Kinnelhead Wind Farm

Scoping Report

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1 Introduction

1.1 Background and Context

1.1.1 RES ('the Applicant') is working towards an application for Kinnelhead Wind Farm ('proposed development'), located approximately 6km southwest of Moffat, Dumfries & Galloway. The application would be made to Scottish Ministers via the Scottish Government Energy Consents Unit (ECU) under Section 36 of the Electricity Act 1989. The application would be supported by an Environmental Impact Assessment Report (EIA Report) as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended (the EIA Regulations).

1.1.2 The total capacity of the proposed development is proposed to be over 50MW, comprising wind turbines with a blade tip height of up to 250m and a Battery Energy Storage System (BESS).

1.1.3 This document forms the Scoping Report submitted to ECU in order to request a Scoping Opinion from the Scottish Ministers, with feedback from consultees, as to the scope of the EIA of the proposed development.

1.2 The Applicant

1.2.1 RES is the world's largest independent renewable energy company, working across 24 countries and active in wind, solar, energy storage, green hydrogen, transmission, and distribution. An industry innovator for over 40 years, RES has delivered more than 27 GW of renewable energy projects across the globe and plans to bring more than 26 GW of new capacity online in the next five years.

1.2.2 From its Glasgow office, RES has been developing, constructing and operating wind farms in Scotland since 1993. Across Scotland, RES has developed and/or built 22 wind farms in Scotland with a total generation capacity of 670MW, including the Solwaybank Wind Farm near Langholm, constructed in 2020. RES also manages 766MW worth of wind farm generated electricity across Scotland, including the neighbouring 10-turbine Minnygap Wind Farm, on behalf of its owner, UK Renewable Energy Group (UKREG).

2 Environmental Impact Assessment (EIA)

2.1 EIA

2.1.1 The EIA Regulations require that before consent is granted for certain types of development, an EIA must be undertaken. The 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).

2.1.2 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, in support of a Section 36 application to the Scottish Ministers.

2.1.3 EIA is an iterative process which identifies the potential environmental effects that in turn inform the eventual design of the 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, operation and decommissioning phases. Consultation is an important part of the EIA process and assists in the identification of potential effects and mitigation measures.

2.2 Purpose of EIA Scoping

2.2.1 The EIA Regulations provides for potential applicants to ask Scottish Ministers to state in writing the information that should be provided within the EIA Report. The 'Scoping Opinion' is to be offered following discussion with the consultation bodies.

2.2.2 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.

2.2.3 This Scoping Report:

- describes the existing site and its context;
- establishes the format of the EIA Report;
- provides baseline information; and
- describes key issues and the proposed assessment methodologies for various technical assessments to be covered in the EIA Report.

2.2.4 In addition, each technical Section concludes by listing the key questions we would like the Scoping Opinion to answer.

2.2.5 This Scoping Report will be issued to the Scottish Ministers via the ECU, who will seek opinions from a range of statutory and non-statutory consultees. Where requested, the report can be made available to other interested parties.

2.3 The EIA Report

2.3.1 The structure of the EIA Report will follow the requirements of EIA (Scotland) Regulations 2017 and other relevant good practice guidance. Essentially, the EIA Report is likely to comprise the following volumes:

- Volume 1 – Non-Technical Summary;
- Volume 2 – Written Statement;
- Volume 3 – Landscape and Visual Impact Assessment (LVIA) GIS Figures;
- Volume 4 – LVIA and Cultural Heritage Visualisations;
- Volume 5 – Technical Appendices; and
- Volume 6 – Confidential Annex (if required).

2.3.2 Each technical chapter within Volume 2 will include, as a minimum, the following sections:

- Baseline
- Assessment of Potential Effects
- Mitigation
- Assessment of Residual Effects
- Assessment of Cumulative Effects
- Summary

2.4 EIA Report Format

2.4.1 The EIA Report will be made available online, on USB flash drive and hard copy where required although in the interest of sustainability we would encourage take up of the online format.

3 The Proposed Development

3.1 Introduction

3.1.1 This section describes the proposed development and provides information on its location, physical characteristics, proposed components and design. The wind turbine and infrastructure layout will be subject to an iterative design process as part of the EIA.

3.1.2 The proposed development is located on land, in the area of **Dumfries & Galloway Council**.

3.1.3 The principal components of the proposed development as scoped include:

- up to 26 three-bladed horizontal axis wind turbines of up to 250m tip height. The wind turbines would be nominally rated at approximately 6.6MW;
- at each wind turbine, associated low to medium voltage transformers and related switchgear;
- wind turbine foundations;
- hardstand areas for erection cranes at each wind turbine location;
- a network of on-site tracks including an access track and site entrance from the public road network;
- borrow pits (dependent on availability of stone within the site);
- a substation compound containing electrical infrastructure, control building, welfare facilities and a communications mast;
- a Battery Energy Storage System (BESS) compound;
- a network of buried electrical and communication cables; and
- temporary construction compounds.

3.2 Site Description

3.2.1 The proposed development is primarily comprised of upland moorland grazing with some existing forestry to the northeast of the site. The site is located adjacent to the north of the operational Minnygap Wind Farm and Harestanes Wind Farm.

3.2.2 The site is approximately 6 km to the southwest of Moffat, as shown on Figure 1.1: Site Location & Preliminary Layout. **Figure 1.1 also provides a table of turbine co-ordinates and in the key are indicative turbine dimensions**.

3.2.3 The site is centred on Ordnance Survey grid ref (299211,601149) and covers an area of approximately 1,470 hectares.

3.3 Site Design

3.3.1 Access to the site is expected to be taken from the A701 via the existing forestry track which already serves Minnygap Wind Farm and is proposed for Daer Wind Farm and Rivox Wind Farm. A new spur of track is planned to be built from this forestry track to take access in to the wind farm site itself. The spur is through a break in the existing forestry which will limit felling requirements.

3.3.2 The provisional layout that is being scoped is based on initial constraints obtained through desk based studies and on site surveys, see Figure 1.2: Layout Constraints Drawing. Further survey work and assessment of the design will be undertaken to further refine the layout.

3.4 Cumulative Development

3.4.1 Schedule 4, regulation 5 of the EIA Regulations details the information for inclusion in EIA Reports. Schedule 4, regulation 5 (e) states the following with respect to cumulative effects:

"*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*".

3.4.2 Other wind farm projects within 20km of the site are listed in Table 3.1. Each EIA Chapter will assess the relevant projects from Table 3.1 within the respective cumulative assessments.

Table 3.1 Wind farms within 20km

Site Name	Status	No. of turbines	Tip height (m)
Harestanes	Operational	68	115/125
Minnygap	Operational	10	125
Clyde	Operational	152	125
Clyde Extension	Operational	54	125.5/ 142
Dalswinton	Operational	15	121
Whitelaw Brae	Operational	14	133.5
Twentyshilling	Operational	9	140
Daer	In planning	17	180
Rivox	In planning	29	200/230
Harestanes South	In planning	8	200
Harestanes West	In planning	12	200/220
Scoop Hill	In planning	60	180/200/225/250

3.5 Electrical Layout and Grid Connection

3.5.1 Wind turbines will be electrically connected to each other via inter-array cable circuits. A substation, which would house transformer(s) and associated switchgear, would convert the electricity generated by the wind turbines onto an appropriate voltage for onward transmission onto the National Grid.

3.6 Construction Phase

3.6.1 It is anticipated that the construction phase of the proposed development would be completed over a period of approximately 18-24 months.

3.6.2 Temporary compound(s) would be required during construction. The temporary compound(s) would include site cabins and welfare facilities for construction workers and could also be used as a laydown area for the delivery of some materials.

3.6.3 Stone required to construct any new access tracks could potentially be obtained from on-site borrow pits. The exact location of borrow pits would be dependent upon site surveys, availability of suitable material and proximity to where it is required. Should a suitable borrow pit search area not be identified within the site, the applicant will need to make provision for the import of aggregate from a suitable off-site source.

3.6.4 All statutory legislation and other best practice guidance would be fully complied with during construction.

3.6.5 Construction mitigation and environmental protection measures would be implemented via a Construction Environmental Management Plan (CEMP).

3.7 Operational Phase

3.7.1 The assessments undertaken to inform the EIA will consider the operational phase of the proposed development in perpetuity.

3.7.2 Routine operational and maintenance work would be carried out as necessary.

3.8 Decommissioning Phase

3.8.1 When decommissioning is required, it is considered that the impacts would be less than the impacts experienced during the construction phase. Therefore it is proposed that **such effects are scoped out of EIA**.

4 Landscape and Visual

4.1 Introduction

4.1.1 It is acknowledged from the outset that, in common with almost all commercial-scale wind and energy developments, some landscape and visual effects would occur as a result of the proposals, including potentially some significant effects.

4.1.2 A key principle of the European Landscape Convention is that all landscapes matter and should be managed appropriately. It is also acknowledged that landscapes provide the surroundings for people's daily lives and often contribute positively to the quality of life and economic performance of an area.

4.1.3 It is therefore proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken as part of the EIA and an LVIA Chapter be included in the EIA Report. The LVIA will be undertaken by Chartered Landscape Architects, who are experienced in the assessment of large scale, onshore wind and solar energy projects and are fully familiar with the landscape in and around this part of Dumfries and Galloway, having previously delivered the LVIAs for other nearby projects.

4.1.4 It is proposed that the LVIA will consider the potential effects of the Proposed Development upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

4.2 Baseline Conditions

4.2.1 The Proposed Development site is located towards the north of Dumfries and Galloway, adjacent to the boundary with South Lanarkshire, on an area of plateau moorland. The Proposed Development is located approximately 6km to the southwest of Moffat.

Landscape Character

4.2.2 In March 2019, NatureScot published an updated set of Landscape Character Type boundaries and descriptions, which includes mapping and descriptions which supersede earlier documents. The western part of the Proposed Development is located within the 'Southern Uplands - Dumfries & Galloway' Landscape Character Type (LCT 177), with the eastern part of the site located within the 'Foothills with Forest - Dumfries & Galloway' (LCT176).

4.2.3 The key characteristics of LCT 177 are defined as:

- *"Large, smooth dome/conical shaped hills, predominantly grass-covered.*
- *Open and exposed character except within incised valleys.*
- *Dramatically sculpted landforms and awe-inspiring scale.*
- *Distinctive dark brown/purple colour of heather on some of the higher areas.*
- *Pockets of woodland in incised valleys.*
- *Stone dykes occasionally define the lower limit.*
- *Legacy of lead and other mining activity, with extensive archaeological remains around the former mining village of Wanlockhead.*

- *Wind farms locally characteristic, away from the more dramatic, scenic and sculptural slopes and skylines".*

4.2.4 The key characteristics of LCT 176 are defined as:

- *"Dark green blanket of forest covering undulating foothills.*
- *Changing landscape with areas with large and medium scale forestry operations and wind farm development.*
- *Forested areas dominated by Sitka Spruce, interspersed with mixed conifers and broadleaf planting, undergoing felling and replanting in large coupes.*
- *Tall mature conifers at roadside.*
- *Areas of more complex, locally distinctive and smaller-scale landscapes, with semi-improved pasture with walled enclosures on open ground, occasional lochs and estate policies, distinctive ridges and landmark summits.*
- *Areas of relict landscape with remains of pre-improvement settlement and agriculture clustered in burn valleys.*
- *Wind farms, locally defining the character in some areas of central Dumfries and Galloway".*

4.2.5 In introducing the updated National Landscape Character Assessment, NatureScot set out that where there are 'topic specific landscape capacity or sensitivity studies, they would take precedence for informing that development type'.

4.2.6 The Dumfries and Galloway Wind Farm Landscape Capacity Study 2020 considers the landscape and visual sensitivity of the identified landscape character types in Dumfries and Galloway to wind energy development, including with reference to larger scale wind energy developments. Therefore, it is proposed to focus the assessment of effects on landscape character on this study and not the national level assessment.

4.2.7 The site lies partly within LCT 18(a) Foothills with Forest, specifically the Ae unit, and partly within LCT 19 Southern Uplands, specifically the Lowthers unit. The LVIA will include an assessment of the sensitivity of the character of the LCTs within the Study Area, before going on to provide an assessment of the potential for the proposed development to result in significant effects on the character of each.

Landscape Designations

4.2.8 The Proposed Development is not located within or close to any nationally designated landscapes. The western part of the Site lies within the Thornhill Uplands Regional Scenic Area (RSA). The Moffat Hills RSA also lies just over 5km to the north-east of the Site.

4.2.9 There are a number of Gardens and Designed Landscapes in the wider landscape surrounding the site, but none within 5 km and only two within 10 km, Raehills and Drumlanrig Castle.

4.2.10 Landscape designations in the vicinity of the site are illustrated at **Figure 4.4.**

Wild Land

4.2.11 Wild Land Areas (WLAs) are mapped and described by NatureScot. The nearest WLA to the Proposed Development is Talla-Hart Fell, WLA 01, located approximately 12.5 km north-east of the site.

4.2.12 Given the distance between the Proposed Development and the WLA, it is considered that the Proposed Development would have limited potential to result in notable effects on the key attributes and qualities of the WLA.

4.2.13 The matter of wind energy and Wild Land is addressed in Policy 4 of the National Planning Framework 4 which states that 'Buffer zones around wild land will not be applied, and effects of development outwith wild land areas will not be a significant consideration'.

4.2.14 As such it is proposed to scope out effects on wild land from the LVIA chapter.

Relevant Guidance and Legislation

4.2.15 The LVIA will be undertaken in accordance with the principles of best practice, as outlined in published guidance documents, notably the third edition of the *Guidelines for Landscape and Visual Assessment* (GLVIA3), (Landscape Institute and the Institute for Environmental Management and Assessment, 2013).

4.2.16 The methodology and assessment criteria proposed for the assessment has been developed in accordance with the principles established in this best practice document. It should be acknowledged that GLVIA3 establishes guidelines, not a specific methodology. The preface to GLVIA3 states:

"This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand."

4.2.17 The approach has therefore been developed specifically for this assessment to ensure that the methodology is fit for purpose.

4.2.18 As part of the development of the proposed methodology, consideration has also been given to the following documents:

- Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments (NatureScot, March 2021);
- Siting and Design of Wind farms in the Landscape, Version 3a (SNH, August 2017);
- Visual Representation of Wind farms – Version 2.2 (SNH, February 2017);
- Landscape Institute (LI) Technical Guidance Note 06/19 Visual representation of development proposals (Landscape Institute, September 2017);
- LI Technical Guidance Note 02/19 Residential Visual Amenity Assessment (RVAA), (Landscape Institute, March 2019); and
- Guidance on Aviation Lighting Impact Assessment (NatureScot 2024).

4.3 Proposed Scope of Assessment

4.3.1 It is proposed that the main objectives of the LVIA will be as follows:

- to identify, evaluate and describe the current landscape character of the site and its surroundings, and also any notable individual or groups of landscape features within the site
- to determine the sensitivity of the landscape to the type of development proposed

- to identify potential visual receptors (i.e. people that would be able to see the Proposed Development) and evaluate their sensitivity to the type of changes proposed
- to identify and describe any impacts of the Proposed Development in so far as they affect the landscape and/or views of it and evaluate the magnitude of change due to these impacts
- to identify and describe any mitigation measures (including mitigation which is inherent in the design and layout of the Proposed Development) that have been adopted to avoid, reduce and compensate for landscape and visual effects
- to identify and assess any cumulative landscape and visual effects
- to evaluate the level of residual landscape and visual effects; and
- to make a professional judgement about which effects, if any, are significant

Distinction between Landscape and Visual Effects

4.3.2 In accordance with the published guidance, landscape and visual effects shall be assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the Development on the physical and perceptual characteristics of the landscape and its resulting character and quality; and
- Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally

Study Areas

4.3.3 In order to assist with defining the study area, a digital Zone of Theoretical Visibility (ZTV) model has been produced as a starting point to illustrate the geographical area within which views of the different components of the development on the site are theoretically possible. This was based on a 'bare-earth' scenario, whereby the screening effect of areas of existing vegetation or built features in the landscape are not taken into account. The ZTV was modelled both to blade tip height using the currently proposed maximum turbine height of 250 m, and to hub height using the currently assumed height of 165 m, and both are presented at **Figures 4.1- 4.3**.

4.3.4 The ZTVs are a useful tool used to provide a focus on the area and receptors that are most likely to be affected by a Proposed Development but should always be subject to verification in the field. In this regard, site visits shall always form the primary basis in understanding the actual likely visibility of development at the site.

4.3.5 Having reviewed the ZTVs and with regard to best practice guidance, it is proposed that the LVIA will consider an initial 35 km radius study area. Detailed assessment will then be provided for a 20 km section of this study area, which it is considered represents a proportionate extent of the study area and the limit within which any potential significant effects might occur.

