and vibration control on construction and open sites; and
- The Control of Pollution Act (CoPA) 1974.

8.5. ASSESSMENT METHODOLOGY

8.5.1. Construction and Decommissioning Effects

282. It is considered that construction and decommissioning noise impacts can be minimised by appropriate controls on working hours, specification of appropriate plant and methods, and implementation of best practices. On this basis and given that the detailed construction and decommissioning schedule is unlikely to be available at this stage, it is proposed to scope out prediction and assessment of construction and decommissioning noise.

283. It is proposed to apply fixed construction limits, in accordance with the ABC method provided in Annex E of BS5228, as follows:

- Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00) – 65 $dBL_{Aeq,T;}$
- Evenings and weekends (19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays) – 55 $dBL_{Aeq,T}$; and
- Night-time (23:00 – 07:00) – 45 $dBL_{Aeq,T}$.

284. These limits will inform the Construction Environmental Management Plan (CEMP).

285. No significant sources of vibration are expected, and it is therefore proposed to scope out further consideration of vibration during the construction and decommissioning phase. Should any blasting be required for the excavation of borrow pits, a blast vibration assessment will be undertaken following consent to determine the maximum blast parameters such that appropriate criteria are met at the closest NoSRs.

8.5.2. Baseline Data

286. The assessment will take note of reported baseline data at NoSRs from the EIA undertaken in 2020 for the proposed Harestanes South Windfarm. The reported information has been reviewed and it is noted that measurements were undertaken in accordance with the IoA GPG and may be assumed to be appropriately representative of dwellings in the area.

287. The assessment will rely on reported baseline data and consider the consented noise limits at NoSRs for the Harestanes and Harestanes South Windfarms. An approach to the apportionment of residual noise limits applicable to the proposed Development will be agreed through consultation with DGC Environmental Health, taking into account the recommendations of the IoA GPG. The derived residual noise limits will preserve cumulative compliance with overall noise limits applicable within the area.

8.5.3. Operational Effects

288. Consultation will be undertaken with the DGC EHO to agree the detailed method of assessment, however the general approach is outlined below.

289. The identity of the closest NoSRs will be agreed and any financial involvement with the proposed Development established. Any relevant wind energy schemes that should be included in the cumulative assessment, whether in planning, consented or operational, will also be identified and agreed. Potentially cumulative developments will be excluded on the basis of a 10 dB difference in noise emissions at relevant NoSRs, where this can be demonstrated through prediction.

290. Preliminary investigation has identified Harestanes Windfarm, Harestanes South Windfarm and Dalwinston Windfarm as potentially cumulative developments. The assessment will include modelling to confirm predicted noise levels from these cumulative developments at NoSRs lying between those cumulative developments and the proposed Development.

291. Should potential cumulative effects be confirmed (as defined by predicted noise levels within 10 dB of the proposed Development) the assessment will consider consented noise limits at NoSRs named in the noise assessments or planning conditions of existing/proposed cumulative developments. If required, apportionment of noise limits will be agreed in direct consultation with the DGC EHO, making reference to the example methods set out in the IoA GPG.

292. A candidate turbine will be assessed for the proposed Development, the noise emission details of which will be reproduced in the EIA Report chapter (A-weighted and octave band data) for critical wind speeds.

293. Noise levels will be predicted within noise modelling software in accordance with the ISO9613 method and the IoA GPG requirements. Corrections for concave topography and topographic screening corrections will be applied to predicted noise levels in accordance with the IoA GPG, where applicable. The two corrections will be assumed not to apply simultaneously, i.e. where topographic screening occurs, it will be assumed that concave topography corrections will not also apply.

294. Corrections for directivity may be applied within the cumulative assessment in accordance with the guidance set out in the IoA GPG, where appropriate, e.g., where NoSRs lie between two developments and where simultaneous down-wind predictions are therefore overly conservative.

295. All residential NoSRs will be assumed to be of high sensitivity. The sensitivity of any other type of receptor identified will be agreed with the EHO.

296. The assessment will consider that predicted compliance with the adopted noise limits will demonstrate that noise effects are 'not significant', while a predicted exceedance of the noise limit will be 'significant' and outline mitigation will be specified accordingly.

8.6. PROPOSED MITIGATION

297. It is considered that construction and decommissioning phase noise can be controlled using appropriate methods including a limit on core hours of works and these would be exerted through the requirements of the DGC EHO. It is considered that such controls would constitute effective mitigation measures.

298. If required by the DGC EHO, site-specific mitigation measures will be outlined to reflect the principles of Best Practicable Means, as set out in the CoPA 1974. The purpose of these measures will be to reduce construction and decommissioning phase noise and, where relevant, vibration impacts insofar as is reasonably practicable.

299. Where predicted operational noise levels exceed the proposed noise limits at any wind speed, outline mitigation strategies will be proposed. Mitigation of operational noise, if required, may include an alternative selection of turbine or operating certain turbines in low noise modes under certain meteorological conditions, such as specific wind speeds and directions.

8.7. POTENTIAL IMPACTS

300. The proposed Development will introduce new noise sources into the area, both during the construction and operational phases. Significant adverse effects can be prevented by restricting noise levels due to the proposed Development to within noise limits determined in accordance with appropriate guidance, as detailed above.

8.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

301. As noted in Section Error! Reference source not found., the occupational and sensitivity status of NoSRs will be agreed directly with the EHO. Should any derelict properties fall within the study area the necessity to consider these in the assessment will be confirmed in consultation.

302. Referring to Section Error! Reference source not found., it is proposed to scope out prediction of construction and decommissioning noise, and all vibration effects. However, appropriate noise limits will be identified.

8.9. SCOPING QUESTIONS TO CONSULTEES

303. The following questions are directed to consultees:

- Do consultees accept the proposed assessment methods and study area?
- Do consultees agree that a baseline noise survey can be scoped out, on the basis that baseline noise levels have been appropriately characterised by previous studies, and that these levels may be relied upon?
- Are consultees satisfied that construction noise does not require prediction, and that construction noise and vibration impacts can be controlled by adopting appropriate limits and formalising these within planning conditions for the proposed Development?
- Do consultees agree that all potentially cumulative developments have been identified? If not, which additional schemes (wind farms or single turbines) are considered to require consideration?

9. Cultural Heritage

9.1. INTRODUCTION

305. This section provides an overview of the Archaeology and Cultural Heritage context for the proposed Development. It sets out proposed study areas to be adopted in the EIA and sets out the currently recorded baseline within those study areas. The relevant legislative and policy framework, and the guidance relevant to the EIA, is set out, along with the methodology that will be employed in the EIA.

306. The Cultural Heritage section of the EIA Report will assess the potential for direct and indirect effects on the cultural heritage within the proposed Development Site, arising from construction activities, and effects upon the settings of heritage assets with statutory and non-statutory designations in the wider landscape surrounding the proposed Development.

9.2. STUDY AREA

307. Two study areas will be used for the assessment:

- Inner Study Area: The proposed Development Site, defined by the Site red line boundary, within which components of the proposed Development, and associated infrastructure are to be sited, will form the study area for the identification of heritage assets that could receive direct or indirect effects arising from the construction of the proposed Development.
- Outer Study Area: A wider study area, extending 10 km from the outermost finalised proposed turbine locations, will be used for the identification of cultural heritage assets whose settings may be affected by the proposed Development (including cumulative effects).

9.3. BASELINE DESCRIPTION

9.3.1. Inner Study Area (Figure 9.1)

308. There is one Scheduled Monument within the Inner Study Area: 'Poldivan Bridge, cairn 730m ENE of' (SM 638), a well-preserved burial cairn, most likely of Bronze Age date, lies in the northeast part of the Site. As a Scheduled Monument the cairn is of heritage value at a national level and of high sensitivity.

309. There are 23 non-designated sites recorded in the Historic Environment Record (HER) as point locations, two linear features, and 21 areas of archaeological interest within the Inner Study Area. The areas of archaeological interest include most of the recorded point locations with only four points not being located within the areas of interest. Of the point locations and linear features, the HER lists most as being of local or regional/local cultural significance.

310. One of the recorded areas of archaeological interest (MDG 13054) relates to a military aircraft crash site on Lamb Hill. The HER describes this as the crash site of Fairey Battle aircraft (a British single-engine light bomber) that crashed on 29 September 1941. Military aircraft crash sites are afforded statutory protection under the Protection of Military Remains Act (1986). Accordingly, this site is of high sensitivity.

311. Two of the non-designated assets (MDG 6453 and MDG 9669) are described in the HER as robbed burial cairns of probable early Neolithic or Bronze Age date, although both are now badly affected by forestry. As the sites of former burials with some potential for the survival of evidence

of prehistoric funerary practices, these sites are of heritage value at a regional or local level and of medium or low sensitivity. A site visit will be undertaken to refine their likely sensitivity.

312. Four other sites (MDG 21676-78 and MDG 21687) are described in the HER as small groups of cairns of early Neolithic to 19th century date and could either be clusters of small prehistoric burial cairns or, more likely, clusters of field clearance cairns. Three of these (MDG 21676-78) now lie within blocks of commercial forestry plantation and are unlikely to survive as undisturbed features. One (MDG 21687) lies within open ground within the forestry and remains may survive undisturbed. Their heritage value and condition of survival is currently unknown, and a site visit will be undertaken to refine their likely sensitivity.

313. Two sites (MDG 21683 and MDG 21688) are described in the HER as cairnfields: groups of numerous small cairns, most likely the result of field clearance. These now lie within areas of open ground within the commercial forestry plantation and are likely to survive as undisturbed features. Their heritage value and condition of survival is currently unknown though, and a site visit will be undertaken to refine their likely sensitivity.

314. The HER also records the remains of a former farmstead (MDG 9667) and other individual farm buildings (MDG 5069, MDG 9670, MDG 9665, MDG 16887, MDG 21679-81, MDG 21685 and MDG 21686) within the Inner Study Area. These now lie within areas of forestry, some in open ground, others within forestry blocks. Their heritage values and condition of survival are currently unknown, and a site visit will be undertaken to refine their likely sensitivity.

315. Also recorded in the HER are three enclosures (MDG 16887, MDG 16888 and MDG 21682), likely to be fields associated with post-medieval farming settlement. They are likely to be of heritage value at no more than local level and of low sensitivity.

316. Two linear features include a network of water channels (MDG 6502) and the route of a drove road. The heritage values and condition of survival of these linear features are currently unknown, and a site visit will be undertaken to refine their likely sensitivity. They are likely to be of heritage value at no more than local level and of low sensitivity.

317. Given the extensive commercial forestry cover over most of the Proposed Development Site, the possibility of new archaeological discoveries that could be constraints to development, and the archaeological potential of the Site as a whole, is likely to be low or negligible.

9.3.2. Outer Study Area (Figure 9.2)

318. Preliminary assessment of the Historic Environment Scotland (HES) designations database shows that there are 50 Scheduled Monuments within 10 km of the Scoping layout turbines. Eight of these are within 5 km of the nearest Scoping layout turbine, including two prehistoric burial cairns (one within the Site) and two prehistoric hillforts, each of which could have a setting sensitive to change.