4.3.6 For the cumulative assessment, consideration was initially given to a 60 km radius from the site, as recommended by NatureScot best practice guidance. Following this review, it is proposed that a 20 km detailed study area be adopted to consider cumulative effects, which is considered represents a proportionate extent of the study area and the limit within which any potential significant cumulative effects might occur.

Visual Receptors

4.3.7 A detailed consideration of the potential for effects to the visual amenity of receptors in the landscape surrounding the site will be set out in the LVIA. This visual assessment will be informed by a selection of representative assessment viewpoints, which are listed below, each of which will be illustrated with daytime visualisations prepared in line with NatureScot best practice guidance.

4.3.8 The LVIA will focus on the potential effects of the Proposed Development on different receptor groups, including settlements, footpath users, recognised tourist routes, long distance walking routes, cycle routes and centres for tourism.

4.3.9 It is also proposed to carry out a separate Residential Visual Amenity Assessment (RVAA) covering any properties located within 2 km of a proposed turbine. Properties lying within a 2 km radius of the design freeze layout will be identified and the list further refined by reference to both the bare earth zone of theoretical visibility consideration of any localised screening provided by woodland and other buildings.

4.3.10 This additional assessment will be presented in an appendix to the LVIA Chapter and would complement the assessment of visual receptors within the LVIA, providing further detail in relation to the effect on the views and amenity from different parts of each property and its curtilage.

Proposed LVIA Viewpoint Locations

4.3.11 It is proposed that the 13 locations set out in **Table 4.1** are included as viewpoints in the LVIA. The locations which are illustrated on **Figures 4.1-4.4** represent visual receptors and character types at a range of distances and directions from the site.

Table 4.1 Proposed LVIA Viewpoints

Viewpoint Number	Location	OS Grid Reference
1	Moffat, Old Carlisle Street	309141, 605006
2	Oakriggside	309424, 602486
3	Crooked Road	305988, 601949
4	Annandale Way, Weatherlaw Knowe	306333, 600204
5	Hart Fell	311363, 613575
6	Southern Upland Way, Daer Reservoir	297374, 608655
7	Rodger Law	294540, 605799
8	Wedder Law	293873, 602514
9	Auchenleck Hill	292028, 598972
10	Lowther Hill	289048, 610716
11	Queensbury	298907, 599750
12	A701, near Raehills	307121, 594478
13	Cocklet Hill	296371, 588248

4.3.12 The proposed viewpoint locations are located at a range of distances and directions from the Proposed Development, are at varying elevations and cover a variety of different character areas and types. Some of the viewpoints are intended to be representative of the visual experience in a general location whereas other viewpoints illustrate the view from a specific or important vantage point.

4.3.13 Each of the representative viewpoints will be visited to evaluate the sensitivity of views. In addition, the study area will also be extensively visited to consider the visibility of the Proposed Development as receptors move through the landscape.

4.3.14 The viewpoints will be used as the basis for determining the effects on visual receptors within the Study Area. The level of effect experienced by different visual receptor groups will be determined by considering in tandem the sensitivity and view with the magnitude of impact.

Visualisations

4.3.15 For each of the above viewpoints, daytime visualisations will be prepared in line with the *Visual Representation of Wind farms – Version 2.2* (SNH, February 2017).

4.3.16 A digital model will be generated to enable the production of wirelines of the Proposed Development from locations throughout the study area to help identify the scale, arrangement and visibility of the proposed turbines. These images will be reviewed on site to assess how natural and built screening would affect visibility of the Proposed Development.

4.3.17 Each of the wireframe models for the viewpoints within 20 km of the site will then be developed further into photomontages to help illustrate the predicted impact of the Proposed Development.

4.3.18 In addition to the proposed wind turbines, the other project components (e.g. access tracks) will be shown in photomontages for viewpoints within 5 km when they would be visible. Beyond 5 km it is considered unlikely that the ancillary elements would form more than a limited element of the entire Proposed Development when compared to the turbines.

Assessment of Turbine Lighting

4.3.19 The Proposed Development will incorporate turbines greater than 150 m, which under Civil Aviation Authority (CAA) Regulations will require to be lit with visible aviation lighting.

4.3.20 It is recognised that in some circumstances, it may be possible for turbine lighting to result in a significant effect on the character of the surrounding landscape. For example, if the proposed wind energy development is located within or in close proximity to a designated dark sky area, or is remote from existing sources of visible lighting, such as residential areas, commercial or industrial sites, or major roads.

4.3.21 For wind energy developments which are not located in such areas, it is considered that there would be no potential for significant effects on landscape character to arise from visible turbine lighting of the type proposed. This is because in these areas the character of the landscape during low natural light levels is already in part characterised by the presence of artificial lighting. Therefore, the addition of visible turbine lighting would not have the potential to bring about a fundamental change to the characteristics of the landscape.

4.3.22 The surrounding landscape context around the Proposed Development contains some existing sources of artificial light, particularly within surrounding settlements, industrial developments

and along highways, and when considering surrounding wind farms already consented with visible aviation lighting. Therefore, the assessment of turbine lighting will focus solely on the additional visual effects introduced by the lights.

4.3.23 In accordance with "*Guidance on Aviation Lighting Impact Assessment*" (NatureScot 2024), the LVIA will assess the additional visual effects of the aviation lighting in the main body of the LVIA chapter. The additional change introduced by the aviation lighting will form a component of the magnitude of change.

4.3.24 This consideration will be informed by a ZTV of the lit turbines and night-time visualisations from a selection of viewpoints, illustrating the proposed lighting effects. In line with NatureScot Visualisation Guidance, the viewpoints selected represent locations from where people are most likely to experience the wind farm at night.

4.3.25 It is proposed that the following night-time visualisations will be produced, which includes a location in Moffat which it is noted has been recognised as a Dark Sky Town, having adopted special street lighting to keep light pollution to a minimum:

- VP 1 – Moffat, Old Carlisle Street; and
- VP 6 – Crooked Road; and

4.3.26 The viewpoints will be used to inform consideration of the potential visual effects on key visual receptors in individual properties, settlements and users of nearby roads.

4.3.27 Photographic examples of existing aviation lighting in similar light conditions will be presented in a separate appendix as a 'control mechanism'.

Cumulative Effects

4.3.28 The LVIA will also consider the potential for any cumulative effects to arise. The requirement for consideration of cumulative effects under the *Environmental Impact Assessment (Scotland) Regulations 2017* is set out in *Schedule 4, paragraph 5*, as follows:

"A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) the cumulation of effects with other existing and/or approved development, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources".

4.3.29 Current best practice guidance for cumulative impact assessment (Assessing the Cumulative Impact of Onshore Wind Energy Developments, (NatureScot, 2021)) refers to a consideration of proposals which are '*awaiting determination within the planning process with design information in the public domain*' and states that '*The decision as to which proposals in the planning / consenting system should be included in an assessment is the responsibility of the determining authority*.'

4.3.31 As such, it is proposed in this LVIA to consider cumulative effects caused by the development of the site in conjunction with other sites which are either operational, under construction, consented or the subject of a full planning application. The NatureScot best practice guidelines identify two principal types of cumulative visual impact:

- Combined visibility – where the observer is able to see two or more developments from one viewpoint; and
- Sequential visibility – where two or more sites are not visible at one location but would be seen as the observer moves along a linear route, for example, a road or public right of way.

4.3.32 The guidelines state that 'combined visibility' may either be 'in combination' (where two or more sites are visible from a fixed viewpoint in the same arc of view) or 'in succession' (where two or more sites are visible from a fixed viewpoint, but the observer is required to turn to see the different sites). Each of the above types of cumulative effect will be considered in the LVIA.

4.3.33 The assessment will also consider the potential cumulative effects of wind turbine aviation lighting, with reference to other wind farms that are either operational, under construction, consented or the subject of a full planning application.

4.3.34 In order that the cumulative assessment remains focussed on other schemes that have the greatest potential to give rise to significant cumulative effects it is necessary at the outset to decide which schemes realistically need to be considered in detail, as to consider all schemes within 60 or 35 km of the Proposed Development would simply detract attention from the key issues relating to the application. In this instance, the wind farms over 20 km away are highly unlikely to give rise to significant cumulative effects which would not occur in any case with the existing distribution of other wind farms (i.e. in the absence of the Proposed Development). It is also considered appropriate and proportionate to scope out all turbines under 50 m within 10 km of the site, and all turbines under 80 m over 10 km distance from the site.

4.3.35 The cumulative impact assessment will therefore focus primarily on those schemes within approximately 20 km of the wind turbine element of the Proposed Development, albeit noting that to the north, this will be expanded slightly to allow for consideration for all the of turbines in the Clyde wind farm, some of which lie just beyond 20km.

4.3.37 The wind farms identified within **Table 4.2** are therefore the schemes on which the discussion of the cumulative landscape and visual impact effects will be primarily focussed, as illustrated on **Figure 4.5**.

Table 4.2 Cumulative Sites

Site	Blade tip height of turbines	Number of turbines
Operational		
Harestanes	125m	68
Minnygap	125m	10
Clyde and Clyde Extension	126.5m/142m	206
Dalswinton	121m	15
Whitelaw Brae	133.5	14
Twentyshilling	140	9
In Planning		
Daer	180m	17
Rivox	230m/200m	29
Harestanes South	200m	8
Harestanes West	220m/200m	12
Scoop Hill	250m/225m/200/180m	60

4.4 Potential Mitigation

4.4.1 Best practice guidance for EIA states that mitigation measures may include:

- avoidance of effects
- reduction in magnitude of effects; and
- compensation for effects (which may include enhancements to offset any adverse effects)

4.4.2 The primary mitigation to be adopted in relation to the Proposed Development will be embedded within the design of the Proposed Development and will relate to the consideration that will be given to avoiding and minimising landscape and visual effects during the evolution of the Proposed Development layout. This is sometimes referred to as 'mitigation by design'.

4.5 Receptors and Effects Scoped In or Out of Assessment

4.5.1 In summary, those receptors scoped in or out of the LVIA following initial desk-based review are listed below:

- Scoped In – Direct effects on the landscape features of the site.
- Scoped In - Physical effects on the landscape character of LCT 18(a) Foothills with Forest, specifically the Ae unit, and within LCT 19 Southern Uplands, specifically the Lowthers unit, within the Site.

- Scoped In – Indirect effects on other LCTs within 20 km radius of the Proposed Development where there is notable theoretical visibility of the Proposed Development.
- Scoped Out – Indirect effects on other LCTs within 20 km radius of the Proposed Development where there is no notable theoretical visibility of the Proposed Development.
- Scoped In – Effects on 15no. representative viewpoints and other principal visual receptors within 20km (e.g. settlements, roads, rights of way) where there is notable theoretical visibility of the Proposed Development.
- Scoped Out – Effects on visual receptors within 20km (e.g. settlements, roads, rights of way) where there is no notable theoretical visibility of the Proposed Development.
- Scoped In – Direct and Indirect effects on the Thornhill Uplands Regional Scenic Area (RSA).
- Scoped In – Indirect effects on the Moffat Hills and any other LLAs where there is notable theoretical visibility of the Proposed Development.
- Scoped In – Indirect effects on the Raehills and Drumlanrig Castle GDLs and any other GDLs where there is notable theoretical visibility of the Proposed Development.
- Scoped Out – Indirect effects on any nationally designated landscapes or Wild Land.
- Scoped In – cumulative sites within 20 km, which are either, operational, consented or in planning
- Scoped Out – cumulative sites which are at pre-planning, or scoping stages, all turbines below 50 m and those below 80 m which are over 10m from the site.
- Scoped Out – cumulative sites which are beyond 20km.
- Scoped In – Detailed assessment of residential properties within 2 km of a proposed turbine as part of a standalone Residential Visual Amenity Assessment.
- Scoped Out - Detailed assessment of residential properties beyond 2 km of a proposed turbine, with these properties being addressed in the main LVIA text only.
- Scoped In – consideration of aviation lighting impacts on visual receptors.
- Scoped Out - consideration of aviation lighting impacts on landscape character.

4.6 Questions

a) Do you agree with the proposed Study Areas?

b) Do you agree with the proposed viewpoint locations and night-time visualisation locations?

c) Do you agree with the matters to be scoped out?

d) Are there any other wind farms you are aware of within the 20 km study area to be included the cumulative assessment?

5 Cultural Heritage & Archaeology

5.1 Introduction

5.1.1 The 'cultural heritage' of an area comprises World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventoried Gardens and Designed Landscapes (GDLs), Inventoried Battlefields and other historic environment features. Alongside its inherent values, the 'setting' of an asset may also contribute to its cultural heritage significance.

5.1.2 The cultural heritage impact assessment will:

- identify cultural heritage assets that may be subject to significant effects, both within the limits of the Proposed Development and within a proposed surrounding radius of 10km from the proposed turbine locations;
- establish the potential for currently unknown archaeological assets to survive buried within the site;
- assess the predicted effects on these assets; and
- and propose a programme of mitigation where appropriate.

5.1.3 It will consider direct effects (such as physical disturbance), indirect effects (such as vibration), setting effects, and cumulative effects (where assets affected by the Proposed Development are also likely to be affected by other unrelated development proposals).

5.1.4 The proposed approach to the assessment of effects on cultural heritage is set out below. The assessment would be undertaken by Elise Christensen (MA Hons, ACIfA, FSA Scot), Senior Archaeology and Heritage Consultant, and overseen by Beth Gray (MA Hons, MCIfA, FSA Scot), Principal Archaeology and Heritage Consultant.

5.1.5 This section is supported by the following:

- Appendix 5.1 – Cultural Heritage Appraisal; and
- Figure 5.1 – Designated Cultural Heritage Assets –ZTV.

Legislation, Policy and Guidance

Legislation

5.1.6 The assessment will be undertaken in accordance with the following principal relevant legislation:

- The Ancient Monuments and Archaeological Areas Act 1979;
- The Planning (Listed Buildings and Conservations Areas (Scotland) Act 1997;
- The Historic Environment (Amendment) (Scotland) Act 2014; and
- Scottish Statutory Instrument No. 101 The Electricity Works (Environment Impact Assessment) (Scotland) Regulations 2017.

Planning Policy

5.1.7 The Scottish Government, Historic Environment Scotland, South Lanarkshire Council, and Dumfries and Galloway Council have issued statements of policy with respect to dealing with the historic environment in the planning system:

- National Planning Framework 4 (NPF4; 2023);
- Onshore Wind Turbines: Planning Advice (2014);

- Planning Advice Note 2/2011: Planning and Archaeology;
- Our Past, Our Future: The Strategy for Scotland's Historic Environment (2023);
- Historic Environment Policy for Scotland (HEPS 2019);
- Designation Policy and Selection Guidance (2020);
- South Lanarkshire Local Development Plan 2 (2021) relevant policies including:
  - NHE2 Archaeological Sites and Monuments; and
- Dumfries and Galloway Local Development Plan (2019) relevant policies including;
  - Policy HE1: Listed Buildings;
  - Policy HE3: Archaeology;
  - Policy HE4: Archaeologically Sensitive Areas;
  - Policy HE6: Gardens and Designed Landscapes; and
  - Policy HE7: Historic Battlefields.

Guidelines and Technical Standards

5.1.8 Relevant guidance and technical standard documents comprise:

- Historic Environment Scotland Guidance on Managing Change in the Historic Environment: Setting (2020);
- A Guide to Climate Change Impact: On Scotland's Historic Environment (2019);
- Scottish National Heritage (NatureScot) and Historic Environment Scotland Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment Process in Scotland (2019); and
- Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk Based Assessment (2014, updated 2020).

Pre-application

5.1.9 A pre-application site visit was conducted with the client to identify potential constraints early in the programme. This scoping report and accompanying appraisal table is informed by the results and observations of this site visit. Images from this site visit of critical heritage assets can be seen in Section 5.4.

5.2 Baseline Conditions

Assets within the Site Boundary

5.2.1 There are three designated heritage assets within the site boundary. These are Kinnelhead Cottage, building (SM12615), Lochanhead, cairn (SM12622), and Kinnelhead Tower, fortified farmstead and cross-incised stones (SM8610). Both Kinnelhead Cottage, building (SSM12615) and Kinnelhead Tower (SM8610) are medieval in date and lie in the eastern portion of Site, c. 1.2km and 1km respectively from the nearest proposed turbine. Lochanhead, cairn (SM12622) is located in the southeastern portion of site, in the lowland terrace near Lothan Burn, c. 700m from the nearest proposed turbine.

5.2.2 There are a further 45 non-designated heritage assets noted on Canmore, an online resource of the historic environment record compiled by Historic Environment Scotland. All cultural heritage assets within the site are noted in **Table 5.1**.

5.2.3 These non-designated assets are varied in date and usage, with there being a majority of prehistoric assets. There is a clear distribution of activity within all periods represented (prehistoric, medieval, and post-medieval) in the eastern arc of Site. Activity from these periods of generally agricultural or settlement related, clustering on the natural terraces along Lothan Burn to the south, Kinnel Water along the northern border, and Threepen Burn through the centre. The confluence of the latter two creating an advantageous and resource rich environment for settlement. There is a distinct presence of possible defensive medieval activity in addition to these settlement patterns, where Kinnelhead Tower (SM8610) is an example of the rarer remains of a possible peel tower. Cross incised stones indicate its use was not purely domestic or defensive. The central and western portions of the Site are bare of any recorded archaeological features.

5.2.4 A full commercial HER data search will be undertaken ahead of the baseline survey and used to inform an understanding of key constraints.

Table 5.1: Heritage assets within the Site Boundary, recorded on Pastmap.

Designation/Local HER Reference	Name	Type	Period
SM12615	**Kinnelhead Cottage, building 285m SSW of**	**Building**	**Medieval**
SM12622	**Lochanhead, cairn 530m WNW of**	**Cairn**	**Prehistoric**
SM8610	**Kinnelhead Tower, fortified farmstead & cross incised stones**	**Fortified Farmstead, Incised Stones**	**Medieval**
MDG355	Kinnelhead	Cairnfield	Prehistoric
MDG356	Threepen Burn	Cairnfield	Prehistoric
MDG4591	Threepen Burn	Cairnfield	Prehistoric
MDG4934	Threepen Burn	Cairnfield	Prehistoric
MDG8770	Kinnelhead	Burnt Mound	Prehistoric
MDG9687	Kinnelhead	Cairnfield	Prehistoric
MDG9688	Kinnelhead	Cairnfield	Prehistoric
MDG9688	Watch Knowe	Burnt Mound	Prehistoric
MDG4722	Hoarlaw Burn	Cairnfield	Prehistoric
MDG8776	Kinnelhead	Burnt Mound	Prehistoric
MDG8768	John Ewart's Knowe	Burnt Mound	Prehistoric
MDG4721	Mower's Knowe	Cairnfield	Prehistoric
MDG8767	Mower's Knowe	Cairnfield, Huts, Kiln, Sheepfold	Prehistoric
MDG8778	Hoarlaw Burn	Burnt Mound	Prehistoric

Designation/Local HER Reference	Name	Type	Period
MDG4585	Lochanhead	Cairnfield	Prehistoric
MDG351	Lochan Burn	Cairn	Prehistoric
MDG10032	Lochan Burn	Burnt Mound	Prehistoric
MDG6	Threepen Burn	Cairnfield, Cultivation Terraces, Lynchet	Medieval
MDG9648	Threepen Burn	Building, Clearance Cairn	Medieval
MDG364	Threepen Burn	Cairnfield, Cultivation Remains, Farmstead	Medieval
MDG8771	Threepen Burn	Building	Medieval
MDG342	Kinnelhead Tower	Cross incised Stones, Fortified House	Medieval
MDG4933	Thorny Knowe	Building, Cairnfield, Sheepfold	Medieval
MDG9411	Kinnelhead	Building, Field Boundary	Medieval
MDG8775	Mowers Knowe	Building	Medieval
MDG360	Hangingshaw Hill	Peat cutting	Post-medieval
Canmore ID 90109	Blairmack	Farmstead	Post-medieval
MDG16996	Blairmack	Enclosure	Post-medieval
MDG8779	Threepen Burn	Building	Post-medieval
MDG4591	Peat Hill	Hut	Post-medieval
MDG3962	Kinnelhead House	House	Post-medieval
MDG358	Kinnelhead	Farmhouse, Farmstead	Post-medieval
MDG23470	Kinnelhead Cottage	Cottage	Post-medieval
MDG13115	Kinnelhead	Mill	Post-medieval
MDG8774	Mowers Knowe	Shieling Hut	Post-medieval
MDG16959	Mowers Knowe	Enclosure, Shieling Huts	Post-medieval
MDG9413	Hangingshaw Linn	Building, Shieling Huts	Post-medieval
MDG8773	Mowers Knowe	Shieling Hut	Post-medieval
MDG16959	Mowers Knowe	Enclosure, Sheepfold, Structure	Post-medieval
MDG10031	Lochanhead	Farmstead	Post-medieval
MDG347	Craighoar Hill	Marker Cairn	Unknown

Designation/Local HER Reference	Name	Type	Period
MDG9689	Upper Knypes	Enclosure	Unknown
MDG9688	Kinnelhead	Cairnfield	Unknown
MDG4589	Kinnelhead	Cairnfield	Unknown
MDG256	Moffat	Cave	Unknown

Assets outwith the Site Boundary

5.2.5 Within 10km of the proposed turbine locations there are a total of 254 designated heritage assets. This includes 54 Scheduled Monuments, two Gardens and Designed Landscapes, two Conservation Areas and 196 Listed Buildings. There are 12 Category A, 104 Category B and 80 Category C Listed Buildings. Of these Listed Buildings, there is a single Category C listed building with 5km of the Proposed Development. There are no World Heritage Sites within 10km of the Proposed Development. There are two Archaeological Sensitive Areas approximately 2km and 4km to the east of the Site. These areas are non-designated assets but are considered to be particularly sensitive.

Assessment Methodology

Study Area

5.2.6 For purposes of this assessment, a study area **(Figure 5.1**) has been defined using the zone of theoretical visibility (ZTV), scale of the development, and professional judgement. It has been determined that 10km extending from the locations of the proposed turbines is sufficient. Assets within the site will be assessed for direct and indirect impacts arising from the proposed development. They will also be subject to an appraisal for potential setting impacts. Assets from within the site and 1km of the Site boundary will be analysed to inform the archaeological potential within the Site.

5.2.8 The sources identified within **Table 5.2** will be consulted to inform the assessment, however, this list is not exhaustive.

Table 5.2 1: Sources to be Consulted

Subject	Author Summary	Source
Designated cultural heritage assets	The database of Historic Environment Scotland (HES)	HES digital data download
Conservation Areas	Dumfries and Galloway Council and HES	HES digital data download
Non-designated cultural heritage assets (Local HER)	Data held by Dumfries and Galloway Council and displayed on Pastmap	Digital data purchased from the Dumfries and Galloway Council as download and shown on Pastmap website
Non-designated cultural heritage assets (National database)	Canmore online database curated by Historic Environment Scotland	Canmore online database
Historic Mapping	National Library of Scotland	National Library of Scotland website
Unpublished reports	Various	Various
Published works of synthesis	Various	Various
Aerial Photography	HES	HES database Canmore and National Collection of Aerial Photography (NCAP) (online)
Historic Land Use Assessment	HES	HES digital data download

5.3 Proposed Scope of Assessment

Assets within the Site

5.3.1 Designated and non-designated assets within the Site will be assessed in order to determine any direct and indirect impacts. Should Dumfries and Galloway Council archaeologist identify any non-designated assets that they consider to be of national/regional significance, and which they consider derive significance from their setting, these should be made known to the Applicant via consultation.

Assets outwith the Site

5.3.2 All nationally significant designated assets within the aforementioned 10 km study area will be subject to an initial setting assessment in order to determine any impacts **(Appendix 5.1**).

Assessment and Types of Impact

5.3.3 Impacts have the potential to be caused by the proposed Development where it changes the baseline condition of either the asset itself or its setting; it being noted that change does not necessarily result in a negative impact.

5.3.4 In accordance with EIA Regulations, this assessment will identify impacts and effects as either direct or indirect, adverse or beneficial, and short-term, long-term or permanent. The definition of impact is described below:

- Direct impacts (physical) 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. Such impacts are most likely to occur during the construction phase and are most likely to be permanent.

- Indirect (physical) impacts are those which would affect the heritage significance of an asset by causing change to its fabric indirectly, such as increased pollution or changes in water draining patterns which can indirectly affect the preservation of heritage materials.

- Setting impacts 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. Setting impacts may also 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.

5.3.5 Assessment will be undertaken separately for direct impact, indirect impact and setting impacts. Direct and indirect impacts are those which would change the heritage significance of an asset through physical alteration; setting impacts are those which would affect the heritage significance of an asset by causing change within its setting.

5.3.6 Direct impacts upon the significance of heritage assets will take into account the level of their heritage significance (where known) and the magnitude (extent) of the identified impacts.

5.3.7 Setting impacts on the significance of heritage assets will be identified and assessed with reference to Managing Change in the Historic Environment: Setting (HES 2020) and the guidance set out by NatureScot and HES (2019). Assessment will be carried out in the following stages:

- initial consideration of intervisibility and other factors leading to the identification of potentially affected assets;
- assessment of the cultural heritage significance of potentially affected assets;
- assessment of the contribution of setting to the cultural heritage significance of those assets;
- assessment of the extent to which change to any contributing aspects of the settings of those assets, as a result of the proposed development, would affect their cultural heritage significance (magnitude of change); and
- determination of the significance of any identified effects.

Consultation

5.3.8 Based on the results of the baseline study, constraint mapping will be generated using GIS software to show mapped heritage assets in relation to a ZTV. This will filter out those assets that do not

require further assessment. It will also be used to identify and agree on the most potentially sensitive assets; these may then require computer-generated visualisations to be produced as part of their assessment, in liaison with consultees.

5.3.9 Consultation will be undertaken with HES in relation to the method of assessment employed in assessing those heritage assets within their remit; these include: Scheduled Monuments, Category A Listed Buildings, Inventoried Gardens and Designed Landscapes (GDLs), and Inventoried Battlefields. Dumfries and Galloway Council will be consulted in relation to non-designated heritage assets and designated heritage assets of regional significance, and any non-designated assets they consider to be of higher significance.

Field Surveys

5.3.10 A targeted site inspection will be carried out in relation to those recorded assets likely to be impacted by the proposed development; the aim of this would be to establish the condition of any recorded assets and identify the potential for any additional presently unrecorded assets.

5.3.11 Targeted field inspection of other assets will also be undertaken following a desk-based comparison of asset mapping with ZTV and satellite imagery; the aim of this would be to identify and inspect any designated heritage assets potentially susceptible to impact as a result of change to setting under the proposed development.

Zone of Theoretical Visibility

5.3.12 The setting impacts assessment will be assisted by a ZTV calculation, presented in **Figure 5.1**. A ZTV calculation maps the predicted degree of visibility of a proposed development from all points within a proportionate, defined study area around the site, as would be seen from an average observer's eye level (two metres above ground level). The ZTV model presented in **Figure 5.1** is based upon the maximum level of theoretical visibility, i.e., the maximum height of the turbine blade tips.

Cultural Heritage Significance

5.3.13 The categories of cultural heritage significance to be referred to are presented in **Table 5.3,** which will act as an aid to consistency in the exercise of professional judgement and provide a degree of transparency for others in evaluating the conclusions drawn.

5.3.14 The significance categories take into account factors such as: designation, status and grading. For non-designated assets, consideration will be given to their inherent heritage interests, intrinsic, contextual, and associative characteristics. In relation to these assets, the assessment will focus upon an assessment of the assets' inherent capability to contribute to our understanding of the past; the character of their structural, decorative and field characteristics as informed by the HER and Canmore records and / or site visit observations; the contribution of an asset to their class of monument, or the diminution of that class should an asset be lost; and how a site relates to people, practices, events, and/or historical or social movements. Assessments of the cultural significance of specific assets, where recorded within the HER, will be taken into account where appropriate.

Table 5.3 2: Cultural Heritage Significance

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

Magnitude of Change

5.3.15 Determining the magnitude of any likely impacts will include consideration of the nature of the activities proposed during the construction and operational phases of the proposed development.

5.3.16 Changes could potentially include ground disturbance and changes to setting. The latter might include visual change, as well as noise, vibration, smell, dust, traffic movements etc. Effects may be beneficial or adverse, and may be short-term, long-term or permanent.

5.3.17 Where adverse effects on cultural heritage assets are possible, the magnitude of change can be reduced through measures to prevent, reduce and/or, where possible, offset these effects. Refer to Section 6.4 for information on mitigation measures that may be considered suitable, if required.

5.3.19 Taking into account all embedded mitigation measures, the magnitude of any impacts will be assessed using professional judgment, with reference to the criteria set out in **Table 5:4**.

Table 5.4 3: Magnitude of Change

Magnitude of Change	Explanatory Criteria
High Beneficial	The proposed development would considerably enhance the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Medium Beneficial	The proposed development would enhance, to a clearly discernible extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Low Beneficial	The proposed development would enhance, to a minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Very Low Beneficial	The proposed development would enhance, to a very minor extent, the cultural heritage significance of the affected asset, or the ability understand, appreciate and experience it.
Neutral/None	The proposed development would not affect (or would have harmful and enhancing impacts of equal magnitude upon) the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Very Low Adverse	The proposed development would erode, to a very minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect impact would not be considered to affect the integrity of the asset's setting.
Low Adverse	The proposed development would erode, to a minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect impact would rarely be considered to affect the integrity of the asset's setting.
Medium Adverse	The proposed development would erode, to a clearly discernible extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect impact might be considered to affect the integrity of the asset's setting.
High Adverse	The proposed development would considerably erode the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect impact would probably be considered to affect the integrity of the asset's setting.

Significance of Effect

5.3.20 Table 5.5 provides a matrix that relates the cultural heritage significance of the asset to the magnitude of change on its significance, to produce an overall anticipated level of impact. This assessment will be undertaken separately direct and indirect impacts and impacts resulting from change to the setting of heritage assets.

Table 5.54: Significance of Effect

Magnitude of Change	Cultural Heritage Significance (excluding unknown)			
	Highest	**High**	**Medium**	**Low**
High beneficial	Substantial	Substantial	Moderate	Slight
Medium beneficial	Substantial	Moderate	Slight	Very Slight
Low beneficial	Moderate	Slight	Very Slight	Very Slight
Very low beneficial	Slight	Very Slight	Negligible	Negligible
Neutral/None	Neutral/Nil	Neutral/Nil	Neutral/Nil	Neutral/Nil
Very low adverse	Slight	Very Slight	Negligible	Negligible
Low adverse	Moderate	Slight	Very Slight	Very Slight
Medium adverse	Substantial	Moderate	Slight	Very Slight
High adverse	Substantial	Substantial	Moderate	Slight

Significance of Effect

5.3.21 Once the anticipated effects of the proposed Development upon cultural heritage assets are defined, professional judgment will be used to determine whether those effects would be either 'Significant' or 'Not Significant' for the purposes of EIA. As part of this determination process, regard will be given to any relevant guidance.

5.3.22 With reference to the matrix presented in Table 5.5 and Section C.8.8 of the EIA Handbook (NatureScot, 2020):

- any effects identified as 'Major' would most probably be considered 'Significant';
- any effects identified as 'Moderate' might also be considered 'Significant', though professional judgment may determine otherwise on the basis of the associated site-/asset-specific detail; and
- any effects identified as 'Minor' or less are unlikely to be considered 'Significant', though again, professional judgment will be exercised.

5.3.23 A clear statement will be made in relation to all affected assets as to whether the identified effects upon them are 'Significant' or 'Not Significant' for purposes of EIA. In cases where the impact is identified as significant, the impact of the proposals on the integrity of the asset would be assessed, following National Planning Framework 4 (NPF4, 2023), Policy 7h.

Cumulative Effect

5.3.24 A cumulative effect is considered to occur when there is a combination of:

- an effect on an asset or group of assets due to changes resulting from the development subject of assessment; and
- an effect on the same asset or group of assets resulting from another development (consented or proposed) within the surrounding landscape.

5.3.25 Consideration of other developments will be limited to:

- wind farm planning applications within 10km of the affected assets that have been submitted and have a decision pending; and
- wind farm planning applications within 10km of the affected assets which have been granted permission but not yet constructed.

5.3.26 Any effect resulting from operational wind farms would be considered as part of the baseline impact assessment. Cumulative impact would be considered in two stages:

- assessment of the combined impact of the developments, including the proposed development; and
- assessment of the extent to which the proposed development contributes to the combined impact.

Mitigation

5.3.27 Where adverse effects on cultural heritage assets are identified, measures to prevent, reduce and/or, where possible, offset these effects, will be proposed. Potential mitigation measures can be discussed in terms of direct, indirect and settings impact.

5.3.28 Suitable measures for mitigating direct and indirect impacts might include:

- the micro-siting of proposed development infrastructure away from sensitive locations;
- the fencing off or marking out of heritage assets or features in proximity to construction activity in order to avoid disturbance where possible;
- a programme of archaeological work where required, such as an archaeological watching brief during construction activities in or in proximity to areas of archaeological sensitivity, or excavation and recording where impact is unavoidable; and/or
- a working protocol to be implemented should unrecorded archaeological features be discovered.

5.3.29 Suitable measures for mitigating any settings impacts might include:

- alteration of the proposed turbine layout;
- reduction of proposed turbine heights; and/or
- changing the proposed colour of select turbines.

Residual Impacts

5.3.30 Residual impacts are those that remain even after the implementation of suitable mitigation measures. Residual impacts will be identified, and the level of those residual impact defined with reference to **Table 5.5**.