319. In addition, there are 277 Listed Buildings within 10 km of the Scoping layout turbines: 14 are Category A Listed, 196 are Category B Listed, and the remaining 67 are Category C Listed. One of the Category A Listed Buildings (Wallacehall, former Academy and Schoolhouse (LB 3953)), 34 of Category B, and nine of Category C are within 5 km of the nearest Scoping layout turbine.

320. Few of the Listed Buildings within 5 km of the nearest Scoping layout turbines have settings that are likely to be sensitive to change. One exception is Category B Listed Closeburn Castle (LB 4004), a late14th century tower house with 18th and 19th century alterations, which is around 4.3 km from the nearest Scoping turbine and has a front elevation facing due east, towards the Proposed Development.

321. There are four Conservation Areas that lie within 10 km of the Scoping layout turbines: Carronbridge, Thornhill, Kirkton, and East and West Cluden. None of these are within 5 km of the nearest Scoping layout turbine.

322. There are four Inventory Garden and Designed Landscapes (GDL) that are at least partly within 10 km of the Proposed Development Site: Drumlanrig Castle, Raehills, Dalswinton, and Crowhill Tower. Dalswinton is the nearest, being around 4.5 km south of the nearest Scoping layout turbine. The others are more than 6 km from any of the Scoping turbine locations.

323. In addition to the designated heritage assets, the HER records 141 non-statutory register (NSR) sites within 10 km of the Scoping layout turbines. Many of these, including prehistoric forts and burial cairns, and medieval or post-medieval castles, potentially have settings that are sensitive to change. Of these NSR sites, 13 are within 5 km of the nearest Scoping layout turbine. These NSR sites are considered by DGC Archaeology Service to be potentially of schedulable quality and of national importance and will therefore be treated in the EIA as being of high sensitivity.

324. There are two Archaeologically Sensitive Areas (ASAs) that are at least partly within 10 km of the Scoping layout turbines: Whitestanes Moor, which abuts the southern end of the Site, and Beattock Hill, 9.9 km to the northeast of the nearest Scoping layout turbine. These sites are a local designation, protected under LDP Policy HE4, and considered by DGC Archaeology Service to be of regional importance. They will be treated in the EIA as being of medium sensitivity.

325. The HER also records 19 Non-Inventory Designed Landscapes (NIDLs) within 10 km of the Scoping layout turbines, all of which have some relict historic value and form the settings for Country Houses and have other Listed Buildings within the policies. Only one of these lies within 5 km of the Site; Closeburn Castle (MDG 25606), which forms the setting for Closeburn Castle (LB 4004) described above. These sites are a local designation, considered by DGC Archaeology Service to be of regional importance, and will be treated in the EIA as being of medium sensitivity.

9.4. GUIDANCE AND LEGISLATION

326. The assessment will be prepared following the advice and guidance in the following documents:

9.4.1. Legislation

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas (Scotland) Act 1997 (as amended by Historic Environment (Amended) (Scotland) Act 2011);
- Historic Environment Scotland Act 2014;
- Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013; and
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

9.4.2. Planning Policies

- National Planning Framework 4 (2022); and
- Historic Environment Policy for Scotland (HEPS) (HES, 2019).

9.4.3. Guidance

- Environmental Impact Assessment Handbook (SNH and HES, 2018, version 5);
- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeology (CIfA, 2014, updated 2020);
- Principles of Cultural Heritage Impact Assessment in the UK (Institute of Environmental Management and Assessment (IEMA, 2021);
- Designation Policy and Selection Guidance (HES, 2019);

- Managing Change in the Historic Environment: Setting (HES, 2016, updated 2020); and
- Planning Advice Note 2/2011: Planning and Archaeology (PAN 2/2011).

9.5. ASSESSMENT METHODOLOGY

9.5.1. Desk-Based Assessment Method

327. An initial desk-based assessment will be conducted covering the Inner Study Area. The purpose will be to identify all known and any hitherto unrecorded heritage assets, designated or otherwise, that could be directly affected by the proposed Development, and to inform an assessment of the archaeological potential of the proposed Development site.

328. Sources to be consulted for the collation of data will include:

- Historic Environment Scotland's (HES) on-line GIS Spatial Data Warehouse;
- Dumfries and Galloway HER;
- National Record of the Historic Environment (NRHE);
- Historic maps held by National Library of Scotland;
- Historic aerial photographic imagery (vertical and oblique) available through the National Collection of Aerial Photography (NCAP);
- Modern aerial photographic imagery available online via Google Earth, Bing Maps and ESRI World Imagery;
- Historic Land-Use Assessment Data for Scotland (HLAmap);
- Lidar data available through Scottish Remote Sensing Portal (where available);
- Any existing geotechnical data, including peat survey data when available; and
- Other readily accessible published sources, including any reports referenced in HER/NRHE records.

329. Data will be gathered for the Outer Study Area to identify designated heritage assets that may be subject to effects on their settings and to provide baseline information for the assessment of setting effects.

9.5.2. Field Survey Method

330. A walk-over field survey of the proposed Development site will be carried out with the following aims:

- to assess the present baseline condition of the heritage assets identified through the desk-based assessment and to accurately record their locations;
- to identify any further features of cultural heritage interest not detected from the desk-based assessment that could be directly or indirectly affected by construction of the proposed Development; and
- to assess the Inner Study Area for its potential to contain currently unrecorded, buried archaeological remains that could be directly or indirectly affected by construction of the proposed Development.

331. Identified sites will be recorded on pro-forma monument recording forms and by digital photography, and their positions (and where appropriate their extents) logged using a Global Positioning System (GPS). The survey data will be compiled in a GIS and used during the design iteration work. The results of the survey work will be provided to DGC's Archaeological Advisors, for inclusion in the HER following completion of the project.

332. Site visits to key heritage assets in the Outer Study Area will be carried out, where necessary and in as far as access is possible, to assess the predicted effect of the proposed Development on their settings. Site visits will include any assets specifically identified by consultees as requiring assessment and those identified through analysis of the blade tip height ZTV, where it is considered, on the basis of professional judgement, that the effect on their settings could be significant.

9.5.3. Assessment Method

333. The effects of the proposed Development on heritage assets will be assessed on the basis of their type (direct effects, indirect impacts, setting impacts, and cumulative impacts) and nature (adverse or beneficial). The assessment will take into account the value/sensitivity of the heritage asset, and its setting, and the magnitude of the predicted impact.

- Direct impacts: occur where the physical fabric of the asset is removed or damaged, or where it is preserved or conserved, as a direct result of the proposal, e.g., removal of archaeological deposits as a result of the excavation of foundation trenches. Such impacts are most likely to occur during the construction phase and are most likely to be permanent.
- Indirect impacts: occur where the fabric of an asset, or buried archaeological remains, is removed or damaged, or where it is preserved or conserved, as an indirect result of the proposal even though the asset may lie some distance from the proposal. An example includes damage to walls as a result of vibration from piling operations or blasting. Such impacts are most likely to occur during the construction phase and are most likely to be permanent.
- Setting impacts: these are generally direct and result from the proposal causing change within the setting of a heritage asset that affects its cultural significance or the way in which it is understood, appreciated, and experienced. Such impacts are generally, but not exclusively, visual, occurring directly as a result of the appearance of the proposal in the surroundings of the asset. However, they may relate to other senses or factors, such as noise, odour or emissions, or historical relationships that do not relate entirely to intervisibility, such as historic patterns of land-use and related historic features. Such impacts may occur at any stage of a proposal's lifespan and may be permanent, reversible, or temporary.
- Cumulative impacts: can relate to the physical fabric or setting of assets. They may arise as a result of impact interactions, either of different impacts of the proposal itself, or additive impacts resulting from incremental changes caused by the proposal together with other projects already in the planning system or allocated in a Local Development Plan.
- Adverse effects are those that detract from or reduce cultural significance or special interest of heritage assets.
- Beneficial effects are those that preserve, enhance, or better reveal the cultural significance or special interest of heritage assets.

9.5.4. Assigning Sensitivity to Heritage Assets

334. Cultural heritage assets are given weight through the designation process. Designation ensures that sites and places are recognised by law through the planning system and other regulatory processes. The level of protection and how a site or place is managed varies depending on the type of designation and its laws and policies (HES, 2019).

335. Table 9.1 summarises the relative sensitivity of heritage assets (including their settings) relevant to the proposed Development, based on the guidance set out in the SNH/HES EIA Handbook (version 5; 2018).

Table 9.1 Sensitivity of Heritage Assets

SENSITIVITY OF ASSET	DEFINITION / CRITERIA
HIGH	Assets valued at an international or national level, including: • Scheduled Monuments; • Category A Listed Buildings; • Inventory Gardens and Designed Landscapes; • Inventory Historic Battlefields; and • Non-designated assets that meet the relevant criteria for designation (including sites recorded in HERs as NSR sites of presumed national importance).
MEDIUM	Assets valued at a regional level, including: • Archaeological sites and areas that have regional value (contributing to the aims of regional research frameworks); • ASA (where these are identified in Local Authority records); • NIDL (where these are identified in Local Authority records); • Category B Listed Buildings; and • Conservation Areas.
LOW	Assets valued at a local level, including: • Archaeological sites that have local heritage value; • Category C listed buildings; and • Unlisted historic buildings and townscapes with local (vernacular) characteristics.
NEGLIGIBLE	Assets of little or no intrinsic heritage value, including: • 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 features (e.g. quarries and gravel pits, dilapidated sheepfolds, etc).

9.5.5. Criteria for Assessing the Significance of Effects

336. The magnitude of impact (adverse or beneficial) will be assessed in the categories, high, medium, low, and negligible and described in Table 9.2.

Table 9.2 Magnitude of Impact

MAGNITUDE OF IMPACT	CRITERIA	
	ADVERSE	BENEFICIAL
HIGH	Changes to the fabric or setting of a heritage asset resulting in the complete or near complete loss of the asset's cultural significance. Changes that substantially detract from how a heritage asset is understood, appreciated, and experienced.	Preservation of a heritage asset in situ where it would otherwise be completely or almost completely lost. Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated, and experienced.
MEDIUM	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is appreciably altered. Changes that appreciably detract from how a heritage asset is understood, appreciated, and experienced.	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. Changes that improve the way in which the heritage asset is understood, appreciated, and experienced.
LOW	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is slightly altered. Changes that slightly detract from how a heritage asset is understood, appreciated, and experienced.	Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed. Changes that result in a slight improvement in the way a heritage asset is understood, appreciated, and experienced.
NEGLIGIBLE	Changes to fabric or setting of a heritage asset that leave its cultural significance unchanged and do not affect how it is understood, appreciated, and experienced.	

9.5.6. Assessment of Effects on Setting

337. The SNH/HES EIA Handbook (2018) Appendix 1, paragraph 42 advises that:

"In the context of cultural heritage impact assessment, the receptors are the heritage assets and impacts will be considered in terms of the change in their cultural significance".

338. HES's guidance document, 'Managing Change in the Historic Environment: Setting' (HES, 2016, updated 2020), notes that:

"Setting can be important to the way in which historic structures or places are understood, appreciated, and experienced. It can often be integral to a historic asset's cultural significance."

"Setting often extends beyond the property boundary or 'curtilage' of an individual historic asset into a broader landscape context".