Matters Scoped Out

5.3.31 On the basis of the work undertaken to date, the professional judgement of the cultural heritage team, and experience of other comparable projects, it is considered that indirect and cumulative impacts of the Proposed Development on Category C Listed Buildings can be scoped out of the EIA in relation to cultural heritage. As per best practice guidance within EIA Handbook (NatureScot, 2019), Category C Listed Buildings are of local rather than national or regional importance, unless in the opinion of an assessor the designation should be higher.

5.3.32 Category B Listed Buildings outwith the 5km of the proposed turbines have been scoped out of any further assessment, with the exception of those wherein specific views are considered to contribute to their significance and/or to the ability to understand, appreciate and experience them. Category B Listed Buildings located more than 5km away from the Site have been scoped out of further assessment.

5.3.33 The significance of a Conservation Area derives from its local heritage and the assets that it contains, rather than the wider landscape. As such, any conservation area outwith 5km has been scoped out, with the justification that, even if visibility between the Proposed Development and the conservation areas may still occur, the conservation areas' significance would not be diminished.

5.3.34 Archaeologically Sensitive Areas (ASAs), covered in Policy HE4 of the Dumfries and Galloway Local Development Plan, are considered on a case by case basis due to the differences in types of areas. There is a single ASA, Beattock Hill (NT 06 02) within 5km of the Proposed Turbines. The justification for its regional designation as an ASA is its archaeological potential in an area of concentrated prehistoric assets, and as such has been scoped out as its wider setting does not contribute to its designation criteria. Designated elements of this ASA, such as Stanshielrig, homestead, enclosures, field systems & clearance cairns (SM4057) and Beattock Hill, fort (SM4748), have been considered in **Appendix 5.1**.

5.3.35 It is also considered that any assets that fall outwith the ZTV (and where those assets' approaches and third points of appreciation also fall outwith the ZTV) can be scoped out of the EIA in relation to cultural heritage.

5.4 Potential Effects

Direct and Indirect Effects

5.4.1 As stated, there are three scheduled monuments and an additional 45 non-designated recorded cultural heritage assets within the Site boundary. Whilst positioned outside of the current placement of the turbines, these known cultural heritage assets may be susceptible to a significant level of direct or indirect impact as a result of the construction of the associated infrastructure (e.g., access tracks, substations). In addition, any design changes for the placement of the turbines may incur potential direct impacts on the heritage assets. Potential mitigation is discussed from **Section 5.5** of this scoping report.

5.4.2 Furthermore, there is the potential for direct impact on any unrecorded cultural heritage assets within the site as a result of the construction process. Relevant mitigation measures will be embedded within the design of the proposed Development as design progresses.

5.4.3 If there are any further ground-breaking works undertaken during operation or decommissioning of the wind farm (e.g., track widening), then there is the potential for further impact on recorded or unrecorded heritage assets. If this is the case, then further mitigation methods, such as a watching brief or design changes to proposed infrastructure may be required.

Setting Impacts

5.4.4 Setting impacts are most likely to occur as part of the construction and operational phases of development, these will be considered as part of the EIA Chapter.

5.4.5 Six designated cultural heritage assets will be subject to detailed settings assessment within the EIA Chapter, as there is the potential for the Proposed Development to have a significant effect upon them.

5.4.6 To provide a preliminary list of assets that will be subject to a detailed assessment, designated assets within 10km of the proposed Development were subject to an initial appraisal. As there were no Category B listed buildings, Inventory Battlefields, or Conservation Areas within 5km these were not included in the appraisal table. No Scheduled Monuments, GDLs, Category A Listed Buildings, or Inventory Battlefields with long distance views as part of their settings were identified outwith 10km of the proposed Development.

5.4.7 The appraisal table (**Appendix 5.1**) has aimed to create a proportionate scope for the assessment and will be an evolving document throughout the EIA process. Assets that fall out of the proposed study area, the ZTV, and that do not have a third viewpoint that contributes to the significance of the monument have been scoped out of assessment. Assets that have been scoped in may be scoped out and vice versa, dependent on the final layout as a result of consultee comments.

5.4.8 All designated cultural heritage assets within 10km, along with the ZTV indicating their visibility of the proposed turbines, are depicted on **Figure 5.1**.

5.4.9 The assets scoped in for further assessment within the EIA chapter after the initial heritage appraisal are as follows:

Scheduled Monuments (6)

- Kinnelhead Tower, fortified farmstead & cross incised stones (SM8610)
- Park Hill, fort (SM10544)
- Stidriggs, fort and settlement 400m ESE of (SM10545)
- Beattock Hill, fort and unenclosed settlement 935m W of Braeside (SM4748)
- Knock Hill, fort 1200m WSW of Kirkpatrick-Juxta Church (SM2197)
- Lochanhead, cairn (SM12622)

Plate 1 – Aerial view of Stidriggs, fort (SM10545) from the east towards visible Harestanes Wind Farm and the proposed site of Kinnelhead Wind Farm.

Plate 2 – Aerial view of Park Hill, fort (SM10544) from the southeast towards visible Harestanes Wind Farm and the proposed site of Kinnelhead Wind Farm.

Proposed Visualisations

5.4.10 Visualisations, in the form of photomontages, will be produced for the following assets as part of the EIA chapter:

- Kinnelhead Tower, fortified farmstead & cross incised stones (SM8610)
- Park Hill, fort (SM10544)
- Stidriggs, fort and settlement 400m ESE of (SM10545)
- Beattock Hill, fort and unenclosed settlement 935m W of Braeside (SM4748)
- Knock Hill, fort 1200m WSW of Kirkpatrick-Juxta Church (SM2197)
- Lochanhead, cairn (SM12622)

5.4.11 This report is accompanied by 5 wirelines showing the scoping layout for the following assets:

- Kinnelhead Tower, fortified farmstead & cross incised stones (SM8610)
- Park Hill, fort (SM10544)
- Stidriggs, fort and settlement 400m ESE of (SM10545)
- Beattock Hill, fort and unenclosed settlement 935m W of Braeside (SM4748)
- Knock Hill, fort 1200m WSW of Kirkpatrick-Juxta Church (SM2197)
- Lochanhead, cairn (SM12622)

5.4.12 Assets that fall out of the proposed study area, the ZTV, and that do not have a third viewpoint that contributes to the significance of the monument have been scoped out of assessment. Assets that have been scoped in may be scoped out and vice versa, dependent on the final layout as a result of consultee comments.

5.5 Potential Mitigation

5.5.1 As stated in the proposed methodology, there are multiple methods of mitigation that may be employed to reduce the potential for impact as a result of the proposed Development.

5.5.2 Suitable measures for mitigating direct and indirect impacts might include:

- the micro-siting of proposed Development infrastructure away from sensitive locations;
- the fencing off or marking out of heritage assets or features in proximity to construction activity in order to avoid disturbance where possible;
- a programme of archaeological work where required, such as an archaeological watching brief during construction activities in or in proximity to areas of archaeological sensitivity, or excavation and recording where impact is unavoidable; and/or
- a working protocol to be implemented should unrecorded archaeological features be discovered.

5.5.3 There will be a 250m fenced off buffer around the Scheduled Monuments within the Site, to ensure that there are no direct impacts from the construction of the proposed development. Furthermore, a buffer of 10m will be placed around any known heritage assets within the site. The cultural heritage team will work with the design team to ensure that any known archaeology within the site is avoided.

5.5.4 Suitable measures for mitigating any settings impacts might include:

- alteration of the proposed turbine layout; and
- reduction of proposed turbine heights.

5.5.5 These mitigation measures will be embedded into the design of the proposed Development and developed through careful consultation with the relevant statutory consultees.

Summary of Scope

5.5.6 As stated, cultural heritage assets both within the site and outwith the site will be considered for potential for direct, indirect, settings and cumulative impacts as a result of the proposed development.

5.5.7 In regard to direct and indirect impacts, mitigation will be embedded into the design of the proposed development, in order to ensure that no known heritage assets will be impacted.

Furthermore, the potential for direct impacts on as of yet unrecorded heritage assets will be considered within the EIA chapter. If warranted, further mitigation will be agreed with the Dumfries and Galloway Council Archaeologist.

5.5.8 A high-level appraisal has been undertaken of the designated heritage assets within 10km of the proposed development. This appraisal can be found in **Appendix 5.1** of the scoping report. As a result of the appraisal, the assets scoped in for further assessment within the EIA chapter after the initial heritage appraisal are as follows:

- Kinnelhead Tower, fortified farmstead & cross incised stones (SM8610)
- Park Hill, fort (SM10544)
- Stidriggs, fort and settlement 400m ESE of (SM10545)
- Beattock Hill, fort and unenclosed settlement 935m W of Braeside (SM4748)
- Knock Hill, fort 1200m WSW of Kirkpatrick-Juxta Church (SM2197)

5.5.9 Furthermore, the potential for cumulative impacts as a result of the proposed development on any sensitive heritage receptors will be considered.

5.6 Questions for Consultees

Q5.1. Do consultees agree with the proposed scope of the assessment, including the proposed Study Areas?

Q5.2. Do consultees agree with the proposed assessment methodology?

Q5.3. Are consultees satisfied with the mitigation measures proposed?

Q5.4. Are consultees satisfied with the locations and types of visualisations proposed?

5.7 References and Standard Guidance

Chartered Institute for Archaeologists. (2014, updated 2020.) Standard and Guidance for Historic Environment Desk Based Assessment.

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

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

South Lanarkshire Council (2021) Local Development Plan 2. Available online at: https://www.southlanarkshire.gov.uk/downloads/file/14534/ldp2_volume_1_document

UK Government. (1979) Ancient Monuments and Archaeological Areas Act 1979. Available at: https://www.legislation.gov.uk/ukpga/1979/46

UK Government. (1997) The Planning (Listed Buildings and Conservations Areas (Scotland) Act 1997. Available at: https://www.legislation.gov.uk/ukpga/1997/9/contents

6 Ecology

6.1 Introduction

6.1.1 As part of the EIA an Ecological Impact Assessment (EcIA) will be undertaken by Locogen Consulting Ltd. (Locogen).

6.1.2 The methodology adopted for the ecological assessment will include a desktop study of relevant and available information, consultation with interested parties and field surveys. The ecological assessment will take into account the relevant legislation including European Council Directives 97//62/EC and 79/409/EEC, commonly known as the Habitats and Birds Directives, the 1994 Conservation Regulations, the Wildlife and Countryside Act 1981 and the Protection of Badgers Act 1992.

6.1.3 Field surveys for protected species will be undertaken in accordance with relevant legislation and guidance. All involved persons are experienced and specialist ecological surveyors and / or consultants who have worked on a variety of wind farm developments across Scotland.

6.1.4 Initial consultation with statutory consultees and local interested parties will be undertaken where appropriate.

6.2 Guidance

6.2.1 Fieldworks and assessment will be undertaken in accordance with best practice outlined in the following guidance:

- Chartered Institute of Ecology and Environmental Management (CIEEM) Impact Assessment[1]
- NatureScot pre-application guidance for onshore wind farms[2]
- Bats and onshore wind turbines - survey, assessment and mitigation[3]
- Extended Phase 1 Habitat Survey; a Technique for Environmental Audit[4]
- National Vegetation Classification: Users' handbook[5]

6.3 Desk Study

6.3.1 The Southwest Scotland Environmental Information Centre (SWEIC) were commissioned in February 2025 to undertake a biological record and designated site search using the following parameters:

- Protected/notable species search up to 2km
- Statutory and non-statutory designated sites within 5km
- Extended bat record search up to 10km

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[1] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3*. Chartered Institute of Ecology and Environmental Management, Winchester

[2] NatureScot (2024) *NatureScot pre-application guidance for onshore wind farms*. Available online: https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms

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

[4] JNCC. (2010) *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit.* Joint Nature Conservation Committee, Peterborough

[5] Rodwell, J.S. (2006) *National Vegetation Classification User's Handbook.* Joint Nature Conservation Committee, Peterborough.

6.3.2 This data will be used alongside field survey data to establish baselines conditions within the Site.

6.4 Field Survey Methodology

6.4.1 To establish the ecological baseline for the site a comprehensive range of surveys will be conducted, with the proposed survey scope designed to be in line with current best practice NatureScot guidance[2]. Ecological surveys have been ongoing since May 2024 and are expected to conclude in April 2025. Further details on ecological surveys undertaken can be found below:

Phase 1 Habitat surveys

6.4.2 A Phase 1 habitat survey of the proposed Kinnelhead Wind Farm was carried out in August 2024, within the optimal survey period[6]. The survey was undertaken by Chris Rogers MCIEEM and followed standard habitat survey methodology as described in the Handbook for Phase 1 habitat survey: a technique for environmental audit**Error! Bookmark not defined.**.

6.4.3 Surveys have characterised the habitats present on site and aimed to identify any habitats of significant conservation value or protected plant species. Where appropriate target notes detailing species composition and botanical features of interest were recorded. The survey area includes all land within the Red Line Boundary (RLB) and up to 200m around proposed turbine locations to account for Groundwater Dependant Terrestrial Ecosystems (GDTWE).

National Vegetation Classification

6.4.4 In addition to the Phase 1 Habitat Surveys, habitats within the RLB have been surveyed to National Vegetation Classification (NVC). This has allowed for detailed mapping of habitat communities and sub-communities within the Site and will allow for identification of European Nature Information System (EUNIS) Annex 1 habitats within the Site. NVC communities will be cross referenced against Scottish Environmental Protection Agency (SEPA) guidance[7] to identify potential GDTWE within the Site.

Bat Activity Surveys

6.4.5 Following current guidance ground-level static surveys to record and provide an indication of bat activity within the Site was undertaken in 2024. Detectors were deployed and pre-determined turbine locations (based off of layout *PSCOmta001*), for a minimum of ten consecutive nights over three monitoring deployments during the active bat season (April to October).

6.4.6 Following guidance deployments were undertaken in Spring (April – May), Summer (June – mid August) and autumn (mid-August to October). The selected monitoring deployment dates were as follows:

- Deployment 1: 10/04/2024 – 24/04/2024
- Deployment 2: 28/06/2024 - 12/07/2024 & /07/2024 – 21/07/2024
- Deployment 3: 04/09/2024 – 18/09/2 & 06/09/2024 – 18/09/2024024

[6] NatureScot (2025) *Ecological survey Calendar*. Available online: https://www.nature.scot/doc/ecological-survey-calendar

[7] Scottish Environment Agency (2014) *Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.* Available online: https://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf

6.4.7 The detectors were set up to record bat echolocation calls continuously from 30 minutes before sunset to 30 minutes after sunrise. Automated detectors (*Wildlife Acoustics Song Meter SM4BAT FS*) were placed at 16 proposed turbine locations to provide a representative sample of bat activity at or close to these points, in accordance with best practice guidelines[8].

Bat Roost Surveys

6.4.8 As part of the protected species surveys, features which could support Potential Bat Roost Habitat (PBRH) will be assessed following methodology in the Bat Conservation Trust (BCT) Guidelines[9]. Assessment for potential roost will be limited to within 200m + rotor radius of proposed candidate turbines, across proposed turbine locations. Subsequently, potential roosting habitat will likely be limited to trees within the Site.

6.4.9 Trees which have the potential to support roost features will be subject to a Ground Level Roost Assessment (GLRA), with PBRH classified as either PRF-I or PRF-M in line with BCT guidelines, to indicate the likelihood of bats being present and inform the requirement for further survey work. Preliminary roost surveys are ongoing, any features which have the potential to support maternity roosts (PRF-M) within 200m+rotor radius will be subject to additional surveys.

Badger

6.4.10 Surveys for badger (*Meles meles*) have been undertaken throughout the Site. Surveys have been undertaken on potential habitat throughout the Site as part of the protected species surveys. The main bulk of surveys have been undertaken in spring 2025 (February – April), to co-inside with the period of high badger activity and prior to vegetation potentially obscuring evidence of use. Field signs for badger as described in Scottish Badger (2018)[10] guidance and Neal & Cheeseman[11] were searched for, including setts, latrines, mammal paths, guard hairs and tracks.

Otter and Water Vole

6.4.11 The Site sits between two river catchments the River Annan catchment to the east and the River Clyde to the west. Several watercourses are present throughout the Site, with Crook Burn and Kinnel Water the largest. Otter (*Lutra lutra*) surveys have been undertaken on watercourses and suitable otter habitat throughout the Site, with evidence of use including spraints, couches, hovers and holts recorded were present. Otter surveys concluded in April 2025. Water vole (*Arvicola amphibious*) habitat surveys have been undertaken throughout the Site, these surveys will aim to determine if there is potential for water vole to be present within the Site, recording signs of potential habitation including latrines, and burrows. If suitable habitat or evidence of use is found within 250m of turbine or infrastructure footprint additional surveys during the optimal survey period (May – September[6]) will be undertaken to confirm presence/absence.