339. The guidance also advises that:

"If proposed development is likely to affect the setting of a key historic asset, an objective written assessment should be prepared by the applicant to inform the decision-making process. The conclusions should take into account the significance of the asset and its setting and attempt to quantify the extent

of any impact. The methodology and level of information should be tailored to the circumstances of each case".

340. The guidance recommends that there are three stages in assessing the impact of a development on the setting of a historic asset or place:

- Stage 1: identify the historic assets that might be affected by the proposed development.
- Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated, and experienced; and,
- Stage 3: evaluate the potential impact of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated.

341. The SNH/HES EIA Handbook (2018) Appendix 1, paragraph 43 advises that:

"When considering setting impacts, visual change should not be equated directly with adverse impact. Rather the impact should be assessed with reference to the degree that the proposal affects those aspects of setting that contribute to the asset's cultural significance".

342. Following these recommendations, the turbine blade tip and hub height ZTVs for the proposed Development will be used to identify those heritage assets from which there would be theoretical visibility of one or more of the proposed wind turbines, and the degree of theoretical visibility:

- Scheduled Monuments, Category A and B Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscapes, and Inventory Historic Battlefields, where present within the blade tip height ZTV and within the Outer Study Area will be included in the assessment.
- Category C Listed buildings and NIDLs within the blade tip height ZTV and within 5 km of the outermost turbines will be included in the assessment.
- Consideration will be given to designated heritage assets beyond 10 km where long-distance views or intervisibility are considered to be an important aspect of their settings. In this instance, none currently stand out as being sensitive receptors.
- Consideration will also be given to designated heritage assets where there is no predicted visibility from the asset but where views of or across the asset are important factors contributing to its cultural significance. In such cases, consideration will be given to whether the proposed Development could appear in the background to those views.

343. The sensitivity of the asset (Table 9.1) and the magnitude of the predicted impact (Table 9.2) are used to inform an assessment of the significance of the effect (direct effect or effect on setting), summarised using the formula set out in the matrix in Table 9.3. The matrix employs a gradated scale of significance (from negligible to major effects) and where two outcomes are possible through application of the matrix, professional judgment supported by reasoned justification, will be used to determine the level of significance.

Table 9.3 Significance of Effects

MAGNITUDE OF IMPACT	SENSITIVITY OF ASSET			
	HIGH	MEDIUM	LOW	NEGLIGIBLE
HIGH	Major	Major / Moderate	Moderate / Minor	Minor / Negligible
MEDIUM	Major / Moderate	Moderate	Moderate / Minor	Minor / Negligible
LOW	Moderate / Minor	Moderate / Minor	Minor	Negligible
NEGLIGIBLE	Minor / Negligible	Minor / Negligible	Negligible	Negligible

344. Major and moderate effects are considered to be 'significant' in the context of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations). Minor and negligible effects are considered to be 'not significant'.

9.5.7. Cumulative Assessment

345. The assessment of cumulative effects on heritage assets will be based upon consideration of the effects of the proposed Development on the settings of assets with statutory designations and non-statutory designations within 10 km of the outermost turbines (the Outer Study Area), in addition to the likely effects of other developments that are under construction, those that are consented but not yet built, and those that are currently at the application stage (and for which sufficient detail is available upon which to develop an assessment).

346. The assessment of cumulative effects on the settings of heritage assets from the proposed Development in combination with pre-existing developments will be addressed in the course of the assessment of effects of the proposed Development alone, as pre-existing developments are part of the baseline environment.

347. Proposed developments at the Scoping or pre-application stage will not be included in the assessment, as such proposals are not fully formed and may be subject to changes that cannot be foreseen.

348. The schemes to be included in the cumulative impact assessment will be those identified through the LVIA consultations with DGC and Nature Scot.

349. The assessment will take into account the relative scale (i.e. size and number of turbines) of the identified developments, their distance from the affected assets, and the potential degree of visibility of the various developments from the assets under consideration. The use of cumulative wireline visualisations will be used to aid the assessment.

9.6. PROPOSED MITIGATION

350. Mitigation to minimise the impacts of the proposed Development on cultural heritage assets is anticipated to include the following measures.

9.6.1. Design Mitigation

- Avoidance of identified areas of constraint located within the proposed Development Site during the design of the turbine layout and the on-site infrastructure.

9.6.2. Construction Phase Mitigation

- Fencing off/marking out areas of constraint within the proposed Development Site for avoidance during the construction phase.
- Archaeological evaluations or set piece excavations where heritage assets cannot be avoided.
- Watching briefs/archaeological monitoring in archaeologically sensitive areas.
- Implementation of a working protocol should unrecorded archaeological features be discovered.

9.6.3. Post Construction Monitoring

- Post construction site visits would be carried out to verify the effectiveness of the marking-out/avoidance mitigation, to ensure that all markers have been removed and that no damage has occurred to demarcated heritage assets.

9.6.4. Decommissioning Phase Mitigation

- Fencing off/marking out areas of constraint that lie close to as-built components of the proposed Development for avoidance during decommissioning phase.

9.7. POTENTIAL IMPACTS

9.7.1. Direct Impacts

351. Construction of the proposed Development could potentially directly affect the previously recorded non-designated heritage assets within the Inner Study Area. However, the nature and locations of the known heritage assets is such that they can most likely be easily avoided by design and significant adverse direct effects from construction are unlikely to arise.

352. Similar impacts to those on previously recorded assets during construction could occur during decommissioning. However, it is anticipated that the as-built infrastructure and track network would be used for decommissioning and it is anticipated direct impacts can easily be avoided and significant adverse effects are unlikely to arise.

353. It is possible that there could be other, as yet unrecorded or unknown and buried remains of archaeological interest within the Site and any such remains could be directly affected by construction of the proposed Development. It is not possible to predict where any such buried remains may be located, and other mitigation measures will need to be considered to address the possibility of direct impacts on buried archaeological deposits.

9.7.2. Indirect Impacts

354. Construction of the proposed Development could potentially indirectly affect previously recorded non-designated heritage assets within the Inner Study Area. However, the nature and locations of the known heritage assets is such that they can most likely be easily avoided by design and significant adverse indirect effects are unlikely to occur.

355. It is possible that there could be other, as yet unrecorded or unknown and buried remains of archaeological interest within the Site and any such remains could also be indirectly affected by construction of the proposed Development.

9.7.3. Setting Impacts

356. The proposed Development could give rise to potentially adverse impacts on the settings of designated heritage assets within the Outer Study Area (as defined above).

357. Based on the Scoping layout, the assets most sensitive to adverse effects on their settings are likely to be the Scheduled Monument within the proposed Development Site (Poldivan Bridge, cairn 730m ENE of (SM 638)) and those close by to the west (SM 2262 and SM 10540) and to the south (SM 5919 and SM 5920), within the Whitestanes Moor ASA. Others further afield, such as Mullach,fort (SM 657) and The Belt, fort, High Townhead (SM 644), may also have settings sensitive to change. Category B Listed Closeburn Castle (LB 4004), and associated NIDL, has a principal vista that is oriented to the east towards the proposed Development.

358. The settings of these, and others in the Outer Study Area will be assessed against the proposed Development ZTV mapping and assessed in the EIA where appropriate. Where appropriate in order to demonstrate the visual impact on the settings of heritage assets, visualisations (photomontages or wirelines) will be provided. The assets to be represented by visualisations will be agreed through consultation with HES and DGC Archaeology Service.

9.8. RECEPTORS AND IMPACTS SCOPED IN AND OUT OF ASSESSMENT

Table 9.4: Summary of Receptors and Impacts for Cultural Heritage

IMPACT	SCOPED IN (PHASE[3])			JUSTIFICATION
	C	O	D	
Direct and indirect effects on heritage assets within the Inner Study Area.	Y	N	N	Construction activities (such as ground-breaking activities, quarry blasting, vehicle movement, and soil/overburden storage) could potentially directly or indirectly impact upon heritage assets present within the Inner Study Area.
Effects on the settings of heritage assets within the Outer Study Area.	N	Y	N	The presence of the proposed Development could potentially affect the settings of heritage assets within the Outer Study Area (which includes the Inner Study Area).
Effects on the settings of Listed Buildings within towns and villages.	N	N	N	For Listed Buildings within towns and villages, the proposed Development would not appreciably alter the features of their settings that contribute to their cultural significance.
Effects on the settings of heritage assets outwith the Outer Study Area.	N	N	N	At distance greater than 10 km it is considered that, in most instances, the proposed Development would not appreciably alter the features of the settings of the heritage assets that contribute to their cultural significance.
Cumulative effects on the setting of	N	Y	N	The proposed Development could in combination with other development in the surrounding landscape potentially

[3] *C = Construction, O = Operation, D=Decommissioning*

IMPACT	SCOPED IN (PHASE[3])			JUSTIFICATION
heritage assets during operation.				affect the settings of heritage assets within the Outer Study Area.

9.9. SCOPING QUESTIONS TO CONSULTEES

359. The following questions are directed to consultees:

- Do consultees agree that the scope of the proposed assessment is appropriate?
- Do consultees agree that the proposed study areas are appropriate?
- Do consultees agree that the proposed assessment methodology is appropriate?
- Do consultees agree with the main potential setting impacts identified?
- Are there any specific assets for which consultees would wish to have visualisations provided?

10. Transport and Access

10.1. INTRODUCTION

361. This section of the Scoping Report covers the predicted access, traffic and transport issues that may arise from the construction, operation, and decommissioning of the proposed Development, the significance of these effects and what suitable mitigation measures can be put in place to offset any adverse impacts.

362. The Transport & Access Chapter will be supported by a Transport Assessment report, Abnormal Load Route Survey and technical figures.

363. The key issues for consideration as part of the assessment will be:

- The temporary change in traffic flows and the resultant, temporary effects on the study network during the construction phase;
- The physical mitigation associated with the delivery of abnormal loads;
- The design of new access infrastructure; and
- The consideration of appropriate and practical mitigation measures to offset any temporary effects.

364. The potential effects of these will be examined in detail in the EIA Report.

10.2. STUDY AREA

365. The proposed study area is as follows:

- A701 between the A75 in Dumfries and the M74 at Beattock; and
- A75 between the M74 junction at Gretna and the A76 in Dumfries.

366. Baseline traffic count data will be obtained from the Transport Scotland live traffic count database for both the A701 and A75.

367. National Road Traffic Forecast (NRTF) Low Traffic Growth assumptions will be used to provide a common future year baseline to coincide with the expected construction traffic peak.

368. Traffic accident data would be obtained from Crashmap UK for the study network to inform the accident review for the immediate road study area. Three years of available data within the proposed study area will be collated.

10.3. BASELINE DESCRIPTION

369. The proposed Development is anticipated to be accessed from the existing access junction on the A701 used for the existing Harestanes Windfarm. All traffic would then access the Site via the existing windfarm and forestry tracks through the operational site and Forest of Ae. These existing tracks would be upgraded as part of the proposed Development works, details of which will be provided within the EIA Report.