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

[9] Collins, J. (ed.) (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th edn). The Bat Conservation Trust, London.

[10] Scottish Badgers (2018). *Surveying for Badgers: Good Practice Guidelines*. Version 1

[11] Neal, E. & Cheeseman, C. 1996. *Badgers*. Poyser Natural History, London

Pine Marten

6.4.12 As part of the protected species surveys, searches for field signs for pine marten (*Martes mates*) will be undertaken in areas of suitable habitat access permitting. Field signs are described in Sargent *et al* [12]. Should any potential dens be identified within 200m of turbine bases or infrastructure, additional survey effort will be undertaken following NatureScot guidance[13].

6.5 Consultation

6.5.1 Following completion of the baseline surveys, it is proposed that NatureScot will be consulted on the results and initial assessments. This Scoping Report also acts as a consultation process with the relevant consultees namely NatureScot for this subject matter.

6.6 Initial Desk Study and Field Survey Results

Statutory Designated Sites

6.6.1 One statutory designated Site was identified within 5km of the Site. Shiel Dod Site of Special Scientific Interest (SSSI) is within 500m of the Site, along its western boundary. The SSSI is designated for supporting upland habitats and upland habitat assemblages which includes blanket bog, subalpine dry dwarf-shrub heath, and calcareous types of spring-head, rill and flush. Also notable, is the presence of national scarce plant hairy stonecrop (*Sedum villosum*). There are no Special Areas of Conservation (SAC) within 5km of the Site.

Non-statutory designated Site

6.6.2 The Galloway and Southern Ayrshire UNESCO Biosphere falls partially within the Site.

Habitats

6.6.3 Phase 1 habitat surveys show that the Site supports a range of habitats including (but not limited to):

- Blanket sphagnum bog (E1.6.1),
- Wet modified bog (E1.7)
- Spring and flush – acid/neutral flush (E2.1)
- Wet heath/acid grassland (D6)
- Acid grassland (B1.1)
- Semi-improved acid grassland (B2.2)
- Neutral grassland semi-improved (B2.2)

Bat Activity Surveys

6.6.4 Results of the 2024 static monitoring show that at least six species of bat are using the Site in some capacity. Species from the *Pipistrellus* genus are the most abundant with common pipistrelle accounting for over 60% of all recorded bat passes.

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[12] Sargent, G., Morris, P. and Troughton, G. 2003. *How to Find and Identify Mammals*, 3rd Edition. The Mammal Society, Southampton

[13] NatureScot (2024) *Standing advice for planning consultations - Pine Martens. Available online: https://www.nature.scot/doc/standing-advice-planning-consultations-pine-martens*

6.6.5 Most turbine locations recorded low levels of bat activity. Locations with low activity levels were generally in open habitats, away from watercourses and features which will be of value for foraging and commuting bats. Four sample locations which were closer to watercourses and edge habitat recorded higher levels of activity, in addition notable and rare species of bat including Nathusius pipistrelle were recorded within the Site at these locations. The Site falls within the recognised range for known Nathusius pipistrelle populations, with biological records confirming presence within the wider landscape. The highest levels of bat activity, and greatest species diversity were recorded at turbine locations closest to Threepen Burn. The results indicate that this habitat is an important resource for foraging and commuting bats within the Site.

Badger

6.6.6 No records of badger were returned form the SWEIC data search. However, evidence of badger use including setts have been identified during the protected species surveys. Subsequently, badger presence on-site is confirmed.

Otter & Water vole

6.6.7 Three records for otter were returned from the SWEIC – one of these was historic dating from 1991. Otter presence has been confirmed within the Site, with spraints, and hovers recorded. Additionally, an incidental sighting of an otter was recorded during the 2025 peat surveys.

6.6.8 At present no evidence of water vole or notes on suitable habitat has been recorded; furthermore, no existing biological records for water vole were returned from the SWEIC data search.

Pine Marten

6.6.9 No existing records or evidence of pine marten have been returned from the field surveys or desk study. Forestry within the Site which could have offered opportunities for pine marten habitation has either been felled or windblown. Subsequently, there is currently no suitable available habitat for pine marten within the Site boundary.

6.7 Assessment Methodology

6.7.1 The findings of the baseline surveys show that the Site supports several notable and protected habitats, and protected species. Taking a precautionary approach at this early stage there are several potential effects and impacts which could arise from the proposed development which are likely to require assessment, these include:

- Direct and indirect habitat loss;
- Disturbance to / loss of breeding sites, resting places, etc.;
- Direct / indirect loss of foraging resource;
- Habitat fragmentation / loss of commuting routes;
- Displacement / disruption to movement of animals within / through the site;
- Direct effects upon protected fauna, i.e. road traffic accidents, etc.;
- Environmental effects, i.e. pollution of watercourses, etc.;
- Changes to habitat composition through land-use change, increased human presence, etc.; and
- Changes to hydrological regimes.

6.7.2 Once completed the results of the protected species surveys will be used to inform the Site layout, using standard NatureScot guidance to embed mitigation (i.e. buffers around otter hovers and badger setts) into the design of the proposed development. The assessment will then involve a full evaluation of ecological receptors within the Site, seeking to determine whether potential effects will be significant or not significant. Geographical importance of a feature, and the magnitude, and duration of a potential effect will be used to determine significance. Table 6.1 below details the proposed geographical importance, and Table 6.2 shows the proposed magnitude criteria. Following CIEEM guidance, a significance matrix will not be used in determining significant and non-significant effects.

Table 6.1: Proposed defined geographical context for evaluating important ecological features

Level of value	Example
International	An internationally designated site
	Site meeting criteria for international designations or qualifying species of a study area where there is connectivity.
	Species present in internationally important numbers (>1% of biogeographic populations).
National	A nationally designated site (SSSI, or a National Nature Reserve (NNR)), or sites meeting the criteria for national designation or qualifying species where there is connectivity.
Regional	Species present in regionally important numbers (>1% of Natural Heritage Zone population)
	Areas of habitat falling below criteria for selection as a SSSI (e.g. areas of semi natural ancient woodland larger than 0.25ha).
Local	Local Nature Reserves (LNR).
	Areas of semi-natural ancient woodland smaller than 0.25ha.
	Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or hedgerows.
Negligible	Usually widespread and common habitats and species. Features falling below local value are not normally considered in detail in the assessment process.

Table 5.2: proposed criteria used to determine magnitude of ecological impacts.

Magnitude	Description
Very High	Result in large-scale, permanent changes in an ecological feature, and likely to change its ecological integrity. These effects are therefore likely to result in overall changes in the conservation status of an ecological feature.
High	Result in large-scale, permanent changes in a receptor, and likely to change its ecological integrity. These effects are therefore likely to result in overall changes in the conservation status of a receptor.
Moderate	Include moderate-scale long-term changes in a receptor, or larger-scale temporary changes, but the integrity of the receptor is not likely to be affected. This may mean that there are temporary changes in the conservation status of the receptor, but these are reversible and unlikely to be permanent.
Minor	Include effects that are small in magnitude, have small- scale temporary changes, and where integrity is not affected. These effects are unlikely to result in overall changes in the conservation status of a receptor.
Negligible	No perceptible change in the ecological feature

6.8 Proposed Mitigation

6.8.1 Following the results of the ground level bat monitoring surveys the following mitigation measure has been proposed at this early stage:

i Implementation of a larger than standard buffer (50m from blade tip) along Threepen Burn. It is proposed that Eurobat guidance[14] is adopted for this habitat, ensuring that a 200m buffer is maintained between proposed turbine locations and Threepen burn to retain the ecological functionality of the watercourse for bats.

6.8.2 Following completion of the protected species surveys further targeted mitigation may be proposed. However, as standard it is likely that standard buffers for otters, and badger will be adopted around rest sites and setts. In addition, a range of precautionary measures, primarily to mitigate and reduce potential impacts to ecological receptors during the construction phase will be suggested. This is likely to include:

- A Construction Environmental Management Plan;
- Pre-construction surveys; and
- Species Protection Plans (SPP).

6.9 Features/Impacts Scoped In or Out of Assessment

6.9.1 At this time, it is proposed that the following species are scoped out from any further assessment:

- **Pine marten**: Due to recent felling and environmental factors (minor windblow) there is no current suitable habitat within the Site for pine marten and no field signs have been

[14] Rodrigues, L., Bach, L., Duborg-Savage, M.J., Karapandza, B., Kovac, D., Kervyn, T., Dekker, J., Kepel, A., Bach, P., Collins, J. & Harbusch, C. (2014) *Guidelines for consideration of bats in wind farm projects* - Revision 2014. EUROBATS Publication Series 6

recorded during and protected species survey. Furthermore, no records of pine marten activity were returned within 2km of the Site from the SWEIC data search.

- **Red squirrel**: Similar, to pine marten, there is limited suitable habitat within the Site for red squirrel, with potential habitat limited to riparian woodland along Threepen Burn. No signs of squirrel activity have been identified during the protected species surveys and proposed turbine will be at least 200m from potential habitat (taking into account the proposed bat buffer). As such the risk of the proposed development effecting red squirrel is considered negligible and will be scoped out of the ecology chapter.
- **Great Crested Newt**: No records of great crested newts (*Triturus cristatus*) were returned from the 2km SWEIC data search. Loch Rig is the only waterbody within the Site boundaries; the loch is located 800m from the nearest proposed turbine. Great crested newts exist within metapopulations, requiring several interconnected waterbodies as breeding ponds, subsequently, the lack of additional ponds is likely to preclude use of the Site by this species. Habitats such as blanket bog may support bog pools which could be of value to amphibians, however, the pools are likely to acidic which will reduce their suitability for GCN habitation. Subsequently, due to a lack of suitable habitat, and existing biological records, great crested newt are scoped out of the ecology chapter.

6.9.2 All other ecological features will remain scoped into the assessment.

6.10 Questions for Consultees

- Do the Consultees agree with the assessment approach set out in the ecology section?
- Do the Consultees agree with the proposed mitigation in regard to bats within the Site; primarily the adoption of Eurobat guidance for Threepen Burn?
- Do the Consultees agree with the rationale behind scoping out pine marten, red squirrel and great crested newt from further assessment in the Ecology chapter?

7 Ornithology

7.1 Introduction

7.1.1 This chapter sets out the proposed approach to assess the potential effects of the Proposed Development on ornithology during its construction and operation.

7.1.2 The assessment will be completed by Dr Steve Percival of Ecology Consulting, in accordance with relevant best practice documents. He has undertaken ornithological assessments for over 200 wind farm developments.

7.2 Baseline Description

Baseline Surveys

Field Surveys

7.2.1 A comprehensive range of bird surveys is being undertaken at this site. Specific surveys are being undertaken over two years (2024/25 and 2025/26 winters and 2024 and 2025 breeding seasons), to give two full years of baseline bird data, in line with the current NatureScot survey guidance (SNH 2017a).

7.2.2 **Vantage Point (VP) Surveys (year-round):** these surveys are being carried out to determine flight activity within the Proposed Development site and assess collision risk. The VP surveys will quantify the bird numbers that could potentially be at risk of collision (including roost flight observations at dawn/dusk). All flight lines of target species are being mapped, and the flight height of each flock recorded.

7.2.3 Three VPs are being used, to give sufficient coverage of the site. The computer-generated viewsheds are shown in Figure 7.1. For each VP, the following surveys are being undertaken:

Breeding season:

- 2024 – April to August – 36 hours/VP; and
- 2025 – April to August – 36 hours/VP.

Autumn/winter:

- 2023-24 – October to March – 42 hours/VP; and
- 2024-25 – September to March – 42 hours/VP.

7.2.4 **Breeding Bird Surveys:** the main breeding bird walkover survey follows the standard Brown and Shepherd (Brown and Shepherd, 1993) moorland survey method but with two additional visits (Calladine *et al.* 2009), as recommended in NatureScot guidance (SNH, 2017). These surveys cover the Proposed Development plus a 500 m buffer (see Figure 7.1), where access is possible. Access has not been allowed into the buffer (except to the south-west of the site), so surveys are restricted to viewing from the adjacent land.

- 2024 – four visits, April to July; and
- 2025 – four visits, April to July.

7.2.5 All bird locations and behaviour are being mapped to 1:10,000 scale, using the standard British Trust for Ornithology (BTO) Common Birds Census notation. All species are recorded. In addition, the survey effort per unit area is being standardised to make the surveys as repeatable as possible, recording systematically for approximately 2 hours per km^2. A route is chosen to ensure that all parts of the Study Area are covered to within about 100 m of the observer, where access is possible. The survey route is plotted on the survey map as it is carried out.

7.2.6 Surveys avoid days with strong winds, heavy rain, fog and low cloud for safety and data quality reasons. Birds are located by walking, listening and scanning by eye and with binoculars. Standard BTO notation is used to record the birds' activities: singing, calling, carrying nest material, nests or young found, repetitively alarmed adults, disturbance displaying, carrying food or in territorial dispute.

7.2.7 **Raptor and Black Grouse Breeding Surveys**: as the survey area may be used by a range of scarce raptors and black grouse, species-specific surveys were undertaken from April to August 2024, and will be repeated in 2025. This includes surveys for black grouse, hen harrier, osprey, golden eagle, goshawk, red kite, peregrine, merlin, barn owl and short-eared owl, following the standard methodologies given in Gilbert *et al.* (1998) and Hardey *et al.* (2013). Raptor surveys comprised walkovers where access was allowed (restricted to the site land ownership – access onto neighbouring land has not been possible to date), supplemented by a series of mini-VPs (shorter watches from additional VPs) to cover other areas (looking out from the site itself), to detect displaying or nesting behaviour during the breeding season. Similarly for black grouse, areas of suitable habitat outwith the site where access was not possible were scanned with binoculars from the site boundary, from publicly accessible locations and from suitable vantage points within the site.

7.2.8 **Winter Walkover Surveys**: whilst the winter VP surveys provide information on key species flight activity over the site outside the breeding season, additional survey work is being undertaken to provide further information on any important bird populations using the area at this time of year. This comprises walkover mapping surveys of the wintering birds within the Proposed Development site and viewing out over a 500 m buffer (see Figure 7.1 – access was not possible outside the landowner boundary). These include surveys at dawn and dusk to check the area specifically for roosting hen harriers and other important raptors, and are being carried out as follows:

- 2023-24 – October to March – monthly surveys; and
- 2024-25 – September to March – monthly surveys.

7.2.9 Wider area surveys for wintering waterfowl were not undertaken as there was no important waterfowl habitat within 2 km.

7.3 Consultation

7.3.1 It is proposed that the following stakeholders will be consulted in relation to the assessment:

- NatureScot;
- Dumfries and Galloway Raptor Study Group;
- The South-west Scotland Wildlife Information Centre;
- South of Scotland Golden Eagle Group; and
- RSPB.

7.4 Desk Study

7.4.1 The ornithological assessment will include a full desk study detailing the designated sites that could be affected by the Proposed Development (as set out above) and available bird records from the stakeholders. A preliminary desk study uses a 5 km search area for nationally important sites and 20 km for internationally important sites.

7.4.2 There is one statutory designated nature conservation site with ornithological interest features in the search area around the Proposed Development (5 km for nationally important SSSI and 20 km for internationally important European Protected Special Protection Areas SPA and Ramsar Sites):

- Castle Loch, Lochmaben SPA/Ramsar site – 19 km south – designated for its internationally important wintering population of pink-footed geese. The SPA citation cites a population of 8,300 pink-footed geese (4% of the international population), though numbers have been lower in more recent years, probably as a result of more geese roosting on the Solway Firth rather than at this site (Mitchell 2012, Woodward *et al.* 2024). It also supports a nationally important wintering population of goosander (winter peak mean of 66, 1% of the British population). The Proposed Development does not lie within any feeding sites recorded in Mitchell (2012), nor in a location that would likely be regularly overflown by geese from this SPA moving to/from feeding and roosting areas (Mitchell 2012).

7.4.3 The following statutory designated nature conservation sites are located within the search but have no ornithological interest features:

- Shiel Dod SSSI – 490 m west – supports an assemblage of upland vegetation communities representative of the Southern Uplands. The upland assemblage includes blanket bog, subalpine dry dwarf-shrub heath, and calcareous types of spring-head, rill and flush.
- Lochwood SSSI - 6 km south-east from the main site but 950 m south from the eastern end of the site access road – an area of old parkland oakwood rare in the Scottish Lowlands, with many ancient oaks and birch-willow-alder carr, and important beetle, butterfly and lichen communities. It would be unaffected by the proposed development.
- River Tweed SAC – 11 km north-east – designated for its fish and otter populations, and wet woodland and riverine habitats.
- Moffat Hills SAC – 13 km north-east – designated for its upland vegetation communities including blanket bog, heath and montane grassland.
- Upper Nithsdale Woods SAC – 17 km west – designated for its wet woodland habitat.
- Tynron Juniper Wood SAC – 17 km south-west – designated for its juniper habitat.

7.5 Baseline Survey Results

Wintering Birds

7.5.1 The 2023-2024 wintering bird surveys found a range of wintering bird populations of conservation importance but with generally only low numbers within, or in proximity to, the Proposed Development in numerical terms and/or in the context of their regional (NHZ) populations. Key wintering bird populations recorded included:

- Pink-footed goose —five migrant flocks were recorded over-flying during the VP surveys, three in October (8, 33 and 93), one in December (55) and one in January (60).
- Barnacle goose – a single flock of 37 birds flew SSE over the site on 17/10/23. These were migratory birds heading to their wintering grounds on the Solway Firth, which migrate across this region on a broad front.
- Red grouse – this species was widely distributed across the higher ground in the western part of the survey area.
- Golden eagle – this species was seen on three dates, with an immature on 15/1/24, two sub-adults on 13/3/24 and a single subadult male on 22/3/24. All birds were likely from the South of Scotland Golden Eagle Project release scheme.
- Scarce raptor species (red kite, hen harrier and goshawk) – these three species were seen only very occasionally during the winter surveys, with no concentration of activity noted.
- Golden plover – small flocks of golden plover were seen using the site in November and February. Flocks were also seen overflying during the VP surveys.
- Common crossbill – there was a single record of this species in the conifer plantation on the southern edge of the site (December 2023).

Breeding Birds

7.5.2 The 2024 breeding bird surveys showed that the survey area generally supported a typical upland breeding bird community, with two high-value species, golden plover (an EU Birds Directive Annex 1 species) and common crossbill (a species specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act).

7.5.3 The breeding bird community included 17 medium-value species, five of which – red grouse, black grouse, snipe, curlew, and skylark – are open-ground species that could be vulnerable to the Proposed Development. The breeding bird assemblage as a whole was assessed as being nationally important (high-value).

7.5.4 Eight additional high-value Schedule 1/EU Annex 1 species were seen during the surveys: red kite, hen harrier, goshawk, golden eagle, osprey, merlin, hobby and peregrine. There was no evidence of nesting by any during the core or wider survey areas.

7.5.5 Initial consultation with the South of Scotland Golden Eagle Project (SSGEP) indicated that the site lies within an active range used by some of their re-introduced golden eagles.

7.5.6 Collision risk modelling will be carried out to inform the impacts of the Proposed Development on these species (Band *et al.* 2007, SNH 2017b, NatureScot 2024), but no specific spatial constraints have been identified from the surveys to date.

7.5.7 As the Proposed Development lies within the potential connectivity distance of the Castle Loch, Lochmaben SPA/Ramsar site (SNH 2016a), a Habitats Regulations Appraisal (HRA) will be undertaken to determine the effects of the proposal in terms of the EU Birds Directive.

7.5.8 Spatial constraints to reduce impacts on breeding birds will be implemented as required, though the precise locations will be informed by further breeding bird surveys in 2025 (as breeding areas may change between years).

7.6 Legislation, Policy and Guidance

7.6.1 The ornithological assessment will be undertaken following the guidance produced by NatureScot (SNH 2017). Additionally, the following documents will be taken into account in the assessment:

Legislation and Policy

- The Wildlife and Countryside Act 1981, as amended;
- European Union (EU) Council Directive 79/409/EEC and 2009/147/EC on the Conservation of Wild Birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive');
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 (as amended), which translates the Birds and Habitats Directives into Scottish Law;
- The Conservation of Habitats and Species (Amendments) Regulations 2017, relating to matters in Scotland;
- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive);
- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended);
- National Planning Framework 4 (NPF4) – sets out the spatial principles, regional priorities, national developments and national planning policy;
- Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment (Scottish Government 2013);
- PAN 51: Planning, Environmental Protection and Regulation (Scottish Government, revised 2006); and
- PAN 60: Planning for Natural Heritage (Scottish Government 2000).

Guidance

- Scottish Executive Circular 6/1995 EIR release (as amended June 2000). Information request and response under the Environmental Information (Scotland) Regulations 2004;
- Planning Circular 1/2017; Environmental Impact Assessment Regulations. Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017);
- 'Managing Natura 2000 Sites' (European Communities 2000);

- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2018);
- Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH 2017);
- Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al.* 2007);
- Avoidance rates for the onshore SNH collision risk model (SNH 2017b);
- Assessing the significance of impacts from onshore windfarms on birds outwith designated areas: version 2 (SNH 2018a);
- Assessing the cumulative impact of onshore wind energy developments (SNH 2018b);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH 2016a);
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information Guidance for Developers, Consultants and Consultees. Version 2 (SNH 2016b);
- Good Practice during Wind Farm Construction (Scottish Renewables et al. 2019);
- Birds of Conservation Concern (BoCC) 5: the Population Status of Birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury *et al.* 2021);
- The UK Post-2010 Biodiversity Framework;
- The draft Scottish Biodiversity Strategy comprising: 2020 Challenge for Scotland's Biodiversity; Scottish Biodiversity List (SBL, NatureScot 2020: https://www.nature.scot/doc/scottish-biodiversity-list)); and
- Scottish Biodiversity Strategy to 2045 Biodiversity: delivery plan 2024 to 2030.

7.7 Assessment Methodology

7.7.1 The key issues for the assessment of potential ornithological effects relating to the Proposed Development were identified as the following (after SNH 2018):

- Direct loss of bird habitat through construction of wind farm infrastructure;
- Disturbance of birds during construction and operation (including displacement of flight activity through barrier effects);
- Mortality of birds through collision with turbine blades or towers during operation; and
- Cumulative effects of wind farm operational disturbance and collision mortality, on the national and Natural Heritage Zone (NHZ) populations of key target species.

7.7.2 The assessment will include a full evaluation of the ornithological importance of the site's bird populations and identification of any particularly sensitive areas. Collision risk will be estimated for bird species of conservation importance regularly over-flying the Proposed Development site (based on the results of the vantage point surveys). This will be calculated using a standard modelling process, applying NatureScot-recommended avoidance rates. Possible disturbance effects will be assessed by determining the bird populations of importance within the wind farm area and its surrounds (based on the field surveys and any additional information available), and by reference to the current literature on bird-wind farm interactions. The assessment will be carried out with reference to the assessment methodologies produced by NatureScot (SNH 2018a) for the wider countryside, and the Chartered Institute for Ecological and Environmental Management (CIEEM 2018).

7.7.3 The conservation value (as defined in Table 7.1) of the receptors present in the Study Area will be identified, and then the magnitude of the possible effect on those receptors will be determined (as described in Table 7.2).

Table 7.1. Conservation Value of Bird Species

Value Definitions	Status
Very high	Cited interest of SPAs, Special Areas of Conservation (SACs) and SSSIs. Cited means mentioned in the citation text for those protected sites as a species for which the site is designated (SPAs/SACs) or notified (SSSIs).
High	Other species that contribute to the integrity of an SPA or SSSI A local population of more than 1% of the national population of a species. Any ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK. EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or Wildlife and Countryside Act Schedule 1 species (if not covered above). Other specially protected species.
Medium	Regionally important population of a species, either because of population size or distributional context. UK Biodiversity Action Plan (BAP) priority species (if not covered above).
Low	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above, present in only locally important numbers.
Negligible	Green-listed species (Stanbury et al. 2021) of favourable conservation status.

Table 7.2: Definition of terms relating to the magnitude of ornithological impacts

Magnitude	Definition
Very high	Total loss or very major alteration to key elements/ features of the baseline conditions such that post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: >80% of population/habitat lost
High	Major alteration to key elements/ features of the baseline conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/habitat lost.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20% of population/habitat lost.
Low	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/habitat lost.
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: <1% of population/habitat lost.

7.7.4 The combined assessment of the magnitude of an impact and the value of the receptor will be used to determine whether or not an adverse effect is significant. These two criteria have been cross-tabulated to assess the overall significance of that effect (Table 5.3). The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant effects in terms of the EIA Regulations. This gives a guide as to the determination of significance, though a final assessment should still be subject to professional judgment.

Table 7.3: Matrix of magnitude of impact and value used to test the significance of effects.

		SENSITIVITY				
		Very high	High	Medium	Low	Negligible
MAGNITUDE	Very high	Major	Major	Major-moderate	Moderate	Negligible
	High	Major	Major	Moderate	Minor	Negligible
	Medium	Major	Major-moderate	Minor	Negligible	Negligible
	Low	Moderate	Minor	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible

7.7.5 The interpretation of these significance categories will be as follows:

- Negligible and minor are not normally of concern, though normal design care should be exercised to minimise any adverse effects;
- Moderate represents a potentially significant adverse effect on which professional judgment must be made, though it is likely mitigation will reduce it below the significance threshold; and
- Major and major/moderate represent significant adverse effects on bird populations which are regarded as significant for the purposes of EIA.

7.7.6 The NatureScot (SNH 2018a) wider countryside assessment guidance defines the key significance test as follows: "An impact should be judged as of concern where it would adversely affect the favourable conservation status of a species, or stop a recovering species from reaching favourable conservation status, at international or national level or regionally." It notes that the key breeding bird baseline population for comparison is the SNH NHZ population. The site lies within the 'Border Hills' NatureScot Natural Heritage Zone (NHZ20).

7.7.7 As the survey area is likely to support specially protected species Schedule 1 of the 1981 Wildlife and Countryside Act, information on the breeding sites and associated flight activity of the species listed on that Schedule will only be provided in a Confidential Appendix. It is important that their breeding locations are kept confidential to minimise the risk of persecution and disturbance. Following NatureScot guidance, the amount of information contained in that Appendix will be kept to a minimum but will include any more detailed data that indicate breeding locations. The assessment of the effects that the Proposed Development may have on these species will be included in the Ornithology chapter (but without identifying nesting locations).

7.8 Cumulative Assessment

7.8.1 A cumulative ornithological assessment will be undertaken following the NatureScot (SNH 2018b) guidance on 'Assessing Significance of Impacts from Onshore Windfarms on Birds

outwith Designated Areas', considering impacts on the favourable conservation status of key species within the relevant Natural Heritage Zone.

7.9 Proposed Mitigation

7.9.1 Ornithological sensitivities will be taken into account as hard constraints when developing the wind farm layout design, with the adoption of appropriate buffers. A range of ornithological mitigation measures are likely to be required, primarily to reduce impacts on breeding birds during the construction phase. These will include the production of a Construction Method Statement to the satisfaction of NatureScot and other relevant stakeholders, timing of works to avoid more sensitive areas/times, and the development and implementation of a Breeding Bird Protection Plan (BBPP) to ensure that no Schedule 1 species are disturbed during the breeding season and protect other nesting birds.

7.10 Features/Impacts Scoped In or Out of Assessment

Scoped in Features/Impacts

7.10.1 No ornithological issues have been Scoped Out from this assessment, though, following NatureScot (SNH, 2018) guidance, the assessment will focus on the key species likely to be affected by the Proposed Development. Key species are being defined using the following criteria:

- species listed on Annex 1 of the EU Birds Directive;
- species listed on Schedule 1 of the 1981 Wildlife & Countryside Act;
- species identified by SNH (2018) as 'Priority bird species for assessment when considering the development of onshore wind farms in Scotland'. These include (a) species that are widespread across Scotland which utilise habitats or have flight behaviours that may be adversely affected by a wind farm, and (b) as 'restricted range' species; and
- red-listed species on the Birds of Conservation Concern list.

7.11 Scoping Questions to Consultees

7.11.1 The above surveys have been scoped to ensure that a robust and complete set of baseline ecological data is collected for the Proposed Development. Please can the consultees confirm if the survey and assessment methodologies are appropriate for the site and in relation to the Proposed Development.

7.12 References

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- Scottish Natural Heritage. (2018a). Assessing Significance of Impacts from Onshore Wind Farms outwith Designated Areas. SNH Guidance.
- Scottish Natural Heritage. (2018b). Assessing the cumulative impacts of onshore wind farms on birds. Guidance. SNH Guidance.
- Scottish Renewables. (2015). Good Practice during Wind Farm Construction.
- 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.
- Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D. and Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. British Birds, 113: 69-104.

8 Geology, Hydrology & Hydrogeology

8.1 Introduction

8.1.1 This chapter was produced by Locogen Consulting Ltd and sets out the proposed approach to the assessment of potential effects on hydrological, geological, and hydrogeological receptors including peat during construction and operation. The assessment is to be carried out in line with relevant legislation and guidance.

8.1.2 No relevant historic records, academic literature, archives, or other sources were found in a search for information on the Site and surrounding area.

8.1.3 For the purposes of scoping, a 500m study area has been proposed around the Site boundary, with an extended 5km study area applied for downstream receptors to account for cumulative impacts (Figure 8.1). Any effects out with this area are considered to be undetectable and thus, not significant.

8.2 Baseline Conditions

Geology and Hydrogeology

8.2.1 The British Geological Survey (BGS) 1:50,000 bedrock map indicates that the Site is underlain entirely by the Gala Group formation[15] (Figure 8.2). The Gala Group is a rock formation in the Southern Uplands from Orlock Bridge fault to the fault boundary with the Ettrick Group to the south and was formed during the Silurian period[16].

8.2.2 The BGS 1:50,000 map indicates there are Superficial deposits present beneath the Site, including Till, Devensian – Diamicton, Glaciofluvial deposits of gravel, sand, and silt, and Alluvium- silt, sand, and gravel (Figure 8.3). Superficial deposits are the youngest geological formations and typically form by natural processes related to wind, water, or ice[17]. The deposits present within the Site boundary are mostly found along river channels and contain unconsolidated materials.

8.2.3 The BGS 1:625,000 faults map indicates that there is one fault within 5km of the Site, which sits to the south and runs southwest to northeast. There are no faults or dykes present within the Site boundary.

8.2.4 The Site sits between two groundwater bodies, East Dumfrieshire (ID: 150690) and Leadhills (ID: 150667)[18]. The East Dumfrieshire Groundwater Body sits within the Solway sub basin district and has an overall classification of 'Good' as per the 2023 classification. The aquifer type is Silurian-Ordovician, and the dominant flow type is through fractures. The aquifer productivity is defined as low. This aquifer sits beneath the majority of the Site from Harestanes Heights and the Kinnel water valley to the eastern boundary.

[15] British Geological Survey (2024). Geoindex Onshore Map. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?layers=BGSBedrock50,BGSSuperficial50
[16] British Geological Survey (2018). Earthwise: Gala Group, Silurian Southern Uplands. Available at: https://earthwise.bgs.ac.uk/index.php/Gala_Group,_Silurian,_Southern_Uplands
[17] British Geological Survey (2025). BGS Geology Themes. Available at: https://www.bgs.ac.uk/datasets/bgs-geology/bgs-geology-themes/#:~:text=Superficial%20deposits%20(which%20we%20used,rocks%20referred%20to%20as%20bedrock.
[18] Scotlands Environment (2025). Scotlands Environment Map. Available at: https://map.environment.gov.scot/sewebmap/

8.2.5 The Leadhills Groundwater Body sits within the Clyde sub basin district and has an overall classification of 'Poor' as per the 2023 classification. It is also a low productivity fracture dominated Silurian-Ordovician aquifer. The aquifer comprises the northwestern portion of the Site, from the Crook Burn valley and Mid Height hill to the Site boundary.

8.2.6 Both groundwater bodies are listed as drinking water protected areas[18].

Peat and Soils

8.2.7 The BGS 1:50,000 superficial geology map includes peat deposits, however there are none present within the Site boundary. The Carbon and Peatland map[19] identifies four classes of peatland soil within the Site boundary.

- Class 0 is located on Queensberry Hill and along the Kinnel water valley at the north of the site, this is defined as mineral soil with no peatland vegetation. It's unlikely that peatland habitats are found on this soil type[20].
- Class 1 soils are defined as 'nationally important carbon-rich soils, deep peat, and priority peatland habitat'. These areas that are likely to be of high conservation value and can be found primarily between Mount Glass, Mid Height, and Harestanes Heights, as well as on the boundary by Lamb Hill.
- Class 3 soil is the dominant type on the Site, this is defined as predominantly peaty soil with some peat soil. The dominant vegetation type is not priority peatland but is associated with wet and acidic types/ Occasional peatland habitats can be found and some areas may contain deep peat. Most soils here are carbon rich.
- Class 5 is peat soil with no peatland vegetation, soils are carbon-rich and deep peat, however soil information takes precedence over vegetation. These areas are found on the western slope of Mid Height and Peat Hill.

8.2.8 The Soil Map of Scotland[21] indicates that the Site contains primarily peaty podzols, with smaller areas of peat, calcareous soils, and peaty gleys. Podzols are acidic soils with a grey leached layer just below the surface and an orangey-brown subsoils and or dark to black organic rich subsoils.