370. It is proposed that all vehicular traffic would use this access, including Abnormal Indivisible Loads (AIL). No heavy goods vehicles (HGV) access is anticipated to be taken through the village of Ae, however there may be limited access taken through the village of Ae by a limited number of light goods vehicles (LGV) during the initial enabling upgrading works on the access route. Following completion of the wider access track, all traffic will access the site from the A701 junction and no

further traffic will pass through the village of Ae. A detailed Route Survey Report will support the application and will identify the necessary access improvements that will be required to enable loads to access the Site.

371. Local or onsite sourced material, such as stone, will be used where feasible and traffic will avoid impacting on local communities, as far as possible.

10.4. GUIDANCE AND LEGISLATION

372. A Transport Assessment will be provided to review the impact of transport related matters associated with the proposed Development. This will be appended to the EIA Report and will be summarised in the Access, Traffic and Transport Chapter within the EIA Report.

373. The following policy and guidance documents will be used to inform the Access, Traffic and Transport Chapter:

- Transport Assessment Guidance (Transport Scotland, 2012); and
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993).

10.5. ASSESSMENT METHODOLOGY

374. The main transport impacts will be associated with the movement of general HGV traffic travelling to and from the Site during the construction phase of the proposed Development.

375. The Guidelines for the Environmental Assessment of Road Traffic (IEA 1993) sets out a methodology for assessing potentially significant environmental effects. In accordance with this guidance, the scope of assessment will focus on

- Potential impacts (of changes in traffic flows) on local roads and the users of those roads; and
- Potential impacts (of changes in traffic flows) on land uses and environmental resources fronting these roads, including the relevant occupiers and users.

376. The following rules taken from the guidance will be used as a screening process to define the scale and extent of the assessment:

- Rule 1: Include highway links 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%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

377. Increases below these thresholds are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flow below this level predicted as a consequence of the proposed Development will therefore be assumed to result in no discernible environmental impact and as such no further consideration will be given to the associated environment effects.

378. The estimated traffic generation of the proposed Development will be compared with baseline traffic flows, obtained from existing traffic survey data in order to determine the percentage increase in traffic.

379. Potentially significant environmental effects will then be assessed where the thresholds as defined above are exceeded. Suitable mitigation measures will be proposed, where appropriate.

380. Committed development traffic i.e. those from proposals with planning consent will be included in baseline traffic flows, where traffic date for these schemes is considered significant and is publicly available. Developments that are proposed or at Scoping would not be included.

381. It is not anticipated that a formal Transport Assessment will be required as these are not generally considered necessary for temporary construction works. A reduced scope Transport Assessment is therefore proposed.

382. Each turbine is likely to require between 11 and 14 abnormal loads to deliver the components to site. The components will be delivered on the extendable trailers which will then be retracted to the size of a standard HGV for the return journey.

383. Detailed swept path analysis will be undertaken for the main constraint points on the route from the port of entry through to the site access junction to demonstrate that the turbine components can be delivered to site and to identify any temporary road works which may be necessary.

10.6. PROPOSED MITIGATION

384. Standard mitigation measures that are likely to be included in the assessment are:

- Production of a Construction Traffic Management Plan;
- Production of a Path Management Plan;
- The design of suitable access arrangements with full consideration given to the road safety of all road users; and
- A Staff Sustainable Access Plan.

385. Additional mitigation will be included should the assessment reveal criteria that are significant following the application of standard mitigation measures.

10.7. POTENTIAL IMPACTS

386. Potential impacts that may arise during the assessment may include the following for users of the road and those resident along the delivery routes:

- severance;
- driver delay;
- pedestrian delay;
- pedestrian amenity;
- fear and intimidation; and
- accidents and safety.

387. The effects that will be considered will be based upon percentage increases in traffic flow and reviewed against the impacts noted above.

10.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

388. Once operational, it is envisaged that the level of traffic associated with the proposed Development would be minimal. Regular monthly or weekly visits would be made to the windfarm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the windfarm for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and

therefore no detailed assessment of the operational phase of the proposed Development is proposed.

389. The traffic generation levels associated with the decommissioning phase will be less than those associated with the construction phase as some elements such as access roads would be left in place on the site. As such, the construction phase is considered the worst-case assessment to review the impacts on the study area. An assessment of the decommissioning phase would therefore not be undertaken, although a commitment to reviewing the impact of this phase would be made immediately prior to decommissioning works proceeding.

10.9. SCOPING QUESTIONS TO CONSULTEES

390. The following questions are directed to consultees:

- Do consultees agree that the proposed methodology is acceptable?
- Do consultees agree that the methods proposed for obtaining traffic flow data are acceptable?
- Do consultees agree that the use of Low National Road Traffic Forecasts (NRTF) is acceptable for the whole of the study?
- What developments (if any) do consultees consider should be included as committed developments within the baseline traffic flows in the assessment, noting that these should have planning consent at the time of Scoping?
- Do consultees have any relevant details of any upgrades or network changes that may be undertaken to the study area network within the next five years which should be considered within the assessment?

11. Socio-Economic and Tourism

11.1. INTRODUCTION

391. This section of the Scoping Report considers socio-economics, tourism and recreation.

392. Socio-economic and tourism assessments of onshore windfarms over the last decade have found no effects assessed as significant in terms of the EIA Regulations and there is no reason to expect significant effects for the proposed Development. It is therefore proposed to scope socio-economics and tourism out of the EIA Report.

393. However, it is recognised that socio-economic issues, including any tourism and recreation issues, will be of interest to stakeholders and so it is proposed to undertake a socio-economic and tourism assessment in a standalone report, which will be submitted alongside the EIA. This will include consideration of local tourism and recreation activity, employment generation and any indirect or induced effects from the proposed Development.

11.2. STUDY AREA

394. The study areas of the assessment will be selected to meet the interests of key stakeholders and will be made of pre-defined administrative geographies.

395. The assessment of economic impacts shall focus on the following study areas:

- Dumfries and Galloway; and
- Scotland.

396. The socio-economic baseline description will also include information for the electoral ward of Lochar, which is the location of the proposed Development.

397. For the tourism assessment, the study area will be a 15 km radius of the Site, consistent with previous research of the relationship with tourism and onshore wind developments.

11.3. BASELINE DESCRIPTION

398. The baseline assessment will include a description of the current socio-economic, recreation and tourism baseline within Lochar, Dumfries and Galloway, and Scotland.

399. Specifically, the baseline study will cover:

- the demographic profile of Lochar, and Dumfries and Galloway within the context of the national demographic trends;
- employment and economic activity of the regional economy compared to the national level;
- the industrial structure of Lochar, and Dumfries and Galloway within the context of the national economies;
- wage levels within the Dumfries and Galloway economy compared to the national level; and
- the role of the tourism sector in the local and regional economy, with consideration to assets, including accommodation providers and public paths, in the immediate vicinity of the proposed Development (15 km).

11.3.1. POPULATION

400. In 2020, Lochar had a total population of 12,270, accounting for 8.3% of the population of Dumfries and Galloway and 0.2% of the population of Scotland (refer to Table 11.1). Of the total population of Lochar, 17% were aged under 16 years old. This proportion is of a similar magnitude to Dumfries and Galloway (16%) and Scotland as a whole (17%).

401. The proportion of the population aged between 15-64 in Lochar was 61%, which was greater than in Dumfries and Galloway (58%) and below the national average (64%). The share of the population in Lochar that was aged 65 and over was 22%, which was below Dumfries and Galloway (26%) but greater than across Scotland as a whole (19%).

Table 11.1 Population by Age, 2020

	LOCHAR	DUMFRIES AND GALLOWAY	SCOTLAND
Total Population	12,270	148,300	5,466,000
0-15	17%	16%	17%
16-64	61%	58%	64%
65+	22%	26%	19%

Source: Office for National Statistics (2021), population estimates UK.

11.3.2. POPULATION PROJECTIONS

402. Over the period between 2018 and 2043, the population of Dumfries and Galloway is projected to decrease from 148,790 to 136,290, which is equivalent to a decrease of 8.4%. However, the population of Scotland is projected to increase by 2.5%, from 5,438,100 to 5,574,820 between 2018 and 2043 (refer to Table 11.2).

403. The proportion of Dumfries and Galloway residents aged 16-64 years old is projected to decrease over time, with the share of working age population falling from 59% to 53% between 2018 and 2043. This is equivalent to a decrease over 15,000 working age people in Dumfries and Galloway, from 87,490 to 72,300. The share of the working age population is also projected to fall across Scotland as a whole, from 64% to 60% between 2018 and 2043.

404. The share of the population of Dumfries and Galloway accounted for by people aged 65 and over is projected to increase from 25% to 34% between 2018 and 2043. This is significantly greater than the national average, where the share of the population accounted for by people aged 65 and over is projected to increase to 25% of the total Scottish population by 2043, rising from 19% in 2018.

Table 11.2 Population Projections, 2018-2043

	DUMFRIES AND GALLOWAY		SCOTLAND	
	2018	2043	2018	2043
Total Population	148,790	136,290	5,438,100	5,574,820
0-15	16%	13%	17%	15%
16-64	59%	53%	64%	60%
65+	25%	34%	19%	25%

Source: Office for National Statistics (2020), Population Projections 2018-2043.

11.3.3. ECONOMIC ACTIVITY

405. Between April 2021 and March 2022, the economic activity rate in Dumfries and Galloway was 74.1%, which was lower than across Scotland where the economic activity rate was 76.5% (refer to Table 11.3). The unemployment rate in Dumfries and Galloway was 4.5% between 2021 and 2022, which was higher than in Scotland as a whole (3.5%). The median annual gross salary of residents of Dumfries and Galloway was £22,690 in 2021/22, which was significantly lower than across Scotland (£26,139).

Table 11.3 Activity Rate, 2020

	DUMFRIES AND GALLOWAY	SCOTLAND
Economic Activity Rate	74.1%	76.5%
Unemployment Rate	4.5%	3.5%
Median Annual Gross Income	£22,690	£26,139

Source: Office for National Statistics (2022), Annual Population Survey Apr 2021 - Mar 2022 and Annual Survey of Hours and Earnings – resident analysis 2021.

11.3.4. EMPLOYMENT STRUCTURE

406. In 2021, 24% of those employed in Lochar worked in the wholesale and retail trade sector, significantly above the share of people in the sector in Dumfries and Galloway (16%), and in Scotland as a whole (14.7%) (refer to Table 11.4). Manufacturing is an important sector in Lochar, accounting for 18% of employment compared to 9% in Dumfries and Galloway and 7% in Scotland. The majority of this employment was associated with the manufacturing of rubber and plastic products at Gates Power Transmission Ltd Dumfries. Construction accounted for 9% of employment in Lochar, which was more than in Dumfries and Galloway (5%) and in Scotland as a whole (6%). Transportation was also an important employer in Lochar, constituting 8% of total employment compared to 4% across both Dumfries and Galloway, and Scotland as a whole.

407. The tourism sector is less important to the economy of Lochar than it is for the economy of Dumfries and Galloway and the wider Scottish economy. Accommodation and food services was underrepresented in Lochar, encompassing 5% of total employment, which was less than in Dumfries and Galloway (8%) and in Scotland as a whole (7%).

408. In Dumfries and Galloway, the most significant employers were wholesale and retail trade and human health and social work, both accounting for 16% of total employment. Agriculture, forestry, and fishing was overrepresented in Dumfries and Galloway, accounting for 13% of employment which was far higher than in Lochar (3%) and across Scotland as a whole (3%).