Hydrology

8.2.9 The Site is split between two main surface water catchments. The majority of the Site is within the River Annan catchment. This comprises the eastern section of the site, with the dividing lines along Harestanes heights, Mid Height and Mount Glass. The River Clyde catchment is located on the western side of these hills and includes the Crook Burn valley. The River Clyde catchment flows predominantly north, and the River Annan flows east-southeast.

8.2.10 The Site is drained by several minor watercourses, with the largest being the Crook Burn, which flows north into the Daer Reservoir. The reservoir has a classification of 'Good' and the Daer Reservoir catchment, which sits within the River Clyde catchment, is a drinking water protected area for surface water. All watercourses within the Site boundary are shown in Figure 8.4.

[19] Scotlands Soils (2016). Carbon and Peatland Map. Available at: https://map.environment.gov.scot/Soil_maps/?layer=10
[20] Scotlands Soils (2023). Carbon and Peatland Map- What is it? Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/
[21] Scotlands Soils (2024). National Soil Map of Scotland. Available at https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/

8.2.11 Kinnel Water (ID: 10653) is a designated watercourse under the Water Framework Directive (WFD), It has a 'Good' overall status and sits within the River Annan catchment. The majority of minor watercourses within the Site boundary are tributaries of the Kinnel Water.

8.2.12 Consideration will be given to all receptors within a 5km study area of the Proposed Development, if they are hydrologically connected. This includes all watercourses within the study area as well as some downstream receptors in the River Clyde and River Annan catchments.

Flood Risk

8.2.13 A review of Scottish Environment Protection Agency (SEPA) flood mapping[22] confirms there are some small areas across the Site that are at risk of flooding. There is a high likelihood of fluvial flooding (10% annual probability) along Kinnel Water from Blairmuc Burn, confined to the watercourse corridor until Kinnelhead Farm, where a medium likelihood flood risk area (0.5% annual probability) emerges. There is also a high likelihood of fluvial flooding along the Lochan Burn, beginning at the confluence with the Small Burn, this flooding is limited to the watercourse corridor. Crook Burn shows a high likelihood of flooding from Berry grain to the Daer Reservoir.

8.2.14 There are some small areas of surface water flooding across the Site, however these are minor and not expected to cause any issues to the Proposed Development.

Private Water Supplies

8.2.15 The Private Water Supply Sources- Scotland[23] dataset indicates that there are at least nine private water supplies (PWS) within 5km of the Proposed Development. This dataset may be incomplete and so a full investigation into PWS in the area will be conducted prior to the submission of the Environmental Impact Assessment.

Protected Sites

8.2.16 There are no protected sites located within the Site boundary. The closest is the Shiel Dod Site of Special Scientific Interest (SSSI)[24] which is located approximately 0.5km from the Site on the western slope of Earncraig hill. Shiel Dod is not hydrologically connected to the Site and is designated for its assemblage of upland vegetation communities which are representative of the Southern Uplands. This includes, blanket bogs, subalpine dry dwarf shrub heath and calcareous spring head, rill and flush[25].

8.2.17 There are no other protected sites located within 5km of the Proposed Development.

8.3 Study Area

8.3.1 The study area will be comprised of the land within the Site boundary, a 500m buffer and an additional study area of 5km for downstream hydrological, hydrogeological and geological receptors. All hydrologically connected receptors within a 5km radius will be assessed.

[22] Scottish Environment Protection Agency (2025). Flood Risk Information. Available at: https://map.sepa.org.uk/floodmaps/FloodRisk/Risk
[23] UK Government (2024). Private Water Supply Sources- Scotland. Available at: https://www.data.gov.uk/dataset/15a641b2-245f-4d23-9241-44d9134723c5/private-water-supply-sources-scotland
[24] NatureScot (2025). Protected Sites Map Search. Available at: https://sitelink.nature.scot/map
[25] NatureScot (N/A). Shiel Dod SSSI. Available at: https://www.nature.scot/sites/default/files/site-special-scientific-interest/1422/sssi-citation.pdf

8.4 Potential Impacts and Effects

8.4.1 Potential effects on hydrological, geological, and hydrogeological receptors may occur throughout the lifespan of the Proposed Development. These will be assessed as part of the EIA process, and will include identification of generic effects of construction, as well as the effects on specific locations and receptors which may be sensitive to pollution or disturbance. This includes, PWS, peatland habitats, and water crossings.

8.4.2 The access track shown in Figure 8.1 utilises existing roads, with only the final section into the main Site requiring construction works. It is assumed that impacts along the existing track roads will be limited.

8.4.3 Significant effects are more likely to occur during the construction phase of the Proposed Development. A summary of some of the potential impacts, arising from construction and operation, are summarised below.

Potential Impacts Arising from Construction

- Loss of peatland habitat through disturbance or disruption to natural flow paths.
- Ground instability and peat slides.
- Pollution to surface water sources and PWS from the release of sediment into watercourses, resulting from excavation, stockpiles, borrow pit works, or watercourse crossings.
- Pollution to surface or groundwater sources resulting from spillage of oils, fuels, chemicals, or other contaminants.
- Change in groundwater flow paths, which has the potential to impact GWDTEs.
- Change in flow paths and natural drainage systems, leading to changes in runoff rates and leading to an increased flood risk at downstream locations.

Potential Impacts Arising from Operation

- Pollution to surface or groundwaters resulting from maintenance works.
- Long term changes in natural surface or groundwater drainage and run off which may impact peatland, PWS, or GWDTEs.
- Increased runoff rates resulting from an increase in impermeable areas, leading to increased flood risk at downstream locations.

8.5 Proposed Methodologies

8.5.1 In addition to the desk-based assessment presented in Section **Error! Reference source not found.**, a Site reconnaissance survey, hydrological walkover, and phase 1 peat survey have been undertaken to obtain information on the peat, hydrology, and geology of the Site and to ground truth the findings of the desk based assessment.

Baseline Desk Study

8.5.2 A further baseline study will be included as part of the EIA, this will utilise all available sources and relevant information relating to hydrology, geology, and hydrogeology. The desk study will identify all sensitive features within the study area that have the potential to be affected by the Proposed Development.

Site Reconnaissance Survey

8.5.3 A Site reconnaissance survey was undertaken by Locogen Consulting Ltd, with a purpose of confirming the presence of peat within the Site boundary and any areas immediately bordering it. The survey was also focussed on identifying evidence of peat movement and any significant hydrological or hydrogeological features. The survey was undertaken following the desk-based review and prior to the beginning of the phase 1 peat probing surveys.

8.5.4 Further details of the site reconnaissance survey are presented in the Peat Instability and Hazard Assessment (PIHA) in Appendix 8.1.

Hydrological Walkover

8.5.5 A hydrological walkover was undertaken by Locogen Consulting Ltd, in conjunction with the phase 1 peat and site reconnaissance survey. The purpose of this was to identify the main hydrological receptors within the site boundary, including man-made drainage channels. The walkover allowed for the watercourse shapefiles to be updated to better reflect the on-site conditions, ensuring accurate 50m buffers can be applied to all watercourses within the Site boundary.

8.5.6 Further surveys may be required to design watercourse crossings and guide the placement of tracks and other infrastructure elements prior to submission of the EIA. Verification of drainage and further identification of PWS may also be required at this stage.

Peat Surveys

8.5.7 A phase 1 peat survey was carried out across the Site, in accordance with current guidance[26]. This comprised of peat depth measurements taken on a 100x100m grid. The data collected from the survey was then used to produce an interpolated peat depth map, which was then used to identify areas of deep peat and identify constraints which can be applied when designing the layout. This approach supports sustainable development and reduces potential impacts on peatlands.

8.5.8 The results of the phase 1 peat survey are shown in Figure 8.5. Peat soil is defined as soils equal to or greater than 50cm in depth. Development on peat greater than 100cm in depth should be avoided.

8.5.9 Notes on the peat condition, hydrological conditions, and vegetation were also recorded during the survey. Areas defined as near natural, indicating high quality peatland should also be avoided. The phase 2 survey will provide greater detail on peat quality and characteristics.

8.5.10 A detailed phase 2 peat depth survey will be undertaken prior to submission of the EIA, in accordance with government guidance[26]. This will be undertaken across the infrastructure footprints, with probing conducted at 50m intervals with 10m offsets along all tracks and 10x10m grids at all turbine locations and any other hardstanding areas. Additional probing points may be required to investigate areas at risk from the Proposed Development. Notes on hydrological condition and vegetation will also be recorded.

[26] Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot:document/Guidance+on+developments+on+peatland+-+peatland+survey+-+2017.pdf

8.5.11 During the phase 2 survey, peat core samples and in-situ testing will also be carried out. Samples will be collected at each turbine location, borrow pit, and other infrastructure location. Details of the acrotelm thickness, soil characteristics and humification (using the Von Post scale) will be collected. Core samples will then be analysed by a laboratory to determine bulk density, loss on ignition, and water content.

8.5.12 In-situ shear vane testing will be performed, with measurements taken each turbine location. The exact testing regime will be defined prior to the beginning of the phase 2 surveys.

Peat Instability Hazard Assessment

8.5.13 A Peat Instability Hazard Assessment (PIHA) has been produced to accompany this report (Appendix 8.1). The report uses desk-based information as well as data gathered during the phase 1 peat survey to assign instability scores to 25m grid squares within the Site boundary and identify areas of high, medium and low risk to inform for the initial wind farm layout. Both a qualitative and semi-quantitative approach has been implemented based on the data currently available.

8.5.14 A detailed Phase 2 Peat Landslide Hazard and Risk Assessment (PLHRA) and peat management and restoration plan will also be produced, these will be submitted alongside the final EIA submission. The PLHRA will utilise all available information from the PIHA and phase 1 and 2 peat surveys.

Assessment and Reporting

8.5.15 The EIA chapter for hydrology, geology, and hydrogeology will outline the methodologies of assessment and assign value to receptors within the study area using current policy and guidance. The following will also be undertaken as part of the assessment:

- Assessment of baseline conditions including, types of flooding, flow at watercourse crossings, PWS, and designated sites
- Identification and mapping of all hydrological and hydrogeological constraints
- Evaluation of significance of potential impacts and mitigation for potential impacts.

8.5.16 The main EIA chapter will be supported by technical appendices, including, but not limited to:

- PLHRA
- Peat management and restoration plan
- Hydrological impact assessment including FEH modelling, PWS assessment, watercourse crossings, and GWDTE
- Associated figures and maps

8.6 Mitigation and Design Considerations

8.6.1 In response to constraints identified through the assessments and surveys, the Proposed Development will undergo design iterations to avoid or reduce the potential effects on receptors where applicable.

8.6.2 It is expected that the following mitigation measures will be applied to the design of the Proposed Development:

- 50m buffer applied to watercourses within the study area where possible. This may be reduced where other constraints mean it is not possible. However, justification for this

reduction would be provided in the EIA and additional mitigation measures deployed to protect the water environment.

- Targeted peat probing during the phase 2 survey to ensure areas of deep peat can be avoided where practical.
- Site specific PLHRA will be prepared, with areas of increased risk to be avoided.
- Production of a peat management and restoration plan to maintain or improve the peatland habitat within the Site boundary where applicable.
- Impacts on PWS will be avoided.
- Impacts upon areas of GWDTE will be avoided where practicable.
- A water crossing assessment will be conducted to mitigate potential impacts resulting from the construction of crossings.

8.6.3 Industry guidance and best practice will be used to minimise the risks associated with construction and operation of the Proposed Development and develop site specific mitigation measures. These will be applied to control and mitigate against the disturbance and loss of peat, flood risk, watercourse crossings, impacts to surface and groundwater, and peat landslides. These will be defined in the EIA.

8.6.4 A Construction Environmental Management Plan (CEMP) will be implemented to ensure good practice is applied throughout the construction phase.

8.7 Environmental Factors Scoped Out of Assessment

8.7.1 It is proposed that the effects on geology are scoped out. Borrow pits will be used for rock extraction for the creation of tracks, and turbine and crane pad areas, however these are limited in area and will be confined to the immediate development footprint. There are no sensitive geological features within the Site boundary.

8.7.2 SEPA flood maps indicate that the Proposed Development does not sit within an area of fluvial or coastal flood risk, therefore it is proposed that a simple screening of potential flooding sources is presented in the EIA, alongside measures used to control run off. A detailed flood risk assessment will not be undertaken.

8.8 Consultation and Scoping Questions

8.8.1 No consultation has been undertaken at this stage; however, this will be undertaken prior to submission of the EIA. The following will be contacted during the consultation process:

- Dumfries and Galloway Council
- SEPA
- NatureScot
- Scottish Water
- Fisheries Management Scotland
- Marine Scotland
- River Annan Trust and District Salmon Fisheries Board

Questions

- Do you agree with the proposed study area?
- Do the consultees agree with the topics scoped in and out of the assessment?
- Do you agree with the proposed surveys to inform the baseline of the site and their methodologies?
- Do you agree that the proposed scope of the assessment is proportionate and suitable?
- Are there any receptors or resources that have not been mentioned that you believe should be included in the assessment?

9 Transport & Access

9.1 Introduction

9.1.1 The section covers the predicted transport and access issues that may arise from the construction of the Proposed Development, the significance of these effects and what suitable mitigation can be put in place to avoid, minimise or offset adverse effects.

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

9.1.3 The key issues for consideration as part of the assessment will include:

- The temporary change in traffic flows and the resultant, temporary effects on the study's road network during the construction phase;
- The physical mitigation associated with the delivery of abnormal loads; and
- The consideration of appropriate and practical mitigation measures to avoid, minimise or offset temporary effects.

9.1.4 The potential effects of these will be examined in detail.

9.2 Study Area

9.2.1 Construction traffic access for the Proposed Development will be taken directly from the A701 using the Ae Forest Timber haulage road junction. Loads will then proceed to the proposed turbine locations using upgraded forestry, estate and new access tracks.

9.2.2 The site access junction has been used for previous wind farm deliveries and is proposed to be used by the Daer Wind Farm and Rivox Wind Farm projects.

9.2.3 Abnormal Indivisible Loads (AIL) for turbine components will use the same access junction to enter the site. 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.

9.2.4 Locally sourced material will be used where feasible and traffic will avoid impacting on local communities as far as is possible.

9.2.5 The proposed study area is based on those roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development. The geographic scope was determined through a review of the other developments in the area, Ordnance Survey (OS) plans and an assessment of the potential origin locations of construction staff and supply locations for construction materials.

9.2.6 The proposed extents of the study area would be as follows:

- The A701 between Moffat and St Anns;
- The M74 between Junctions 16 and 16; and
- B7076 between M74 Junctions 14 and 15.

9.3 Baseline Conditions

9.3.1 The A701 is a two-way single carriageway road which forms part of the trunk road network to the west of the M74. To the east of the M74, the road is operated by Dumfries & Galloway Council

(D&GC) and links Edinburgh to Dumfries via Penicuik and Moffat. The A701 is predominantly subject to the national speed limit, however, this reduces when travelling through villages and settlements.

9.3.2 The M74 is operated by Autolink on behalf of Transport Scotland and provides trunk road connections between the M6 at Gretna and Glasgow. Within the study area the road is subject to a 70mph speed limit and has strategically placed grade separated junctions.

9.3.3 The B7076 provides the non-motorway access alongside the M74. The road is operated by South Lanarkshire Council (SLC) and D&GC and is generally subject to a 60mph speed limit.

9.3.4 There are two Core Paths recorded by Dumfries and Galloway Council that may cross potential access routes to the Proposed Development site. These are:

- The Annandale Way; and
- The Southern Upland Way.

9.3.5 Both routes cross the construction access route on the off-road section of the route. They cross the public road network on the A701 near Beattock, however the crossing is grade separated and no physical interaction at this location between users is possible.

9.4 Method of Assessment and Reporting

Baseline Data Collection

9.4.1 Baseline traffic count data will be obtained from new Automatic Traffic Count (ATC) surveys located on the B7076 to the north of Junction 15 of the M74.

9.4.2 Further traffic data for the study area road network will be obtained from UK Government Department for Transport (DfT) traffic count data and the Traffic Scotland database. 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.

9.4.3 Traffic accident data will be obtained from Crashmap UK for the study network to inform the accident review for the immediate road study area. Five years of data will be collated for the roads leading from Junction 15 of the M74 to the site access junction

Desk Study

9.4.4 A desk review of the study area roads will be undertaken using OS maps and aerial photography to identify constraints and receptors in the area and to inform the wider study.

Consultation

9.4.5 Consultation will be undertaken with the following statutory consultees:

- Transport Scotland (trunk road matters);
- SLC (matters relating to the B7076); and
- D&GC (for local road network matters).

9.4.6 Further consultation will be undertaken via the Electronic Service Delivery for Abnormal Loads (ESDAL) weight review for structures on the proposed AIL access route from King George V Docks in Glasgow to the Site via the strategic trunk road and local road networks.

Assessment of Effects

9.4.7 The Environmental Assessment of Traffic and Movement (IEMA, 2023) 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.

9.4.8 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.

9.4.9 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.