Table 11.4 Employment Structure, 2021

	LOCHAR	DUMFRIES AND GALLOWAY	SCOTLAND
Wholesale and retail trade	24%	16%	14%
Manufacturing	18%	9%	7%
Construction	9%	5%	6%
Transportation and storage	8%	4%	4%
Education	6%	8%	8%

	LOCHAR	DUMFRIES AND GALLOWAY	SCOTLAND
Administrative and support service activities	6%	4%	8%
Accommodation and food service activities	5%	8%	7%
Real estate activities	4%	2%	2%
Professional, scientific, and technical activities	4%	4%	6%
Agriculture, forestry, and fishing	3%	13%	3%
Human health and social work activities	3%	16%	15%
Water supply; sewerage, waste management	2%	1%	1%
Arts, entertainment, and recreation	2%	2%	2%
Information and communication	1%	1%	3%
Public administration and defence; compulsory social security	1%	4%	6%
Other service activities	1%	2%	2%
Electricity, gas, steam, and air conditioning supply	1%	0%	1%
Financial and insurance activities	0%	1%	3%

Source: Office for National Statistics (2022), Business Register and Employment Survey (BRES) 2021.

11.3.5. EDUCATION

409. The workforce in Dumfries and Galloway has lower levels of qualifications than the wider Scottish population (refer to Table 11.5). Across Dumfries and Galloway, 43% of people have achieved at least a National Vocational Qualification Level 4 (NVQ4) qualification, equivalent to a higher education certificate. This is lower than the share of people in Scotland of 50%, with a higher education certificate. The proportion of people who have achieved no qualifications in Dumfries and Galloway (9%) is slightly higher than across Scotland as a whole (8%).

Table 11.5 Qualification Levels, 2021

	DUMFRIES AND GALLOWAY	SCOTLAND
NVQ4+	43%	50%
NVQ3+	61%	65%
NVQ2+	80%	80%
NVQ1+	86%	86%
Other Qualifications	5%	6%

	DUMFRIES AND GALLOWAY	SCOTLAND
No Qualifications	9%	8%

Source: Office for National Statistics (2022), Annual Population Survey – Data for Jan 2021 – Dec 2021

11.3.6. SCOTTISH INDEX OF MULTIPLE DEPRIVATION

410. The Scottish Index of Multiple Deprivation (SIMD) is a relative measure of deprivation which ranks small areas of Scotland across seven dimensions: income, employment, education, health, access to services, crime, and housing. These areas can be ranked based on which quintile (fifth of the distribution) they belong to, with a small area in the first quintile being in the 20% most deprived areas in Scotland.

411. Lochar has lower levels of deprivation and higher levels of affluence compared to Dumfries and Galloway and Scotland as a whole (refer to Table 11.6). There are 17 small areas in Lochar, none of which are in the most deprived quintile and 24% are in the least deprived quintile. Small areas In Lochar are more concentrated towards the least deprived end of the distribution, with 59% of the small areas in the fourth and fifth quintiles and with 83% in the third, fourth, and fifth quintiles.

412. There are 98 small areas in Dumfries and Galloway, of which 3% are in the most deprived quintile and 12% in the least deprived quintile. Small areas in Dumfries and Galloway are concentrated within the middle of the distribution, with 35% of the small areas in the third quintile and with 85% in the second, third and, fourth quintiles.

413. Both Lochar and Dumfries and Galloway have fewer small areas concentrated in the most deprived quintiles compared to the national average. However, Lochar has more small areas congregated towards to least deprived end of the distribution than Scotland as a whole, whereas Dumfries and Galloway has fewer small areas in the least deprived quintile than the national average. This implies that both Lochar and Dumfries and Galloway have lower levels of inequality than exists in Scotland as a whole.

Table 11.6 Scottish Index of Multiple Deprivation by Quintile, 2020

	LOCHAR	DUMFRIES AND GALLOWAY
1 (most deprived quintile)	0%	3%
2	18%	19%
3	24%	35%
4	35%	31%
5 (least deprived quintile)	24%	12%

Source: Scottish Government (2020), Scottish Index of Multiple Deprivation 2020.

11.3.7. FUEL POVERTY

414. The proportion of households living in fuel poverty, where at least 10% of income is spent on heating, is higher in Dumfries and Galloway than in the rest of Scotland (Table 11.7). In Dumfries and Galloway, 29% of households (20,000) live in fuel poverty, compared to 24% across Scotland as a whole. Residents over 65 are most affected by fuel poverty, as they are more likely to be living on a fixed income, spending long periods of time at home, and living in substandard housing.

415. The proportion of households in extreme fuel poverty, where at least 20% of income is spent on energy, is also higher in Dumfries and Galloway than in the rest of Scotland. In Dumfries and Galloway, 15% of households (11,000) live in extreme fuel poverty, compared to 12% across Scotland.

416. The latest data available on fuel poverty presented in Table 11.7 were released in 2020. Given the recent increases in the price of fuel and electricity, it is likely that the present scale of the problem is greater than captured by these statistics.

Table 11.7 Fuel Poverty, 2019

	DUMFRIES AND GALLOWAY	SCOTLAND
Fuel Poverty	29%	24%
Extreme Fuel Poverty	15%	12%

Source: Scottish Government (2020), Scottish House Condition Survey: Local Authority Analysis 2019.

11.4. GUIDANCE AND LEGISLATION

417. There is no specific legislation or guidance available on the methods that should be used to assess the socio-economic impacts of a proposed onshore windfarm development. The proposed method has however been based on established best practice, including that used in UK Government and industry reports on the sector. This assessment will draw from two studies by BiGGAR Economics on the UK onshore wind energy sector, a report published by RenewableUK and the Department for Energy and Climate Change (DECC) in 2012 on the direct and wider economic benefits of the onshore wind sector to the UK economy (BiGGAR Economics, 2012) and a subsequent update to this report published by RenewableUK in 2015 (BiGGAR Economics, 2015).

418. There is also no formal legislation or guidance on the methods that should be used to assess the effects that windfarm developments may have on general tourism and recreation interests. The proposed method will consider individual attractions and tourism facilities to assess if there could be any effects from the proposed Development.

419. For recreational assets guidance has been provided by NatureScot on how to assess effects on recreational amenity and the approach outlined has been used. This takes into consideration a number of potential effects, including direct effect on facilities, such as limitation or restrictions on access, and effects on the intrinsic quality of the resources enjoyed by people. In general, this guidance would consider recreational and access impacts to potentially be significant if:

- permanent or long-term effects on the resources on which enjoyment of the natural heritage depends, in particular where facilities have been provided by NatureScot or others under statutory powers;
- permanent or long-term change that would affect the integrity and long-term sustainable management of facilities which were provided by NatureScot or others under statutory powers;
- where there are recreational resources for open air recreation pursuits affected by the proposal which have more than local use or importance, especially if that importance is national in significance;
- major constraints on or improvements for access or accessibility to designated natural heritage sites; and
- where mitigation and/or compensatory or alternative recreational provision is considered to be inadequate.

420. It is also important that the socio-economic and tourism assessment takes account of the relevant local and national policy objectives. The most relevant objectives for this are expected to be included in the following strategies:

- Scotland's National Strategy for Transformation;

- Scotland's National Performance Framework;
- Climate Change (Emissions Reduction Targets) (Scotland) Act;
- Onshore Wind Policy Statement;
- Local Energy Policy Statement;
- South of Scotland Regional Economic Strategy;
- DGC LDP2 2017 - 2022; and
- Borderlands Inclusive Growth Deal.

11.5. ASSESSMENT METHODOLOGY

421. Renewable energy and green jobs have become central to economic policy. The assessment will take account of the relevant local and national policy objectives. The most relevant are expected to include:

- Scotland's National Performance Framework;
- Scotland's National Strategy for Economic Transformation; and
- local economic strategies, including Southern Scotland Enterprise.

422. The assessment of economic impacts associated with the construction and operations and maintenance of the proposed Development shall focus on Dumfries and Galloway, and Scotland.

423. The tourism review will focus in on the vicinity of the proposed Development. In line with similar assessments, it will consider a 15 km radius of the proposed Development.

424. The report on socio-economics and tourism will include the following sections:

- introduction, including scope of assessment and methodology;
- socio-economic policy context;
- baseline socio-economic context;
- socio-economic assessment;
- measures to maximise socio-economic benefits;
- tourism assessment; and
- summary of findings and conclusions.

11.6. PROPOSED MITIGATION

425. Proposed mitigation and enhancement measures will depend on the findings of the assessment and potential effects identified. These are likely to include, but not be limited to, supply chain engagement and development of opportunities for local businesses.

11.7. POTENTIAL IMPACTS

426. The impacts that will be considered in this assessment will include the potential socio-economic, tourism and recreation impacts associated with the proposed Development.

427. An economic impact analysis will be undertaken using the methodology developed by BiGGAR Economics; which has been used to assess over 140 onshore windfarms across the UK. The potential socio-economic impacts that will be considered are:

- temporary effects on the regional and/or national economy due to expenditure during the construction phase;
- permanent effects on the regional and/or national economy due to expenditure associated with the ongoing operation and maintenance of the proposed Development;
- permanent effects as a result of any additional public expenditure that could be supported by the additional tax revenue that would be generated by the development during the operational phase; and
- permanent effects on the local economy that could be supported by any community funding and/or shared ownership proposals during the operational phase of the development.

428. The link between onshore wind energy developments and the tourism sector has been a subject of debate. However, the most recent research has found no link between tourism employment, visitor numbers and onshore wind development.

429. In 2021 this study was updated, and research identified 16 windfarms with a capacity of at least 10 MW that became operational between 2015 and 2019. Analysis of trends in tourism employment in the locality of these windfarms (15 km radius) found that 11 of the 16 areas had experienced more growth in tourism employment than for Scotland as a whole. For 13 of the 16 windfarms, trends in tourism employment in the locality had outperformed the local authority in which they were based. This work reflected an update of previous work undertaken by BiGGAR Economics in 2017 that considered 28 windfarms constructed between 2009 and 2015 and the trends in tourism employment in the areas local to these developments. The analysis found that there was no relationship between the development of onshore windfarms and tourism employment at the level of the Scottish economy, at the local authority level nor in the areas immediately surrounding windfarm developments.

430. Nevertheless, the tourism sector is an important contributor to the Scottish economy, and particularly this area of Scotland, and so there is merit in considering whether the proposed Development will have any effect on the tourism sector. This assessment will consider the potential effects that the proposed Development could have on tourism attractions, routes, trail, and local accommodation providers. This will consider the implications of any effects identified for the tourism sector in Dumfries and Galloway, particularly those receptors within 15 km of the proposed Development.

11.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

431. Socio-economic and tourism assessments of onshore windfarms over the last decade and more have found no adverse effects assessed as significant in terms of the EIA Regulations and there is no reason to expect significant adverse effects for the proposed Development. It is therefore proposed to scope socio-economics and tourism out of the EIA Report and consider these impacts in a separate stand-alone report.

11.9. SCOPING QUESTIONS TO CONSULTEES

432. The following questions are directed to consultees;

- Do consultees agree that the socio-economics and tourism assessment should be scoped out of the EIA Report and considered in a stand alone report?

12. Aviation and Radar

12.1. INTRODUCTION

433. This section of the Scoping Report considers the potential effects of the construction and operation of the proposed Development on aviation and radar interests, including those of the United Kingdom (UK) Civil Aviation Authority (CAA), Ministry of Defence (MOD), NATS (comprising NATS (En Route) plc (NERL) and NATS (Services) Limited (NSL)), the Met Office, regional airports, local aerodromes, and other UK aviation stakeholders.

434. The potential effects that wind turbines can have on aviation interests include the following:

- Turbines can present a physical obstruction in the vicinity of aerodromes or other aviation activity sites such as military low flying areas;
- Turbines are an issue for civil and military aviation Primary Surveillance Radars (PSRs) as the characteristics of moving turbine blades are like that of aircraft. If spurious PSR returns or clutter are generated by turbines they can mask genuine aircraft returns, thereby affecting the safe provision of air traffic services (ATS);
- The effects of wind turbines on Secondary Surveillance Radar (SSR) are considerably less than effects on PSRs. Turbine towers can obstruct and diffract SSR signals, but these effects are typically only considered when turbines are within 10km of the facility. At greater ranges, SSR signals reflected from wind turbines can result in the radar generating a false target in a direction that is different to where the intended aircraft target is. Guidance on safeguarding distances varies with CAA recommending 10km and NATS recommending 28km(15nm).
- Turbines can cause adverse effects on the overall performance of Communication, Navigation and Surveillance (CNS) equipment.

12.2. STUDY AREA

435. In considering the spatial coverage of the aviation study area, the overriding factor is the potential for turbines to have an impact on civil and military PSRs, taking into account required radar operational ranges. In general, PSRs installed at civil and military airfields have an operational range of between 40 nautical miles (nm) and 60nm. All radar equipped airfields within 60nm (111 km) of the proposed Development are therefore included in the study area. En route radars operated by NERL and military Air Defence (AD) radars are required to provide coverage at ranges in excess of 60nm and so all such radars with potential Radar Line of Sight (RLoS) of the proposed Development turbines are also included in the study area.

436. Potential receptors considered within the study area are outlined below.

12.2.1. Civil Aerodromes

437. The CAA publication CAP 764 Policy and Guidelines on Wind Turbines (CAA 2016) states the distances from various types of aerodromes where consultation should take place. These distances include:

- Aerodromes with a surveillance radar – 30km;
- Licensed aerodromes where the wind turbines will lie within airspace coincidental with any published Instrument Flight Procedures (IFPs);
- Non-radar equipped licensed aerodromes with a runway of more than 1,100 m – 17km;
- Non-radar equipped licensed aerodromes with a runway of less than 1,100m – 5km;
- Non-radar equipped unlicensed aerodromes with a runway of more than 800m – 4km;

- Non-radar equipped unlicensed aerodromes with a runway of less than 800m – 3km;
- Gliding sites – 10km; and
- Other non-aerodrome aviation activity such as parachute sites and microlight sites - 3km.

438. CAP 764 advises that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. For example, aerodromes may utilise their radars at ranges considerably in excess of 30km.

439. As well as examining the technical impact of turbines on CNS facilities, it is also necessary to consider the physical safeguarding of Air Traffic Control (ATC) operations using the criteria laid down in the CAA publication CAP 168 Licensing of Aerodromes (CAA 2022) to determine whether wind turbines will breach obstacle clearance criteria.

12.2.2. MOD

440. MOD receptors under consideration within the study area include:

- MOD airfields, both radar and non-radar equipped;
- MOD AD radars; and
- Military aircraft engaged in low flying activities.

12.2.3. NERL Facilities

441. It is necessary to consider the possible effects of wind turbines upon NERL radar systems; a UK-wide network of PSR and SSR facilities which provides en route information for both civil and military aircraft.

12.2.4. Meteorological Radio Facilities

442. Wind turbines have the potential to adversely impact meteorological radio facilities such as weather radar. The Met Office must be consulted by developers of wind turbine proposals within a 20km radius zone of any of their UK weather radar sites.

12.3. BASELINE SURVEY

12.3.1. Airspace

443. The proposed Development lies within a volume of uncontrolled (class G) airspace which extends from ground level up to Flight Level (FL) 85 (standard atmospheric pressure equivalent of 8,500 feet (ft) above mean sea level (amsl). In uncontrolled airspace the responsibility to see and avoid other traffic and obstacles rests with the pilots in command of civilian and military aircraft and any ATS provided is essentially advisory.

444. Above the uncontrolled airspace is a portion of controlled (class A) airspace known as the Borders Control Area (CTA). Aircraft within class A airspace are under a Radar Control Service. Clearance from the controlling authority is required to enter the controlled airspace and control instructions are mandatory. It provides a 'known traffic environment' in which ATC is aware of all traffic operating within the designated airspace. This airspace, specifically Borders CTA 2, extends from FL85 up to FL195 (standard atmospheric pressure equivalent of 19,500ft amsl) and is controlled by Scottish Control (NERL) based at NATS Prestwick Centre. The airspace includes elements of IFPs associated with Prestwick, Glasgow, and Edinburgh airports, and lower ATS routes.

445. The published Area Minimum Altitude in the vicinity of the proposed Development is 4,000ft amsl. This provides a minimum obstacle clearance of 1,000ft above all obstacles within the specified area. With a maximum possible tip elevation of 1,800ft amsl, the minimum clearance would be maintained above the proposed turbines.

446. The proposed Development is located within military Low Flying Area 20T (Area 2B at night), predominantly within an MOD red high priority consultation zone, with a smaller area within a

blue low priority zone. This airspace is a Tactical Training Area within which military aircraft may conduct low flying training down to 100ft Minimum Separation Distance. Although wind turbines in red zones are likely to raise considerable and significant concerns from the MOD, these should be alleviated by the fitting of MOD accredited aviation safety lighting to the turbines in accordance with Air Navigation Order Article 222.

12.3.2. Aerodromes

447. The nearest radar equipped aerodromes to the proposed Development are Prestwick Airport, 64km to the northwest, Glasgow Airport, 85km to the north-northwest, and Edinburgh Airport, 80km to the north-northeast.

448. Initial modelling indicates that none of the proposed turbines would be in RLoS of the PSR facilities at these airports.

449. The nearest non-radar equipped licensed aerodrome to the proposed Development is Carlisle Airport, 58km to the southeast, while the nearest minor aerodrome identified is the private airstrip at Glenswinton, 29km to the southwest. The closest known glider airfield is at Falgunzeon, 27km south-southwest of the proposed Development.

450. MOD West Freugh is the closest military radar equipped airfield to the proposed Development, 90km to the west-southwest. Turbines within the proposed Development would not be in RLoS of the West Freugh PSR.

12.3.3. En Route Radars and Navigation Aids

451. The closest NERL operated radars to the proposed Development are the combined PSR/SSR facilities at Lowther Hill (16km north) and Great Dun Fell (93km southeast), and the PSR only facilities at Cumbernauld (81km north) and Kincardine (92km north).

452. The NATS online self-assessment map for 200m tip turbines suggests that at least eight of the proposed 13 turbines would be in RLoS of one or more of these facilities.

453. Initial modelling indicates that ten of the 13 proposed turbines would be in RLoS of Lowther Hill PSR, and two of the 13 proposed turbines would be in RLoS of Great Dun Fell PSR. The proposed turbines would not be in RLoS of Cumbernauld PSR or Kincardine PSR.

454. To protect their SSR facilities from the impact of windfarms, NATS establish a safeguarded zone of radius 28km (15nm) around them. All the proposed turbines would be within this range from Lowther Hill SSR.

455. The closest NERL en route navigation aid to the proposed Development is the Green Lowther Distance Measuring Equipment (DME) facility, 17km to the north. The NATS recommended safeguarded zone is a circle of 10km around the DME.

456. Royal Air Force Spadeadam is an Electronic Warfare Tactics facility approximately 67km east-southeast of the Proposed Development. Spadeadam Range is supported by a PSR at Deadwater Fell (65km east) and the Berry Hill PSR/SSR (69km east-southeast).

457. Initial modelling indicates that nine of the proposed turbines would be in RLoS of Deadwater Fell PSR, while none of the proposed turbines would be in RLoS of Berry Hill PSR/SSR.

458. The closest MOD AD radar is at Brizlee Wood, 118km east of the Proposed Development. Initial modelling indicates that the proposed turbines would not be in RLoS of Brizlee Wood PSR.

12.3.4. Met Office Weather Radars

459. The closest Met Office radars to the proposed Development are located at Holehead in Stirlingshire, 93km to the north-northwest, and at Munduff Hill in Perth and Kinross, 110km to the north-northeast.

12.4. GUIDANCE AND LEGISLATION

460. There are several documents which provide relevant guidance and legislation for assessing the impact of wind turbines on aviation.

- Onshore Wind Policy Statement (Scottish Government 2017);
- Onshore Wind Policy Statement Refresh 2021: Consultative Draft (Scottish Government 2021);
- Onshore Wind Policy Statement 2022 (Scottish Government 2022);
- CAP 032: UK Aeronautical Information Publication (AIP) (CAA 2023);
- CAP 168: Licensing of Aerodromes (CAA 2022);
- CAP 670: Air Traffic Services Safety Requirements (CAA 2019);
- CAP 738: Safeguarding of Aerodromes (CAA 2020);
- CAP 764: Policy and Guidelines on Wind Turbines (CAA 2016);
- Air Navigation Order 2016/765 (CAA 2022);
- Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level (CAA 2017);
- NATS wind farm self-assessment maps, available on the NATS website;
- UK Military AIP (MOD 2023); and
- MOD Obstruction Lighting Guidance (MOD 2020).

12.5. ASSESSMENT METHODOLOGY

461. The assessment will comply with the guidance documents listed in section 12.4 and comprise further desk-based studies, including RLoS modelling, that will identify and examine in greater detail sensitive aviation and radar receptors. These studies will be undertaken in parallel with consultation with relevant stakeholders to provide a detailed understanding of potential impacts. It is expected that consultation will be an iterative process, allowing for any concerns that are raised to be considered throughout the pre-application phase and in finalising the consent application.

12.6. CONSULTATION

462. It is proposed that consultation is undertaken with the following aviation stakeholders:

- NERL;
- MOD;
- Prestwick Airport;
- Glasgow Airport; and
- Edinburgh Airport.

12.7. RECEPTORS AND IMPACTS SCOPED IN AND OUT OF ASSESSMENT

463. The impact of PSRs is scoped into the assessment. Some turbines within the proposed Development would be in RLoS of the NERL PSR facilities at Lowther Hill and Great Dun Fell, and MOD Deadwater Fell PSR. All other PSR facilities within the study area are scoped out of the assessment.

464. The proposed Development would be within the NATS recommended safeguarded zone for Lowther Hill SSR, therefore impacts on this facility are scoped in. All other SSR and en route navigation aid facilities within the study area are scoped out of the assessment.

465. The proposed Development would be beyond the 20km consultation zone radius of any Met Office weather radar sites, therefore meteorological radio facilities are scoped out of the assessment.

466. The proposed Development would be within the lateral extents of several published IFP charts for Prestwick, Glasgow and Edinburgh airports. Potential impacts on these airports' operations are therefore scoped into the assessment. Impacts on other aerodromes are scoped out of the assessment.

467. The impact of the proposed turbines on military low flying is scoped into the assessment.

12.8. SCOPING QUESTIONS TO CONSULTEES

468. The following questions are directed to consultees:

- Do consultees agree that the scope of the proposed assessment is appropriate?

13. Forestry

13.1. INTRODUCTION

469. This section of the Scoping Report sets out the proposed approach to the assessment of potential effects on the forestry within the Site which would result from the construction and operation of the proposed Development.

470. In the UK there is a strong presumption against permanent deforestation unless it addresses other environmental concerns. In Scotland, such deforestation is dealt with under the Scottish Government's Control of Woodland Removal Policy (Forestry Commission Scotland, 2009). The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. It will be essential that the proposed Development addresses and satisfies the requirements of the Policy.

13.2. STUDY AREA

471. The Site is located within part of the Forest of Ae Composite Land Management Plan (LMP). The forestry study area will be restricted to the relevant management unit within the LMP.

13.3. BASELINE DESCRIPTION

472. As discussed above the proposed Development is located within the Forest of Ae which is owned by the Scottish Ministers on behalf of the Scottish nation and managed by Forestry and Land Scotland (FLS). The Forest of Ae is a long established commercial forest created over an extended period of time which is into the production phase with ongoing felling and replanting. The Forest of Ae Composite LMP incorporates the forest blocks of Kirkland, Old Forest Queensberry, and Stiddriggs. The principle objective of the plan is continued timber production and maintaining the principle species as Sitka spruce. In addition, there are areas identified as "treasured" throughout the forest and these are of higher importance for landscape, habitat, and biodiversity where timber production will be of lower importance. The current LMP expires in 2027. The operational Harestanes Windfarm is partly located within the forestry study area.

473. A desk-based assessment revealed there are no woodlands within the Site recorded in the Ancient Woodland Inventory Scotland (AWIS). The Native Woodland Survey of Scotland (NWSS) identifies areas of woodland which contain a mixture of native woodland and exotic conifers within the site.

474. The National Forest Inventory (NFI) identified the woodlands as coniferous with large areas of felled crops or young trees at the time of the inventory. A preliminary site survey identified that the semi-mature and mature crops within the study area had suffered significant wind blow damage from the storms over the winter of 2021/22.

475. A forestry baseline will be prepared which will detail the crops existing at the time of preparation of the EIA Report. This will include current species; planting year; felling and restocking plans contained within the existing LMP; and other relevant woodland information. It will be prepared from existing forest records; desk-based assessments; consultations with FLS; and further field surveys.

13.4. GUIDANCE AND LEGISLATION

476. The proposed Development forestry proposals will be prepared in accordance with current policies, guidance, and best practice, including, but not limited to:

- Forestry Commission (2017): The UK Forestry Standard: The Government's Approach to Sustainable Forestry, Forestry Commission, Edinburgh;
- Forestry Commission Scotland (2009): The Scottish Government's Policy on Control of Woodland Removal, Edinburgh;
- Forestry Commission Scotland (2013): The Native Woodland Survey of Scotland;
- Forestry Commission Scotland (2018) The National Forest Inventory Woodland Scotland;
- Forestry Commission Scotland (2019): Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal;
- SEPA (2017): SEPA Guidance Notes WST-G-027 "Management of Forestry Waste";
- SEPA (2014): LUPS-GU27 "Use of Trees Cleared to Facilitate Development of Afforested Land";
- The Scottish Government (2022): National Planning Framework 4: revised draft. Edinburgh;
- The Scottish Government (2018): The Forestry and Land Management (Scotland) Act 2018, Edinburgh;
- The Scottish Government (2019): Scotland's Forestry Strategy 2019 -2029, Edinburgh; and
- UKWAS (2018): The UK Woodland Assurance Standard 4th Edition, UKWAS, Edinburgh.

13.5. ASSESSMENT METHODOLOGY

477. A Development Forest Plan will be prepared. This will include a felling plan to show which crops would be felled, and when, for the construction and operation of the proposed Development. It will further include a restocking plan showing areas to be replanted or areas which are to be left unplanted for the proposed Development.

478. The desk based assessment will consider landowner crop databases; the NWSS; the NFI; aerial photography; Scottish Forestry (SF) publicly available databases; and current policy, legislation and guidance.

479. The field survey will consist of site walkovers to verify and update baseline data; assess the crops with respect to integration of the development infrastructure; and to identify any opportunities within the forests for onsite compensatory planting, if required.

480. A key issue will be the integration of the proposed Development into the existing and proposed forest structure to minimise the loss of woodland area and to ensure the landowners and the Applicant are able to meet their management objectives. Forest design and the effect of the proposed Development on it is an important part of the overall design process.

481. The changes to the forest structure will be analysed and described including changes to woodland composition, timber production, traffic movements, and the felling and restocking plans where relevant. The resulting changes to the forest structure will be assessed for compliance against the UK Forestry Standard (Forestry Commission, 2017) and the Scottish Government's Control of Woodland Removal Policy in line with the methodology outlined in the Control of Woodland Removal Policy Implementation Guidance (Forestry Commission Scotland, 2019).

13.6. POTENTIAL MITIGATION & ENHANCEMENT

482. Measures to avoid or mitigate potential effects upon the forest structure will, as far as practicable, sought to be embedded in the design of the proposed Development through consideration of the siting and scale of the proposed Development infrastructure; and by using existing access tracks and forest roads where possible. Woodland loss will be minimised by keyholing infrastructure into the felling and restocking plans.

483. Potential forms of mitigation and enhancement may include a redesign of the existing forest structures including, for example, changes to the felling programme; the use of designed open space; alternative species and woodland types; and the provision of compensation planting, on or off site.

13.7. POTENTIAL IMPACTS

484. Commercial forests are dynamic and constantly changing through, for example, landowner activities; market forces; natural events, such as windblow or pest and diseases; or developments. The forestry assessment will be a factual assessment describing the changes to the physical forest structure resulting from the incorporation of the proposed Development into the forests. Other chapters within the EIA Report will identify the sensitive receptors relevant to their disciplines and report on the effects of the proposed Development forestry proposals on these receptors (i.e. ecological habitats and protected species).

485. There is potential for changes to the forest structure resulting from the proposed Development, with consequential implications for the management plans across the remaining parts of the forests. It is anticipated areas of forestry will require to be felled for the construction of access tracks, wind turbine locations and other infrastructure, which may result in a loss of woodland area. Apart from the crops to be felled at the time of construction it is anticipated at this stage that no other proposed Development felling will be required during the operation and decommissioning phases, but this will be clarified within the EIA Report following the detailed design of the proposed Development. Ongoing forestry management, including any further felling and restocking, is expected to be the responsibility of the forest owners as part of their routine management, subject to approval from the appropriate regulatory authorities as required.

13.8. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

486. As detailed above, it is anticipated that there will be no impacts on the felling structure during operation and decommissioning, therefore these are scoped out of the EIA Report.

487. The changes to the forestry for a particular development are regarded as site specific and it is considered there are no cumulative on-site forestry issues to be addressed, therefore cumulative forestry impacts are scoped out of the EIA Report.

13.9. SCOPING QUESTIONS TO CONSULTEES

488. The following questions are directed to consultees:

- Are consultees content with the proposed methodology and scope for the forestry assessment? and
- Do the consultees have any information, particularly with reference to new guidance, which should be taken into account?

14. Shadow Flicker

14.1. INTRODUCTION

489. This section of the Scoping Report considers shadow flicker, an effect caused by the rotation of the turbine blades when the sun is shining, which can create a flickering or strobe like effect. It can be distracting and disturbing for people who are affected. Effects occur usually when the frequency of the flicker is less than 1.5 hertz (Hz).

14.2. GUIDANCE AND LEGISLATION

490. There are at present no formal guidelines available on what exposure would be acceptable in relation to shadow flicker and there is no standard for the assessment of shadow flicker. The specific advice sheet from Scottish Government, Onshore Wind Turbines, a web-based guide (Scottish Government, 2014) sets out the potential geographic area which may fall under assessment: "*Where this (shadow flicker) could be a problem, developers should provide calculations to quantify effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule ten rotor diameters), 'shadow flicker' should not be a problem*."

491. Published research by Department of Energy and Climate Change (DECC), Update of UK Shadow Flicker Evidence Base (DECC, 2011), evaluates the current international understanding of shadow flicker and confirms an acceptable study area for assessment is ten rotor diameters from each turbine and within 130 degrees either side of north.

14.3. STUDY AREA

492. The shadow flicker study area will consider all residential properties within ten rotor diameters and 130 degrees either side of north of the finalised turbine locations.

493. The rotor diameter of the proposed turbines is anticipated to be up to 162 m, therefore the potential shadow flicker study area would be up to 1,620 m for the final turbine locations.

14.4. BASELINE DESCRIPTION

494. A preliminary search area of eleven rotor diameters from each turbine of the Scoping layout has been utilised to identify potential receptors, presenting a worst case assessment and to take account of future design iterations. Based on a review of OS mapping and preliminary site visits, this has identified six properties with the potential to experience effects (see Figure 14.1).

495. Specific receptors will be confirmed once design freeze has been confirmed, i.e. when turbine locations are fixed and a candidate turbine rotor diameter has been defined. Potential for shadow flicker impacts will be assessed at all residential receptors within the final shadow flicker study area.

496. Potential cumulative impacts from other windfarms in the surrounding area on identified receptors will also be assessed.

14.5. ASSESSMENT METHODOLOGY AND POTENTIAL IMPACTS

497. The shadow flicker assessment will be undertaken using WindPRO computer modelling software and will be run for both a worst case scenario (accounting for 365 sunshine days per year and 100% turbine operation) and realistic scenario (using, where possible, measured meteorological data and 85% turbine operation) on the potential shadow flicker occurrence for a 1m x 1m ground floor window at each identified sensitive receptor location, assumed to be facing directly towards the proposed Development.

498. The sensitivity of the receptors will be considered to be high unless there are particular reasons for reduced sensitivity. A significant effect is defined as where a receptor is identified as experiencing either:

- greater than 30 hours of flicker a year or more than 30 minutes per day on the worst affected day (based on a worst-case scenario); and
- greater than 8 hours of flicker a year taking account of meteorological parameters.

499. The assessment will present clear findings on the estimated number of hours of shadow flicker impact anticipated for each receptor, for both scenarios.

14.6. POTENTIAL MITIGATION

500. The results of the assessment will be reported in the EIA Chapter and will also consider any potential mitigation options if required, which may include implementation of a shadow flicker protocol.

14.7. RECEPTORS AND IMPACTS SCOPED IN AND OUT OF ASSESSMENT

501. It is proposed that an assessment on the potential effects of shadow flicker at the operational stage of the Proposed Development is scoped into the EIA Report. As shadow flicker impacts only occur when turbine blades are turning, there is no potential for shadow flicker to occur during construction and decommissioning, therefore impacts during these phases are scoped out of the EIA.

14.8. SCOPING QUESTIONS TO CONSULTEES

502. The following questions are directed to consultees:

- Do consultees agree with the study area outlined above?
- Do consultees agree to the above methodology to identify significant effects?

15. Telecommunications

15.1. INTRODUCTION

503. This section of the Scoping Report considers the potential effects of the proposed Development on fixed telecommunications links and television reception.

504. Wind turbines can adversely impact the operation of telecommunication links and television transmitters if located within the path of the transmitters and their associated receivers.

15.2. STUDY AREA

505. The telecommunications study area will consider identified links within 2 km of the Site.

15.3. BASELINE DESCRIPTION

15.3.1. Telecommunications

506. Review of Ofcom's online database and a detailed desk study has identified three fixed telecommunications links within the 2 km study area. These cross the Site from the existing mast to the west, with one heading in an easterly direction and the other two in a south-easterly direction. Design work to date has taken the location of these links into consideration and applied appropriate separation distances in discussion with the relevant operators.

15.3.2. Television

507. The closest television transmitter mast is located approximately 9.5 km to the west at Nithsdale.

15.4. ASSESSMENT METHODOLOGY AND POTENTIAL IMPACTS

15.4.1. Telecommunications

508. Fixed links passing through the study area will be mapped and their separation distances from turbines modelled. Initial consultation in October 2022 with operators - Airwave, Atkins, Arqiva, BT, the Joint Radio Company (JRC), MBNL, Virgin Media/OS, and Vodafone - has been undertaken based on indicative turbine locations. Seven of these operators have confirmed no objection to the proposed Development to date, the final operator's response is pending.

509. Any potential effects on telecommunications links will be sought through further formal consultation with the relevant link operators. Where possible and applicable, the turbines will be designed to take into account the minimum separation distance from identified communication link(s). An assessment will be made as to the significance of potential operational effects and where appropriate, suitable mitigation measures will be discussed with operators.

15.4.2. Television

510. The closest television transmitter is over 5 km from the Site. Television transmitters in the area have switched to digital transmission only. Currently there is no widely accepted method of determining the potential effects of wind turbines on digital television reception, however digital television signals are better at coping with signal reflections, and do not suffer from ghosting that may occur with analogue signals.

511. To date there are very few cases of wind turbine interference with digital television reception post-digital switchover. Given the strength of the digital signal in the area and the inherently

resilient nature of digital television reception, there is considered to be a low risk of any interference from a wind energy development at this location on domestic television reception.

512. Due to the low risk of interference with television reception, the requirement to address any reception issues once the proposed Development is operational could be conditioned in any consent granted. For the above reasons, it is not proposed to carry out a detailed assessment of potential effects on television reception.

15.5. PROPOSED MITIGATION

513. Effects on fixed telecommunications links may be mitigated by ensuring that turbines are located outside the identified separation buffers, which will be agreed in direct dialogue with relevant stakeholders.

15.6. RECEPTORS AND IMPACTS SCOPED IN OR OUT OF ASSESSMENT

514. An assessment of the potential effects of the proposed Development on telecommunications during the operational phase is scoped into the EIA. As the only impacts during construction and decommissioning would be from the presence of turbines as they are erected, these potential impacts are no worse than those experienced during operation, therefore a detailed assessment of construction and decommissioning impacts is scoped out of the EIA.

515. Due to the low risk of interference with television reception, the potential impacts of the proposed Development on television is scoped out of the EIA.

15.7. SCOPING QUESTIONS TO CONSULTEES

516. The following question is directed to consultees:

- Do consultees agree that the scope of the proposed assessment is appropriate?

16. Carbon Calculator

16.1. INTRODUCTION

517. This section of the Scoping Report sets out the proposed approach to the assessment of potential effects of the proposed Development on carbon balance as a result of the construction, operation, and decommissioning of the Proposed Development. Calculation of the carbon footprint will be based on best practice guidelines including the Scottish Government Carbon Calculator Tool (Scottish Government, 2022).

16.2. PROPOSED SCOPE OF ASSESSMENT

518. A windfarm has the potential to displace electricity generated from fossil fuels during its operational lifespan and consequently prevent carbon dioxide (CO_2) from being released. The EIA will provide an estimate of the potential amount of CO_2 savings that can be made, based on assessing the electricity generation mix that the proposed Development is displacing at any given time and the carbon released due to the construction of the proposed Development.

16.3. ASSESSMENT METHDOLOGY

519. In addition to carbon impacts associated with the manufacture, transport and construction of a windfarm, a windfarm constructed on peatland habitat and/or within forestry also has the potential to generate CO_2 emissions as a result of the degradation of peat and felling of woodland. The current best practice guidance available on the Scottish Government website (Scottish Government, 2022) provides a method to calculate carbon emission savings associated with windfarm developments on Scottish peatlands based on a full life cycle analysis approach, using a web-based application.

520. The tool was originally published in 2008 and the latest version (v1.7.0) published in November 2022. The tool compares the carbon costs of windfarm developments with the carbon emissions savings attributable to the windfarm. The calculation is summarised as the length of the time (in years) it will take the carbon savings to amount to the carbon costs also referred as the “payback period”. An assessment of effect of significance will not be undertaken but the volumes of CO_2 savings and emissions will be provided in the EIA report.

16.4. POTENTIAL MITIGATION

521. During the design process, the turbines will be sited to avoid identified areas of deep peat as far as possible and measures to minimise peat disturbance, especially during excavation, will be taken into consideration. Best practice measures will also be considered to minimise peat disturbance during construction and decommissioning and will be provided as a part of the CEMP. The proposed Development will incorporate suitable drainage design to minimise the potential for hydrogeological impacts that could result in dewatering of peat.

522. The design process will also take into account the existing forestry across the Site, and will incorporate the proposed Development into the forestry management plan, to minimise forestry felling and to account for associated compensatory planting as required.

523. These measures will be accounted for as appropriate within the Carbon Calculator.

16.5. SCOPING QUESTIONS TO CONSULTEES

524. The following question is directed to consultees:

- Do consultees agree with the above methodology for assessing carbon emissions and savings as a result of the proposed Development?

17. Other Issues

17.1. WASTE STRATEGY

525. A Site-specific CEMP will document the approach to waste management. A borrow pit management and peat management plan (if required) will document measures to manage Site-won resource and any excavated peat. A forestry assessment will consider the forest felling and restock requirements associated with the construction of the proposed Development. It is therefore proposed that an assessment of waste strategy is scoped out of the EIA.

17.2. AIR QUALITY

526. The air quality of the Site is expected to be good due to the rural location, with few pollution sources.

527. During the construction of the windfarm, the movement of vehicles and the on-site plant would generate exhaust emissions. Given the short-term nature of the construction period and the limited area to be developed, effects on air quality are likely to be negligible.

528. Construction activities have the potential to generate dust during dry spells, which may adversely affect local air quality. Given the scale and nature of construction activities and given the distance between construction areas and the nearest residential properties, it is considered that dust from construction is unlikely to cause a nuisance.

529. An operational windfarm produces no notable atmospheric emissions. The operation of the windfarm would therefore have no discernible adverse effects on local or national air quality.

530. Relevant mitigation measures for air quality, dust and pollution control will be captured within the site-specific CEMP.

531. It is therefore proposed that an assessment of air quality is scoped out of the EIA.

17.3. RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

532. Given the nature of the proposed Development, and its remote location, the risk of a major accident or disaster is considered to be extremely low. The Principal Designer will ensure a Design Risk Assessment process is followed during the design phase to ensure designers fully assess risks and mitigate to a level deemed as low as reasonably practicable during the design stage as part of the requirements of the Construction (Design and Management) Regulations (2015). If required, a PLHRA will be undertaken as part of the EIA Report.

533. During the operational phase of the proposed Development, routine maintenance inspections will be completed in order to ensure the safe and compliant operation of all built infrastructure.

534. It is therefore proposed that an assessment of the risk of major accidents and/or disasters is scoped out of the EIA.

17.4. POPULATION AND HUMAN HEALTH

535. There are no residential properties within the Site. The closest settlement is the village of Ae approximately 1.3 km to the south. The renewable onshore wind sector is regulated by the Health & Safety Executive (HSE) and the Applicant has robust Health & Safety protocols and procedures

in place to ensure that during the construction and operation of developments, all personnel and members of the public are protected.

536. Effects on population and human health will be assessed in relation to landscape and visual impacts, noise, shadow flicker, and impacts on private water supplies, under the respective technical studies detailed above. Mitigation measures to ensure human safety will be implemented through the CEMP. It is therefore proposed that an assessment of population and human health is scoped out of the EIA.

17.5. ESKDALEMUIR SEISMIC ARRAY

537. The proposed Development is within the 50 km MOD consultation zone for the Eskdalemuir Seismic Monitoring Array, the turbines being approximately 30 km from the centre of the Array. At present, the MOD has allocated all extant seismic ground vibration for the Array and can be expected to object to the proposed Development on Eskdalemuir safeguarding grounds. However, work is ongoing under the auspices of the Scottish Government to review the safeguarding algorithm under which seismic budget is allocated, investigating the opportunity to extend the "no build" zone form 10 km to 15 km and to determine if new turbines are more seismically quiet than older turbines. An update on this will be provided in the EIA and impacts considered as required.

17.6. SCOPING QUESTIONS TO CONSULTEES

538. The following questions are directed to consultees:

- Do consultees agree that it is appropriate to scope out waste strategy from the EIA?
- Do consultees agree that it is appropriate to scope out air quality from the EIA?
- Do consultees agree that it is appropriate to scope out major accidents and disasters from the EIA?
- Do consultees agree that it is appropriate to scope out population and human health from the EIA?

18. Summary

539. This EIA Scoping Report outlines the proposed technical and environmental assessment that will be included within the EIA Report for the proposed Development. The proposed scope and methodologies for each assessment have been provided and the guidance to be followed set out. Should any further information be required in order that a full EIA Scoping Opinion can be provided we would be happy to provide further information and/or discuss any further requirements.

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Figures

Appendix A – Relevant Consultees

COMPETENT AUTHORITY

- Scottish Government Energy Consents Unit (ECU)

STATUTORY CONSULTEES

- Planning Authority – Dumfries & Galloway Council
- Historic Environment Scotland (HES)
- NatureScot
- Scottish Environment Protection Agency (SEPA)

NON-STATUTORY CONSULTEES

- Association of Salmon Fisheries Boards
- BAA Edinburgh Airport
- BAA Glasgow Airport
- British Horse Society
- BT
- Civil Aviation Authority
- Crown Estate Scotland
- Defence Infrastructure Organisation
- Fisheries Trust Scotland
- Glasgow Prestwick Airport
- John Muir Trust
- Joint Radio Company
- Marine Scotland Science
- Mountaineering Council of Scotland
- NATS Safeguarding
- Nuclear Safety Directorate
- RSPB Scotland
- Scottish Forestry
- Scottish Rights of Ways and Access Society (ScotWays)
- Scottish Water
- Scottish Wildlife Trust
- Transport Scotland
- Visit Scotland

COMMUNITY COUNCILS

- Ae Community Council
- Aulgirth and District Community Council
- Closeburn Community Council
- Keir Community Council
- Kirkmahoe Community Council
- Kirkmichael Community Council
- Lochmaben and District Community Council
- Tinwald Parish Community Counci