9.4.10 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.

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

9.4.12 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.

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

9.4.14 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.

9.4.15 Potential effects arising from the construction of the Proposed Development on road users and residents along the delivery route may include the following:

- Severance;
- Driver delay;
- Pedestrian delay;
- Non-motorised user amenity;
- Fear and intimidation;

- Road safety; and
- Large loads.

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

9.4.17 The effects on receptors identified within the study area will be reviewed for the construction phase, with a peak construction period assessment undertaken. This will include a review of the maximum potential impact and therefore it is considered to provide a robust assessment of the effects of construction traffic on the local and trunk road networks.

Residual and Cumulative Effects

9.4.18 Short term residual effects may occur and would be addressed by mitigation measures.

9.4.19 Medium long-term residual effects would not occur due to the short-term nature of the construction traffic.

9.4.20 Cumulative traffic assessments will be undertaken where publicly available information is available for consented developments that are of a significant scale.

9.5 Proposed mitigation

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

- Production of a Construction Traffic Management Plan;
- A Staff Sustainable Access Plan; and
- A Framework Abnormal Load Transport Management Plan.

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

9.5.3 Site specific mitigation, based upon experience of other schemes in the surrounding area, will include:

- Section 96 Agreement of the Roads (Scotland) Act to protect the public road against abnormal wear and tear in the study area;
- Design of the Site access junction to ensure that approved access routes are adhered to; and
- Enhanced temporary construction warning and direction signage.

9.5.4 Details of these measures will be detailed in the Transport Assessment.

9.6 Potential Sources of Impact

9.6.1 The main transport impacts will be associated with the movement of general heavy goods vehicles (HGV) traffic travelling to and from the Site during the construction phase of the Proposed Development.

9.7 Receptors / matters scoped out

9.7.1 Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly or weekly visits would be made to the wind farm 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 wind farm 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 development is proposed.

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

9.8 Questions for Consultees

- Stakeholders and consultees are asked to confirm their acceptance of the proposed Transport and Access study area, data collection methodology and assessment methodology.
- Stakeholders and consultees are asked to confirm any cumulative development considerations.
- Stakeholders and consultees are invited to respond using the Transport Scoping Form attached in Appendix 9.1.

10 Acoustics

10.1 Introduction

10.1.1 This Chapter sets out the proposed approach to the assessment of potential effects resulting from the construction and operation of the Proposed Development in relation to sound immissions.

10.2 Assessment Methodology

10.2.1 Operational acoustic impact will be assessed in accordance with ETSU-R-97[27] , and the Good Practice Guide to its application issued by the Institute of Acoustics[28]. This is consistent with '*Planning Advice Note 1/2011: Planning and Noise*'[29] and the further guidance provided in the web-based planning advice on renewable technologies for onshore wind turbines[30].

10.2.2 Although ETSU-R-97 makes reference to a background and operational noise, there is a distinction between sound and noise. This document differentiates between sound and noise and therefore the use of 'background sound' as well as '*operational sound*' is more appropriate.

10.2.3 Construction sound immissions will be discussed with reference to the procedures within BS 5228-1:2009+A1:2014[31]. This is consistent with the web-based Scottish Government technical advice on construction sound assessment in '*Appendix 1: Legislative Background, Technical Standards and Codes of Practice*'[32].

10.2.4 If blasting is required at potential borrow pits located at the Proposed Development, the expected sound and vibration levels will be discussed with reference to BS 5228-2:2009+A1:2014[33], BS 6472-2:2008[34] and '*best practicable means*' in this regard.

10.2.5 The study area will be determined by the proximity of nearby properties to the Proposed Development and the location of any neighbouring wind farms being considered as part of the cumulative assessment.

10.2.6 The acoustic assessment will include the nearest properties to the Proposed Development. Any properties that are in planning or consented will be considered alongside those already existing.

10.2.7 The assessment will consider the potential effects associated with construction and operation of the Proposed Development as detailed below.

10.2.8 BS 5228 provides various means of predicting construction noise and vibration levels from various plant and supplies a wide range of generic plant source noise levels for this purpose.

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[27] The Department of Trade and Industry (1997). ETSU-R-97: The assessment and rating of noise from wind farms.

[28] Institute of Acoustics (2013). A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise.

[29] Scottish Government (2011). Planning Advise Note 1/2011: Planning and Noise. Scottish Government.

[30] Scottish Government (2014). Onshore wind turbines: planning advice.

[31] Code of practice for noise and vibration control on construction and open sites - Part 1: Noise', British Standards Institution, BS 5228-1:2009+A1:2014.

[32] Scottish Government (2011). Appendix 1: Legislative Background, Technical Standards and Codes of Practice.

[33] Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration', British Standards Institution, BS 5228-2:2009+A1:2014.

[34] British Standards Institution (2008). BS 6472-2:2008 Guide to evaluation of human exposure to vibration in buildings – Part 2: Blast induced vibration.

However, the construction of the Proposed Development is not expected to have any significant impacts given the distance of the turbines from neighbouring properties and the generic nature of the works. As a result, it is proposed that specific construction noise predictions will not be undertaken and only a discursive assessment is provided.

10.2.9 An assessment of potential effects of sound due to the operation of the wind farm at the nearest properties will be undertaken. The operational acoustic assessment will be carried out on the basis of the sound pressure levels with penalties applied for tonality, if applicable.

10.2.10 It is not proposed to carry out an assessment of the potential effects of sound from operation of the wind farm at specific frequencies, e.g. low frequency sound, or the potential effects of other sound and vibration characteristics due to operation, such as amplitude modulation and vibration. However, a generalised discussion of these topics, in relation to current guidance and research, with reference to the Proposed Development will be provided.

10.2.11 The construction and operation of BESS is not expected to have any significant impacts upon neighbouring properties in the region of 1 km or more. As a result, it is proposed that a 1 km buffer will be used in the layout design and an acoustic assessment of the proposed BESS be scoped out.

10.3 Baseline Conditions

10.3.1 The acoustic environment around the site is expected to be typical of a rural area and consist of sounds generated by wind, watercourses, farm machinery, birds, distant traffic and occasional overflying aircraft. Additionally, noise from the operational Harestanes and Minnygap wind farms are likely to contribute to the acoustic environment.

10.3.2 It is proposed that there would be no requirement for background noise surveys for the Proposed Development due to the extensive amount of data which is already available for the nearest noise sensitive receptors. The results obtained from multiple survey positions associated with cumulative wind farm developments would be used to represent the background environment expected to occur at the other nearby assessment locations considered. The existing background noise data for the neighbouring sites would be used to derive daytime and night-time noise limits for each of the assessed properties. This approach is consistent with the guidance provided by ETSU-R-97 and current good practice as set out in the IOA GPG. Furthermore, there is the potential for background noise levels to be affected by the presence of the existing turbines.

10.4 Potential Effects

10.4.1 The potential impact of sound and vibration on residential amenity at nearby properties due to the operation of the Proposed Development will be assessed. Where necessary, appropriate mitigation measures will be proposed, and any residual impacts identified.

10.4.2 The potential impact of sound and vibration on residential amenity at nearby properties due to the construction and decommissioning of the Proposed Development will be addressed through a discursive assessment. Specific construction noise predictions will not be undertaken.

10.5 Cumulative Effects

10.5.1 A cumulative assessment will consider any neighbouring wind farms that are close enough to result in the potential for a significant cumulative effect on the identified properties. Any wind farms that are in planning (having had an application for consent submitted) will be considered along with those that are already operational or consented.

10.6 Mitigation

10.6.1 Standard good practice measures to reduce acoustic impact during construction will be implemented in line with the '*best practicable means*' defined by the Control of Pollution Act 1974 (her Majesty's Stationary Office, 1974)[35]. If additional mitigation measures are required, this will include a reduction in construction activities or traffic during certain periods, where considered appropriate.

10.6.2 The potential effects of sound due to operation of the wind farm will be considered in the design process via the application of nominal buffers to neighbouring residences within which turbines will not be placed.

10.6.3 The results of the baseline sound monitoring taken from the cumulative wind farm development acoustic assessments will also inform the design of the site, with greater separation distances potentially being required for residences with relatively low background sound levels and corresponding derived acoustic limits.

10.6.4 The turbines which comprise the Proposed Development will be operated in reduced sound modes if this is necessary to meet the acoustic limits derived in accordance with ETSU-R-97.

10.6.5 The potential operational acoustic impacts from the battery energy storage system associated with the wind farm will be considered in the design process by incorporating appropriate buffers between the storage system compound and neighbouring residences.

10.7 Summary of Scope

10.7.1 Potential impacts relating to the operation of the Proposed Development will be discussed and assessed as part of the EIAR supporting the planning application.

10.7.2 The nearest planned, consented or existing properties within an approximate 10 km radius of the centre of the Proposed Development are scoped into the assessment.

10.7.3 As explained earlier, it is proposed that background sound monitoring will not be undertaken.

10.7.4 **Specific assessments of low frequency sound, amplitude modulation or vibration due to operation of the Proposed Development are scoped out of the assessment**. However, a discussion of relevant guidance and research regarding these topics will be provided as supporting information.

10.7.5 It is proposed that specific construction noise predictions associated with the Proposed Development will not be undertaken and only a discursive assessment is provided.

[35] Her Majesty's Stationary Office (1974). Control of Pollution Act.

10.7.6 It is proposed that an **acoustic assessment of the proposed BESS be scoped out**, as is not expected to have any significant impacts given the distance buffer from neighbouring properties that will be implemented.

10.8 Questions for Consultees

10.8.1 RES has consulted the Dumfries & Galloway Council's Environmental Health on this topic and agreed the scope presented. Consultees should fully justify any alternative to be considered.

11 Climate Impact

11.1 Policy

11.1.1 The EIA will help inform an assessment of the proposed development against local and national climate and planning policies which will be presented separately from the EIA Report in a Planning Statement.

11.2 Carbon Balance

11.2.1 In framing the climate change context and state of climate emergency, a carbon balance assessment will be undertaken using SEPA's online carbon calculator. Results will be presented in the EIAR to inform the assessment on climate change.

12 Aviation & Other Issues

12.1 Aviation

12.1.1 Aviation is considered to not be an EIA topic but will be assessed and the findings presented in a separate technical report that will accompany the application.

12.1.2 Radar systems can be susceptible to interference from wind turbines as the blade movement can cause intermittent detection by radars within their operating range. This is particularly relevant where there is a radar line of sight between the radar and the wind turbines. Due to their height, wind turbines can also impact airports and airfields if they protrude into the safeguarding areas above and around them.

12.1.3 Consultation will be undertaken once the locations of the wind turbines have been finalised with appropriate interested parties. The technical report will present the findings of these consultations and all responses received, as well as any predicted impacts on aviation and mitigation required.

12.1.4 There are aviation and defence interests in the area that could potentially be affected by the proposed development. Initial assessments indicate that operations at the NATS En Route Limited (NERL) primary and secondary radars at Lowther Hill, situated approximately 12 km from the proposed development, may be impacted. It is likely too that the Ministry of Defence (MOD) Deadwater radar at RAF Spadeadam, some 59 km from the development will be impacted. The proposed development is also located inside the Eskdalemuir Seismic Array consultation zone and, at 20 km from the array, the proposed development will cause an unacceptable impact under the existing MOD procedures. A national working group is actively consulting the MOD on developing a new process.

12.1.5 Consultation will be undertaken with civil and military aviation stakeholders to agree if mitigation measures are necessary.

12.1.6 The UK Air Navigation Order (ANO) 2016, Article 222, sets out the statutory requirement for the lighting on en-route obstacles, which applies to structures of 150 m or more above ground level. A visible lighting scheme will be agreed with the Civil Aviation Authority (CAA). The MOD is likely to request an infra-red lighting scheme for low flying military aircraft in the area and this will be agreed through consultation with the MOD.

12.2 Television and Telecommunications

Television and Radio

12.2.1 Wind turbines have the potential to adversely affect analogue television reception through either physical blocking of the transmitted signal or, more commonly, by introducing multi-path interference where some of the signal is reflected through different routes.

12.2.2 Most television services these days are served by a digital transmitter and, therefore, television reception is unlikely to be affected by the development of the windfarm as digital signals are rarely affected. In the unlikely event that television signals are affected by the Proposed Development, mitigation measures will be considered by the applicant. **Television reception is, therefore, scoped out from the EIA**, and will be documented in a separate Technical Report to accompany the application.

12.2.3 Broadcast radio (FM, AM and DAB digital radio) are transmitted on lower frequencies than those used by terrestrial television signals. Lower frequency signals tend to pass through obstructions more easily than the higher frequency signals, and diffraction effects also become more significant at lower frequencies. Both these factors will tend to lessen the impact of new structures on broadcast radio (Ofcom, 2009).

12.2.4 **It is therefore proposed that an assessment of potential effects on broadcast radio is scoped out of the EIA** and will be documented in a separate Technical Report to accompany the application.

Telecommunications and Fixed Links

12.2.5 Wind turbines have the capability of affecting electromagnetic transmissions by physically blocking or dispersing the transmission/signal. This means that telecommunications and/or broadcast signals could experience interference.

12.2.6 Consultation will be undertaken with relevant stakeholders and consultees with respect to telecommunications.

12.2.7 Ofcom is responsible for the licensing of two-way radio transmitters. It holds a register of most fixed links and will therefore be consulted in order to establish baseline conditions. However, because not all fixed links are published, system operators will also be individually consulted on the potential for the Proposed Development to cause electromagnetic interference.

12.2.8 **This subject matter is not considered to be EIA related and will not form part of the EIAR**. Nonetheless, the outcome of this consultation process, including any mitigation actions taken, will be detailed in a separate Technical Report to accompany the application.

12.3 Shadow Flicker

12.3.1 Shadow flicker occurs when a certain combination of conditions prevail at a certain location, time of day and year. It firstly requires the sun to be at a certain level in the sky. The sun then shines onto a window of a residential dwelling from behind the wind turbine rotor. As the wind turbine blades rotate it causes the shadow of the turbine to flick on and off. This may have a negative effect on residents in affected properties.

12.3.2 In the UK, significant shadow flicker is only likely to occur within a distance of 10 times the rotor diameter (of a wind turbine), from an existing residential dwelling.

12.3.3 The rotor diameter of the proposed turbines would be up to 170 m; so the potential area in which shadow flicker could occur would be up to 1,700 m from the proposed turbine locations. Once the final turbine layout and parameters are fixed, the locations of residential properties in proximity to the Site will be verified and if any are situated within ten rotor diameters from the proposed turbine positions including any micro siting radius, a shadow flicker model will be run to predict potential levels of effect.

12.3.4 Based on the design of the Proposed Development undertaken to date, and the location of some residential properties found in the surrounding area, it is likely that a shadow flicker assessment will be undertaken, covering residential properties within 10 rotor diameters of turbines.

12.3.5 If shadow flicker cannot be avoided through design, technical mitigation solutions are available, such as shutting down turbines when certain conditions prevail. Thus, it is considered that

shadow flicker will not be a significant effect and is scoped out of the EIAR but nevertheless will be presented in a separate Technical Report accompanying the application.

12.4 Ice Throw

12.4.1 Ice throw is where ice formation on blades is thrown onto the ground below during operation. Its impact on a receiving body is potentially hazardous. Ice throw may occur during the project operational time given the climatic conditions at the location of the Proposed Development (as can be seen in the Wice Atlas icing Map[36] (2023), which shows icing levels across regions of the country).

12.4.2 As per SNH 2019[37] "Wind turbines have a risk of ice throw and warning signs at access points should highlight this issue. These should advise the public not to stand close below towers, and to take care when nearby and in-line with turbine blades, under icy conditions."

12.4.3 Accordingly, signage will be recommended and a note added to the Project Management Documentation and Obligations Register. Further mitigation may be implemented if found to be required. This would be bespoke to the situation and risk.

12.4.4 It is therefore proposed that **ice throw is scoped out of the EIA,** albeit documented in a separate Technical Report to accompany the application.

12.5 Forestry

12.5.1 Forestry is considered to not be an EIA matter and will not be presented in the EIAR. There is an area of commercial forestry in the northeastern corner of the site, which has been felled.

12.5.2 A new access spur is proposed to be taken from the existing forest track through an existing break in the woodland as shown in Figure 1.1.

12.5.3 Where felling and tree management is required, this will be detailed in a separate technical report to accompany the application and will quantify compensatory replanting that may be required.

12.6 Socio-economics

12.6.1 The socio-economic impact of the Proposed Development is not considered to be an EIA matter however it will be assessed and presented in a separate report to accompany the application.

12.7 Summary

12.7.1 The topics discussed in sections 12.1-12.6 are important factors but considered to be either not relevant to EIA or not create significant adverse effects and therefore scoped out of the EIAR. They will however be documented in a separate Technical Report accompanying the application.

[36] http://virtual.vtt.fi/virtual/wiceatla/
[37] https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction