



Balgray Wind Farm

SCOPING REPORT

22nd December 2023





Contents

1. Introduction.....	4
2. Proposed Development.....	6
3. General Approach to the Environmental Impact Assessment Report.....	14
4. Environmental Impact Assessment Report.....	17
5. EIA Subjects.....	22
6. Landscape and Visual Amenity	23
7. Ornithology	36
8. Ecology.....	47
9. Hydrology, Geology and Hydrogeology	57
10. Noise	60
11. Socio-Economic Assessment	67
12. Cultural Heritage.....	76
13. Traffic and Transport	89
14. Climate Change.....	93
15. Aviation, Telecommunications and Eskdalemuir	94
16. Shadow Flicker	98
17. EIAR Accompanying Documents	100
18. Responding to this Scoping Report	101
Appendix A. Not Used	104
Appendix B. Landscape and Visualisation Figures.....	105
Appendix C. Ornithology and Ecology Letters of Engagement.....	106
Appendix D. Peat Probing Interpolation.....	107

1. Introduction

1.1. Project Context

This Scoping Report has been prepared by Locogen Consulting on behalf of Fred. Olsen Renewables Limited (Fred. Olsen Renewables) in anticipation of an application under Section 36 of the Electricity Act 1989 for a wind farm development to the east of Sibbaldbie, Lockerbie, Dumfries and Galloway ('the Proposed Development').

Under the statutory procedures set out in the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations) it is proposed that any such application is accompanied by an Environmental Impact Assessment Report (EIAR). Under Regulation 12 of these EIA Regulations, a formal opinion of the information to be supplied in the EIAR is sought from Scottish Ministers. The purpose of this report, in seeking a scoping opinion, is to ensure that all relevant issues surrounding the Proposed Development are addressed using appropriate methods within the EIA process and preparation of the EIAR.

Under the regulations the purpose of this scoping report is to identify those potentially significant environmental effects which might require further assessment and to scope out those which do not.

The design of the proposed development to date has been an iterative process, and the layout has avoided impacts as far as possible. It may be that the layout presented in this Scoping Report is further refined during the EIAR preparation process and through further consultation. Therefore, it should be noted that any amendments to the design are unlikely to increase the likelihood of a significant effect. However, should any changes occur that are likely to result in a significant or unknown effect on an important feature previously scoped out, then this feature will be scoped back into the EIA process as part of the preparation of the EIAR. Any changes will first be discussed with the relevant consultees, to ensure that they too are in agreement with the applicant's understanding and before altering the inclusion or exclusion of features from the EIAR.

1.2. The Developer

The proposal is being developed by Fred. Olsen Renewables who have been involved in the onshore wind industry since their first investment in 1996. Since then, they have endeavoured to sympathetically develop greenfield wind farm projects over a range of sites. In addition to the UK, they now have activities in Norway, Sweden and the Republic of Ireland where a number of projects are currently under development.

Fred. Olsen Renewables has 530 MW of operational onshore wind capacity. Fred. Olsen Renewables' aim is to participate in projects from an early stage - from initial community engagement and site selection through to planning, construction and operation of the projects over their lifetime. The approach is based on a successfully demonstrated full lifecycle principle.

1.3. The Agent

Locogen is an independent Scottish company comprising a team of professional project managers, engineers, planners and environmental consultants with expertise in the development and implementation of low carbon generating technologies.

Our team have extensive experience in the development and delivery of a range of renewable technologies for commercial, public sector and community organisations.

The specific services we provide for wind energy projects includes (among others):

- Environmental screening and scoping works;
- Management of the EIA, planning submission and appeal process;
- Grid connection applications, negotiations and agreements;
- Wind monitoring and detailed wind resource and energy yield assessments;

Locogen has successfully project managed the construction of over 40 commercial wind energy projects.

1.4. Previous Application

The Agent is aware that an application was made to the Scottish Government for a substantially different development known as Newfield Wind Farm (09/C/4/0011) in August 2010 on land that includes the proposed application site at Balgray. The proposed Balgray Wind Farm development is within a much reduced development area which is pulled back into the site, with a reduced number of turbines to that considered under the Newfield Wind Farm application..

1.5. Proposed Development Brief

The Applicant is investigating the potential for a wind farm development consisting of the erection, 35 year operation, and subsequent decommissioning of up to 7 turbines with a maximum turbine heights of 230m to blade tip and up to 43MW battery energy storage system.

The principal elements of the Proposed Development are described in further detail below.

- up to 7 wind turbines, with a turbine heights of up to 230m to tip;
- foundations supporting each wind turbine;
- associated crane hard standings at each turbine location;
- external transformer housing;
- a network of onsite access tracks and associated watercourse crossings;
- a network of underground cables to connect the turbines to the onsite substation;
- an onsite control building and substation;
- a permanent anemometer mast or LiDAR compound for wind monitoring;
- temporary construction and storage compound(s), laydown area(s) including car parking;
- temporary borrow pits;
- site signage; and
- battery energy storage systems which are designed to complement renewable energy generation.

2. Proposed Development

2.1. Site Description

The Proposed Development is located Dumfries and Galloway, approximately 6km northeast of Lockerbie. It is set in a rural area comprising of a mix of upland hills and areas of forestry. The Residential property of Balgrayhill is located on the south of the site with a number of residential properties (both individual and clusters) in the surrounding area, in particular to the west, including (but not limited to) Balgray Home Farm, Rockhillflat, Hallhills, Hewke and Claydaubing Bridge, and Sibbaldbie. The settlement of Boreland is located 2.0km north of the site. The site is a single parcel of land owned by Balgray Estate. The Proposed Development boundary is shown in Figure 2.1 in red, and is shown as the 'Development Area'.

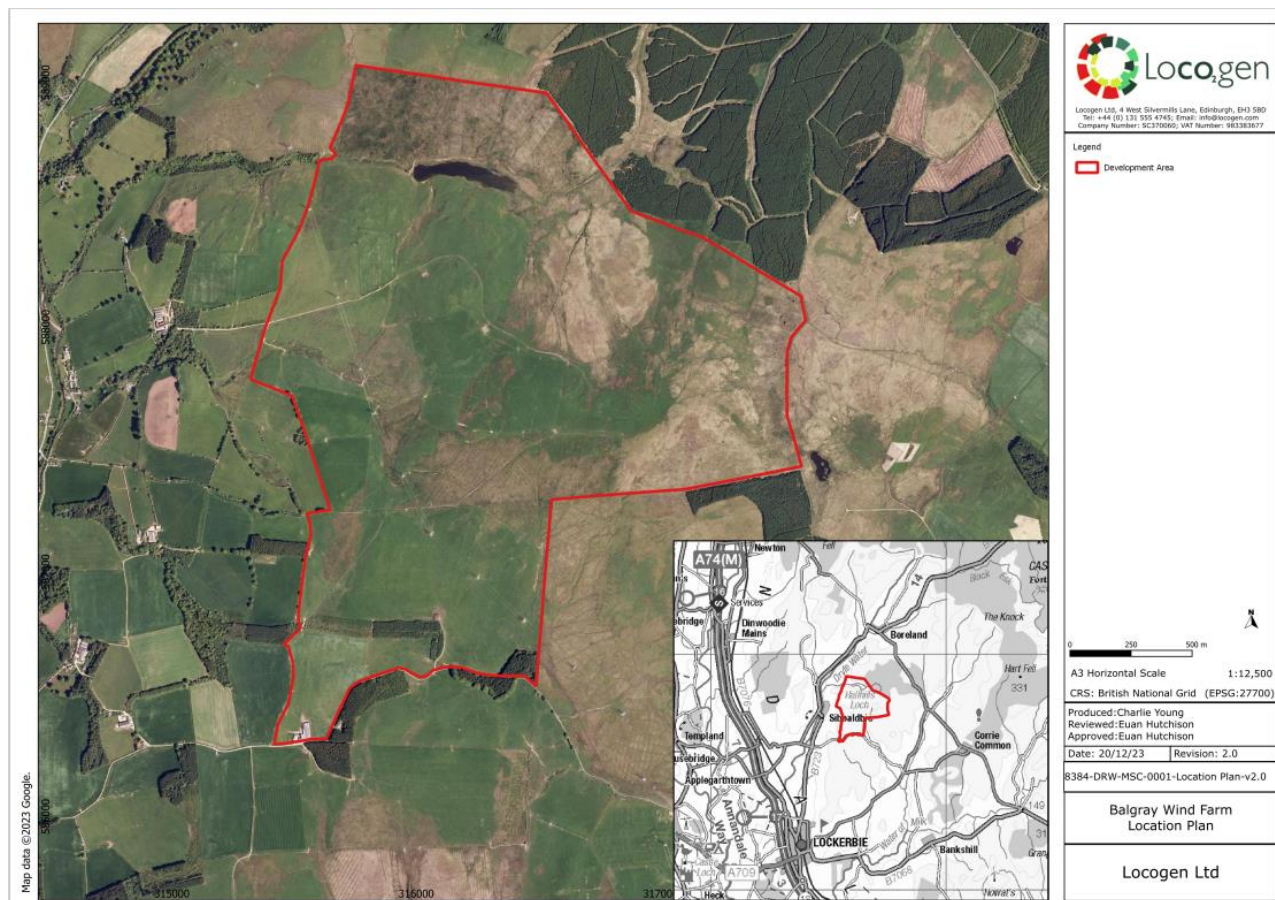


Figure 2.1 Site Location Plan

The Proposed Development will utilise, upgrade and extend the existing access tracks on site. This informed the initial site design process. Wind resource monitoring is ongoing, results to date are encouraging and will enable the project to contribute towards net zero in Dumfries and Galloway, renewable energy targets in Scotland and the UK. The lifespan of the Proposed Development is proposed to be 35 years, after this time the project would be decommissioned, or options to repower the project and extend the lifetime of the project could be investigated.

2.2. Physical Characteristics

The landform comprises primarily of a series of foothills rising up from the eastern part of Dryfe Valley, namely Firtree Hill (250m AOD), Rockhillflat Hill (206m AOD) and Mid Hill (221m AOD), with areas of sloping and undulating upland plateau. The landscape in the area is characterised by semi-improved pasture, rough pasture, heath and coniferous forestry plantations. An Overhead Transmission Line (OHL) runs across the site from north to south.

The site is bounded to the west by adjacent upland farmland grazing, to the north by forestry plantation, to the east by upland farmland and coniferous forestry and to the south by a minor public road. Hallhills Loch is in the north of the site and a number of small tributaries pass through the site draining primarily west into the Dryfe Water, with some tributaries draining south and east into Water of Milk. Both these watercourses join the River Annan. There are a few small roads and tracks servicing farms and forest operations accessing the site from westerly and southerly directions.

2.2.1. Other Wind Developments

There are no operational wind farms immediately adjacent to, or within the immediate area, of the Proposed Development. There are a number of wind farms located within the wider area of the Proposed Development, and these will be considered as part of the cumulative assessments.

2.2.2. Other Proposed Development and Land Use

The Proposed Development site is also subject to a forestry planting application which if implemented could alter the existing baseline of the EIA.

2.3. Wind Turbines

A specific turbine model has not yet been selected but will most likely consist of a horizontal axis machine with three rotor blades up to a maximum height of 230m to tip. Depending on the candidate turbine selected, external transformers may also be placed next to each turbine. All wind turbines of greater than 150m in height require visible, red aviation lights, and the intention is the scheme will be developed in consultation with Civil Aviation Authority (CAA) and agree a reduced lighting scheme before the application is submitted.

Crane pads would be left in-situ following erection of turbines to allow for maintenance and replacement of parts as necessary during the lifetime of the project.

2.4. Turbine foundations

The foundations of the turbines will consist of concrete reinforced with steel bar. Typically, a turbine foundation specification is an inverted 'T' shape consisting of a large pad with protruding upstand left approximately 200mm above ground level. Detailed design specifications for each foundation will depend on site-specific factors such as ground conditions, the specific turbine used, and other engineering factors.

Following the construction of the foundations, a layer of vegetation and/or mineral soils that was excavated from the turbine foundation area would be reinstated. Stability for the turbine is provided through the weight of the foundation and the material replaced and compacted over it. A drainage system may be installed around the foundation depending on the height of the water table in order to prevent the build-up of water pressure under the foundation. In some instances in locations that are particularly sensitive to hydrological disturbance, a

submerged foundation design could be employed which would eliminate the need for a drainage system around the foundation.

2.5. Crane hardstand and temporary laydown areas

To facilitate the construction and maintenance of the proposed wind turbines, crane hard stands and temporary laydown areas will be needed. At this early stage in the process the final location, design and orientation of these has yet to be determined but would be undertaken in accordance with the principles identified elsewhere in this report and any potential residual impacts highlighted in the EIAR.

2.6. Access Tracks

Where possible existing access tracks will be utilised but additional site tracks will also be required. The route alignment of the tracks will be chosen to minimise potential impacts on the environment, while taking account of other site-specific constraints, and the EIAR will include rationale for their location.

The construction of the site tracks falls under the two following main categories:

- ‘Cut’ track – This involves the removal of superficial ground layers, along with soft subsoils until an adequate bearing layer is reached which can be used for the formation level. This method of construction will be used on steeper topography where floating track is deemed unacceptable due to ground conditions or slope stability and would generate higher volumes of excavated material.
- ‘Floating’ track – is when superficial layers and subsoils are left in-situ with the track built on the existing ground level, utilising geotextiles and geogrids to reinforce the track materials. This technique is generally used where there are deep soft underlying materials e.g. peat or soft clays. Watercourse crossings would be minimised as far as possible and where these cannot be avoided then indicative water crossings would be identified and assessed.

2.7. Temporary Borrow Pits

On site temporary borrow pits may be used to minimise the potential effects on the environment and transport network associated with transporting aggregate materials to site and utilising site-won stone reduces the potential to alter the pH of groundwater on site. The EIAR will include search areas of the proposed locations for on-site borrow pits.

The EIAR will present details of the borrow pit designs including indicative borrow pit plans. A detailed working borrow pit scheme and a decommissioning and restoration strategy would be produced pre-construction as part of an appropriately worded suspensive condition.

2.8. Buried Electrical Export Cables

The transformers will connect to a substation via high voltage underground cables placed in linear trenches which will follow the route of the on-site tracks where possible. In addition electrical marker posts will be placed to identify their locations where the cables cross open ground.

2.9. Anemometry Mast(s)

Anemometry masts are used to monitor wind speed and directional flow across the wind farm site in order to gather data on the available wind resource. This in turn provides a greater degree of certainty within the gathered data, overcoming seasonal variations in wind

flow and identifying the potential for mechanical or electrical failure. In many instances there is a need to move masts around larger sites in order to gain a more comprehensive understanding of wind characteristics across the whole site.

2.10. External Transformer Housing

The proposed wind turbines would produce electricity at a range between 690 Volts and 1000 Volts. This electricity would then be transformed to 33,000 Volts (33kV) via a transformer located external to the tower of each turbine, dependent on the final turbine model used. The transformers would be linked to an on-site substation via the high voltage underground cables.

2.11. Temporary Construction and Storage Compounds, Laydown Areas and Ancillary Infrastructure

In order to facilitate construction, temporary compounds may need to be developed strategically within the site. Infrastructure associated with the construction and operation of the Proposed Development will be required. This infrastructure will be constructed in line with best practice and relevant guidelines in order to minimise environmental impacts.

2.12. Drainage and Drainage Attenuation Measures (as required)

Detailed drainage design will include sediment management measures to attenuate and treat runoff from wind farm infrastructure.

2.13. Substation, Compound and Control Building

The control building would serve as the sites operational hub. The surrounding compound will provide additional services such as storage and car parking. The substation will increase the electricity generated on site for connection to the national grid.

2.14. Battery/energy storage

A battery energy storage system (BESS) facility of approximately 43MW capacity (equivalent 258MWh if developed with 6 hour battery) is proposed to the south of the site consisting of battery containers with some external ancillary infrastructure in order to store excess electricity generated by the Proposed Development and to export it when required. Its external appearance is similar to a shipping container with lithium-ion battery cells inside. These will be grouped together in a secure compound.

Assessments will be undertaken for a number of stages;

Construction - specific assessment for transport and installation of materials.

Operation Noise from the operation of electrical equipment will be assessed. This will comprise equipment including, but not limited to; transformers, power electronic converters and cooling fans. This is very similar to the characteristics of electricity substations, and normal procedures for estimating noise emissions are considered best practice.

A fire safety plan will be written encompassing the design, installation, operation which will utilise best practice and industry guidance.

Decommissioning No specific issues are expected, provided obligations are placed to remove and dispose of active materials from the site. It is anticipated the detail can be included in a decommissioning plan.

The environmental impact of the BESS will be considered at all stages of the assessment.

2.15. Grid Connection

The proposed wind turbines will generate electricity at 690 Volts - 1000 Volts. The electricity is then transformed to 33,000 Volts (33kV) via a transformer located immediately adjacent to the tower of each turbine, depending on the final turbine model to be used. The transformers would be linked to an on-site substation by high voltage underground cables in trenches which follow the route of the on-site tracks where possible, with electrical marker posts used to identify their locations where the submerged cables cross open ground.

Connection of the Proposed Development to the national grid would be subject to a separate application. The Applicant is assessing potential options for a transmission connection to the electrical distribution network. The grid connection will be subject to a separate application for consent by SP Transmission Plc, under Section 37 of the Electricity Act 1989. Accordingly, any potential environmental effects as a result of offsite grid connection will not be considered in the EIAR.

2.16. Operational Period

The Proposed Development will automatically operate most of the time and will be monitored by an experienced team at the control building on site and by the Applicant's remote operations team. Each individual turbine operates independently from the other. The pitch angle of the turbine blades of each individual turbine would automatically be adjusted by the control system within the turbine, as appropriate for the measured wind speed within the operational wind speed range.

In the event sensors, placed within the nacelle of the turbine, register any instability in the structure or any other malfunction in operation or should wind speeds increase over safe limits, then the turbine would automatically shut down as a safety precaution. If the shutdown is due to high wind speeds then the turbine would automatically recommence operation once average wind speeds fall within the operational range (generally between approximately 4 metres per second (m/s) and 25m/s, i.e. 9 miles per hour (mph) and 56mph, although potential technological improvements may allow for operation during stronger winds. Under other causes of shut down the turbine would remain shut down and in a safe condition until manually restarted by a member of the operations and maintenance team.

The expected lifetime of the project is envisaged to be 35 years from the commencement of operating to decommissioning. Turbines are now generally designed with a warranty life of at least 30 years although further advances in technology and understanding of turbine life may prolong this. To ensure that turbines continue to operate at optimum performance levels regular pre-planned maintenance and servicing programmes are performed at the site on each turbine, in addition to any maintenance undertaken in the event of a malfunction. Minor scheduled maintenance checks are usually carried out every six months with major services being undertaken annually throughout the entire lifetime of the turbine.

Each turbine contains lubricating and hydraulic oils. These are often removed and replaced during regular maintenance operations. In the unlikely event of a lubricant leak the fully sealed tower bottom would act as a bund containing the spillage temporarily until it can be appropriately cleaned up. Spill kits would be made readily available on site. Storage of other potentially polluting substances on site during the operational period of the wind farm would only occur in agreement with relevant authorities such as SEPA.

Maintenance and operation staff on site would make use of the control building.

2.17. Decommissioning

At least six months prior to the decommissioning of the site a Decommissioning Method Statement would be prepared and agreed with the relevant consultees. Best practice guidelines at this time will be employed.

Locogen expects a planning condition regarding decommissioning to be attached to the consent. Should the Proposed Development be consented, its restoration fund would be expected to include salvage from turbine components. The provision of the fund should avoid creating unnecessary duplication for the both the landowner and the planning authority.

If, nearer the time of decommissioning, it is considered by the wind farm operator that the development area may be suitable for re-powering or if the existing wind farm infrastructure is suitable for a lifetime extension, the Applicant may submit a new application to the relevant authority for such development.

2.17.1. Project Design

The iterative design process has considered a range of turbine heights and locations that led to the current layout design (Figure 2.2). This iterative design process may result in further changes throughout the Environmental Impact Assessment Report preparation process. As such, the layout (Figure 2.2 contained within this Scoping Report) may develop further in response to further survey work, the Scoping Opinion and public consultations.

As part of the project, measures will be undertaken to ensure that the Proposed Development results in a biodiversity net gain, with the proposal seeking to conserve, restore and enhance biodiversity within the site. Specific measures have not been identified at this stage of the development; however, biodiversity net gain will likely be achieved through a combination of habitat creation, restoration and enhancement. Were feasible, priority habitats including degraded peatland habitat will be the primary focus of conservation and enhancement.

Should the turbine layout change from now to the application, it should be noted that the layout presented within this scoping report represents a 'greatest extent scenario' and generally any amendments to the design will not increase the likelihood of a significant impact. Should there be any subsequent changes to the turbine layout that are likely to have a significant impact on identified receptors then these will be included within the EIAR. If the changes are not likely to have a significant impact, these will first be discussed with the relevant consultees to ensure that they too are in agreement with the Applicant's understanding.

A micro-siting allowance of up to 75 m will be sought within the application to allow flexibility.

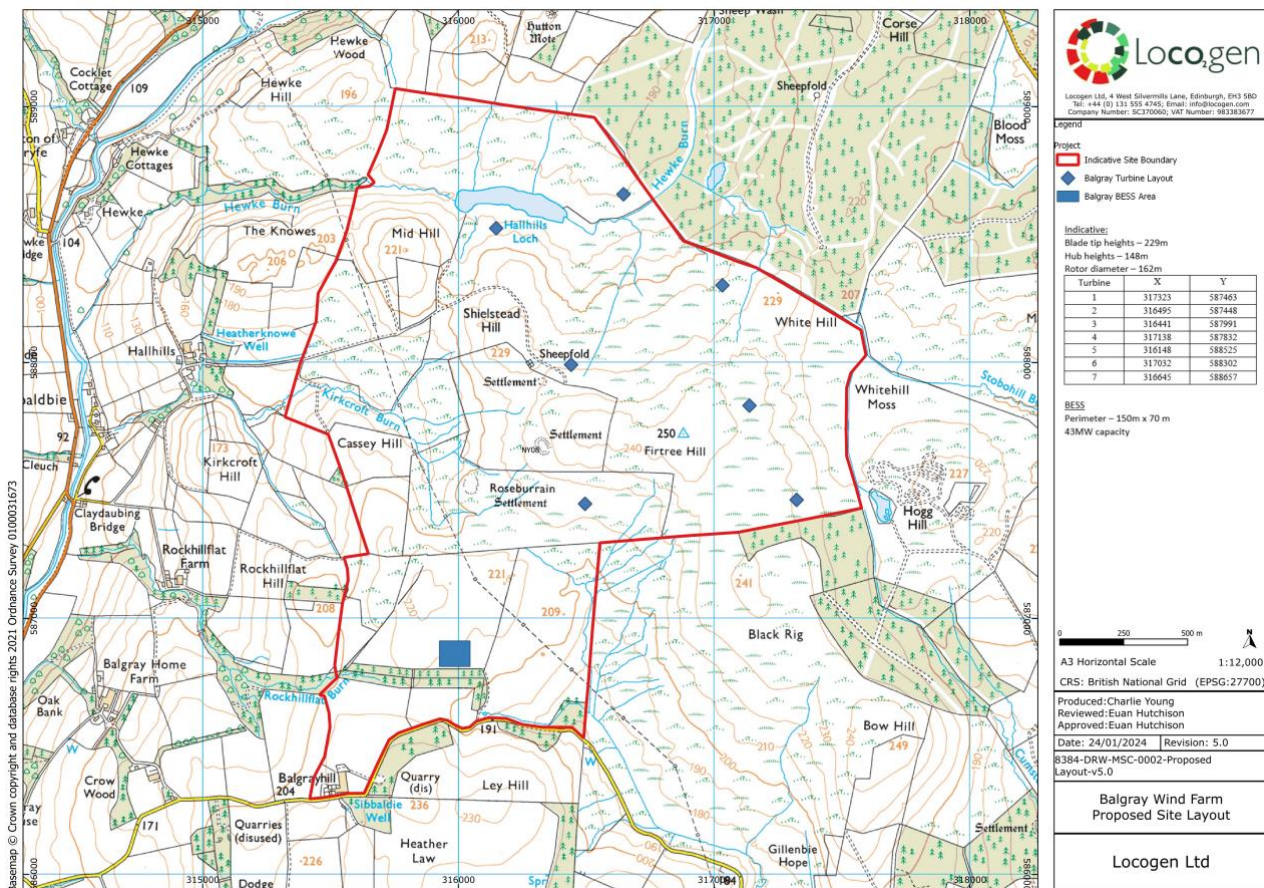


Figure 2.2: Proposed Site Layout

2.17.2. Turbine Delivery

The Proposed Development is located in a relatively rural part of Dumfries and Galloway but road access to the site is relatively good with the A74(M) Motorway, the B723 road and Breckenry Road lying to the west of the site. The B723 and Breckenry Road provide the main link between the motorway and the site with short sections of the B7068 and B7076 used to access the motorway at Junction 17.

The A74(M) motorway will also be the key strategic route for the importation of other construction materials that will be required to construct the windfarm. It provides excellent linkage to the central belt of Scotland as well as a direct linkage to the M6 motorway that extends into the north of England.

The A74(M), Breckenry Road, the B7068, B7076 and B723 will be used as construction routes to access the Proposed Development with materials coming from both the north and south. The B723 between Lockerbie and the site will be used as a construction route and there may be a small percentage of development traffic using the B723 north of the site.

The Proposed Development site itself will be accessed from an Unclassified Road that extends eastwards from the B723 to the south of the Development site. A new access junction would be formed on this road with a new access track constructed to take traffic northwards to the turbine locations.

Abnormal Loads carrying blade components are likely to be transported from KGV docks in Glasgow to site by road. The route would involve vehicles travelling along the local road network to the M8 and then south to the A74(M) to Lockerbie. At Lockerbie, the vehicles would exit the motorway at Junction 17 to join the B7068 before heading northwards on the

B7076 and north eastwards on Breckenry Road to the B723. At the junction of the B723, vehicles would cross the B723 onto an Unclassified Road to head eastwards before turning north into the site.

2.17.3. Construction Works

It is estimated that construction works would take approximately 24 months to construct the Proposed Development. Construction works would include the following main activities:

- working of borrow pits;
- construction of the temporary construction compound;
- construction of site access tracks, passing places and any watercourse crossings;
- construction of culverts under tracks to facilitate drainage and maintain existing hydrology;
- construction of turbine foundations and transformer plinths where required;
- construction of an onsite substation (and energy storage system);
- excavation of trenches and cable laying adjacent to site tracks;
- movement onto site and delivery and erection of wind turbines;
- commissioning of the wind farm; and
- site restoration including re/planting.

Where possible, construction activities will be carried out concurrently to reduce the overall length of the construction programme. Phasing of the construction process may result in civil engineering works progressing in some areas of the Site whilst turbines are being erected elsewhere.

To minimise disruption to land use, site restoration would be undertaken as early as possible. It is anticipated that stone will be sourced from onsite borrow pits; however, it may be necessary to import some stone to the Site. Stone and other construction material would typically be transported by road from source or seaport. Large loads such as wind turbine components (rotor blades, tower sections and nacelles) would be transported to the Site by specialised abnormal load vehicles using the designated route referred to above.

A Construction Environment Management Plan (CEMP), incorporating a Construction Method Statement (CMS) would be agreed with the Local Planning Authority prior to commencement of construction. The production of the CEMP is an essential element in managing the environmental impact of the Proposed Development, is regarded as an embedded part of the application and would be secured through an appropriately worded Planning Condition. Similarly, no development will commence until a suitably qualified Ecological Clerk of Works (ECoW) has been appointed. The ECoW's role is to oversee construction operations and ensure that they are carried out in accordance with the relevant management plans. Once again this is considered as an essential and embedded part of the proposal, and it is proposed that the ECoW's appointment would be secured by an appropriately worded Planning Condition.

3. General Approach to the Environmental Impact Assessment Report

EIAR preparation process is a statutory procedure and legal requirement which ensures that the likely significant impacts of development of a certain type and scale on the environment are fully appraised and considered in the decision-making process. It provides an opportunity to 'design out' potentially significant adverse environmental effects early in the process. Prevention or avoidance at the outset are generally considered preferable to mitigation or remediation measures at a later stage.

3.1. EIA as part of the EIAR Process

The environmental impacts of the scheme will be predicted for each of the environmental topics by comparing the baseline environmental conditions with the conditions that would prevail should the scheme to be constructed and operational. The environmental effects of the scheme will be predicted in relation to the main environmental receptors built resources and natural resources.

A distinction will be made in the assessments between impacts and effects, where:

- Impacts are defined as the predicted change to the baseline environment attributable to the scheme; and
- Effects are the consequence of impacts on environmental resources or receptors.

3.2. Temporal Scope

The EIA will address the construction phase, the operational phase which would last for approximately 35 years, as well as the decommissioning phase.

3.3. Spatial Scope

The geographical coverage of the EIA will include taking into account the following:

- the physical extent of the application site and the proposed works within it;
- the nature of the baseline environment and the manner in which effects are propagated; and
- pattern of governmental administrative boundaries which provide the planning and policy context for the scheme.

3.4. Establishment of Environmental Baseline

The assessment team will ensure that sufficient data is collated to enable a robust and comprehensive assessment, appropriate to the nature and scale of the proposed works. The extent of the baseline assessment will be determined using both professional judgement and industry best practice. In addition, the EIAR will also identify areas where the baseline may change, prior to the construction and operational phases of the project from current conditions (for example, maturation of landscape change in a cumulative context etc). This will be considered as part of the assessment.

Baseline data will be collected through various ways including desk top study, consultation, field surveys and monitoring. All of this will be clearly reported in the EIAR. The EIAR will also indicate any difficulties encountered in compiling environmental baseline conditions (such as the potential forestry planting in the development area) in accordance with the regulations.

3.5. Iterative Design Stage

Locogen and Fred. Olsen Renewables recognise that EIA is an iterative process and therefore findings from the EIA baseline activities will inform and influence the design of the wind farm proposal and then the potential impacts of the proposal will be assessed. This iterative process of design and environmental assessment will continue until an optimized design for the proposal is realised that avoids potential for environmental impacts where possible.

3.6. Prediction and Evaluation of Impacts and Effects

The prediction of impacts assesses the change to the environmental baseline that may result from the construction and operation of the Proposed Development. The effects will be categorised into one or more of the following:

- positive effects that have a beneficial influence;
- negative effects that have an adverse influence;
- temporary effects that persist for a limited period of time only, due to particular construction activities for example;
- permanent effects resulting from an irreversible change to the environmental baseline or which persist for the foreseeable future;
- direct effects that arise from activities that form an integral part of the project;
- indirect effects that arise from activities not explicitly forming part of the project;
- secondary effects that arise as a result of an initial effect of the scheme; and
- cumulative effects that arise from the combination of different impacts at a specific location, the recurrence of impacts of the same type at different locations, the interaction of different impacts over time, or the interaction of impacts arising from the scheme in conjunction with other unrelated development projects.

There is no statutory definition of what constitutes a significant effect. A significant effect may be considered as an effect which, either in isolation or combination with other effects, should be taken into consideration in the decision making process. This general definition will be used as the basis against which the significance criteria for environmental disciplines will be developed. The threshold of significance for predicted effects can potential vary between the environmental topics. The assessment team will ensure that a consistent approach is applied to prevent undue weight being given to a particular discipline to the detriment of another.

3.7. Mitigation of Environmental Effects

Mitigation measures will be considered as part of the assessment for all resulting effects including any significant adverse effects. The EIAR will include a description of the measures designed to prevent, reduce and where possible remedy any significant adverse effects. In line with the regulations, when identifying mitigation measures, the project will take into account the practicability and cost effectiveness of the proposals and how effective they are in reducing environmental impacts. Where practical, mitigation measures will be outlined as commitments to ensure they are implemented. Mitigation incorporated into the design to avoid impacts will also be recorded.

Once the final design has been adopted and account has been taken of any mitigation measures, residual adverse effects will be listed. The significance of a residual adverse effect will be determined by correlating the magnitude of the change arising from the scheme with the sensitivity of the particular component under consideration.

The EIAR will describe the measures proposed to prevent, mitigate against or remedy any significant adverse effects. The residual effects once the design is finalised and mitigation measures are taken account of will be listed. The level of significance will be determined by correlating the magnitude of change and the sensitivity of the resource or receptor as illustrated below:

3.7.1. Magnitude of change

Magnitude	Description
High	Total loss or major alteration to key elements/features of the baseline conditions
Medium	Partial loss or alteration to one or more key elements/features of the baseline conditions
Low	Minor shift away from the baseline conditions
Negligible	Very slight change from baseline conditions

3.7.2. Significance of effect

Sensitivity of Resource/Receptor	Low	Medium	High
Magnitude of Impact			
High	Moderate	Moderate / Major	Major
Medium	Low / Moderate	Moderate	Major
Low	Low	Low / Moderate	Moderate
Negligible	Negligible / Low	Low	Low / Moderate

4. Environmental Impact Assessment Report

The EIA process will result in the production of an Environmental Impact Assessment Report (EIAR). The EIAR will identify those features/ receptors that have been agreed with the competent authority and their advisers as those that are likely to have a significant effect from the Proposed Development and will make an influence on their decision process.

It will focus on each of the broad topics identified within this Scoping Report, plus any others that develop throughout the remainder of the EIA process until submission.

Where features are considered, the assessment methodology, results, effects and mitigation proposed (if any) will be included. This will allow for the residual effect from the Proposed Development to be identified to allow the competent authority sufficient information to determine the application.

The EIAR will supplement the application and will include a Non-Technical Summary (NTS). A Pre-Application Consultation (PAC) Report, a Planning Design and Access Statement are likely to also be provided to support the application.

The EIAR is likely to comprise the following volumes:

- Volume 1: EIAR written text
- Volume 2: Figures
- Volume 3: Technical Appendices
- Volume 4: Non-Technical Summary

Volume 1 of the EIAR will comprise the following chapters:

Topic	Chapter	Title
<i>Introductory</i>	Chapter 1	Introduction
	Chapter 2	Approach to EIA
	Chapter 3	Site Selection and Design Evolution
	Chapter 4	Project Description
<i>Biological and Physical Environment</i>	Chapter 5	Landscape and Visual Impact Assessment
	Chapter 6	Ecology
	Chapter 7	Ornithology
	Chapter 8	Noise
	Chapter 9	Hydrology, Geology and Hydrogeological Assessment
<i>Population and Human Health</i>	Chapter 10	Forestry
	Chapter 11	Transport and Access
	Chapter 12	Cultural Heritage
	Chapter 13	Aviation, Telecommunications and Eskdalemuir
	Chapter 14	Shadow Flicker

Chapter 15	Socio Economics
Chapter 16	Climate Change
<i>Summary of Chapter 17</i> <i>Assessment</i>	Residual, Synergistic Effects and Schedule of Mitigation and conclusions

As per Regulation 17 of the EIA Regulations, the EIAR will be submitted to Scottish Ministers by hard copy, as well as electronically. Upon submission of the application, the EIAR will be made available for public inspection in accordance with Regulation 18 at appropriate locations to be agreed with Dumfries and Galloway Council and will be distributed to the relevant consultees. The NTS will be submitted as part of the EIAR, and will provide a summary of the main findings and will be written in a non-technical language for ease of understanding.

The preparation of the Environmental Impact Assessment Report (EIAR) draws together an assessment of the likely significant environmental effects arising from the Proposed Development.

The EIAR will continue the iterative design process already being undertaken on this project. The EIAR has numerous steps which provides the opportunity to mitigate or remove environmental effects through project design, removing the requirement to provide measures to prevent, reduce or offset significant effects later in the EIAR process.

The EIAR will consider the construction, operational and decommissioning phases of the wind farm. The geographical area of the EIAR will take into account the physical extent of construction works; the baseline environment and the manner in which effects are propagated; and National and Local planning and policy context for the Proposed Development.

The EIAR will identify the baseline through desktop studies, consultation, field survey and monitoring, as well as areas where this baseline may change prior to the wind farm's construction and operation.

The effects of the Proposed Development will be classified as follows:

- Positive effects that have a beneficial influence;
- Negative effects that have an adverse influence;
- Temporary effects that persist for a limited period (for example due to particular activities during construction)
- Permanent effects resulting from irreversible change to the baseline environment
- Direct effects arising from activities that form an integral part of the Proposed Development
- Indirect effects arising from activities not explicitly form part of the Proposed Development
- Secondary effects arising as a result of an initial effect
- Cumulative effects arising from a combination of different impacts at a location, recurrence of impacts of the same type at different locations, interaction of different impacts over time or the interaction of impacts arising from the scheme in conjunction with other projects; and
- Synergistic effects where several individual impact factors combine to have an effect on a receptor greater than the total of the individual impacts.
- Effects will also be considered according to those affecting the natural environment and those affecting human health and pop

The EIAR will describe the measures proposed to prevent, mitigate against or remedy any significant adverse effects. The residual effects once the design is finalised and mitigation measures are taken account of will be listed. The level of significance will be determined by correlating the magnitude of change and the sensitivity of the resource or receptor as illustrated below:

4.1. Magnitude of change

Magnitude	Description
High	Total loss or major alteration to key elements/features of the baseline conditions
Medium	Partial loss or alteration to one or more key elements/features of the baseline conditions
Low	Minor shift away from the baseline conditions
Negligible	Very slight change from baseline conditions

4.2. Significance of effect

Sensitivity of Resource/Receptor	Low	Medium	High
Magnitude of Impact			
High	Moderate	Moderate / Major	Major
Medium	Low / Moderate	Moderate	Major
Low	Low	Low / Moderate	Moderate
Negligible	Negligible / Low	Low	Low / Moderate

4.3. Securing Commitments and Mitigation through Planning Conditions

Where commitments have been discussed within this scoping report, they will form part of the EIAR and will be secured, if the Proposed Development receives consent, through specific planning conditions. The proposed conditions will be addressed specifically in the Planning Design and Access Statement.

4.4. Legal Policy and Climate Change

The application will be submitted and will seek consent under Section 36 of the Electricity Act 1989, and in doing so will also seek deemed planning consent under section 57 of the Town and Country Planning (Scotland) Act 1997. In doing so reference will be given to the following legislative and policy framework. This will be principally considered in the Planning Design and Access Statement.

International and European Context

COP 28 UAE – UN Climate Change Conference

- COP 28 UAE – UN Climate Change Conference
- The COP UN Paris Agreement 2015
- Intergovernmental Panel on Climate Change 2018 (IPCC)
- The United Nations Emissions Gap Report 2020
- European Union (EU) Directive 2009/28/EC

United Kingdom energy policy

- The Climate Change Act 2008
- UK Government Energy White Paper – Powering our Net Zero Future in 2020
- Committee on Climate Change (CCC) – Reducing UK emissions – 2019 Progress Report to Parliament and Committee on Climate Change – Net Zero; The Sixth Carbon Budget
- Climate Change Act 2008 (2050 Target Amendment) Order 2019
- Reducing UK emissions – 2020 Progress Report to Parliament
- Strategy and Policy Statement for Energy Policy in Great Britain: consultation – May 2023
- British Energy Security Strategy 2022
- Powering up Britain: Energy Security Plan 2023

Scottish Government energy policy

- The Climate Change (Scotland) Act 2009
- The Reducing Emissions in Scotland – 2020 Progress Report
- The Scottish Government's Programme for Scotland 2020-2021 – 'Protecting Scotland, Renewing Scotland' (2020)
- Update to the Climate Change Plan 2018 – 2032: Securing a Green Recovery on a Path to Net Zero
- The Scottish Energy Strategy 2017
- The Onshore Wind Policy Statement (OWPS) 2022
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019
- Climate Ready Scotland: climate change adaptation programme 2019-2024
- Draft Scottish Energy Strategy and Just Transition Draft Plan 2023
- Scotland's Electricity and Gas Networks: Vision to 2030
- Onshore Wind Sector Deal for Scotland 2023

National Planning Policy

- National Planning Framework 4 (NPF4) 2023

Local Policy

- Dumfries and Galloway Local Development Plan 2
- Wind Energy Development: Development Management Considerations

4.4.1. Consultation

Early and ongoing engagement with the local community is considered critical to the evolution and development of the proposed wind farm. This helps identify key issues and concerns and provides invaluable feedback in terms of collating baseline data that will be used to inform the EIAR.

Initial engagement has already been established with the local community, and a programme of statutory and public consultation has been created. This will include at least 2 public exhibitions, attendance of community council meetings, one to one meetings with local residents and other interested stakeholders, leaflets drops, creation of a project website with feedback options, engagement through social media outlets, and appointment of a dedicated point of contact.

In addition, engagement will be undertaken with statutory stakeholders in order to gain further baseline information and feedback in terms of key issues and likely surveys required.

This process of continued engagement with both statutory and non-statutory consultees will also help inform potential mitigation and remedial measures as well as influencing the overall evolution of the Proposed Development. This will be presented in a PAC Report.

5. EIA Subjects

In the following sections the subject areas included in the Scoping Report are provided. Where it is considered that certain subjects or particular aspects within subjects can be scoped out of the EIAR, evidence and a rationale is provided.

Natural Environment

6. Landscape and Visual Amenity
7. Ornithology
8. Ecology
9. Hydrology, Geology and Hydrogeology

Human Health and Population

10. Noise
11. Socio-Economic Assessment
12. Cultural Heritage
13. Traffic and Transport
14. Climate Change
15. Aviation, Telecommunications and Eskdalemuir
16. Shadow Flicker
17. EIAR Accompanying Documents
18. Responding to this Scoping Report

Appendices

6. Landscape and Visual Amenity

6.1. Introduction

It is acknowledged from the outset that, in common with almost all commercial wind energy developments that some landscape and visual effects would occur as a result of the Proposed Development.

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.

Therefore, it is proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken 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 energy projects and are fully familiar with the landscape in the vicinity of the site.

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.

6.2. The Site

The site is located at Firtree Hill on open moorland hills within the administrative boundary of Dumfries and Galloway Council (DGC). The Residential property of Balgrayhill is located on the south of the site with a number of residential properties (both individual and clusters) in the surrounding area, in particular to the west, including (but not limited to) Balgray Home Farm, Rockhillflat, Hallhills, Hewke and Claydaubing Bridge, and Sibbaldbie. The settlement of Boreland is located 2.0km north of the site. The nearest main settlements to the proposed turbines are Lockerbie, situated approximately 5.2 km to the south west, Moffat, situated approximately 17.7 km to the north north west, Langholm situated approximately 19 km to the east south east and Dumfries situated approximately 20 km to the south west.

The nearest main transport routes include the A74(M) situated approximately 5 km to the west, the B723 situated approximately 1.3 km to the north west and the B7068 situated approximately 5.9 km to the south.

The site and the proposed turbine locations are shown on Figure 2.2Error! Reference source not found..

6.3. Guidance and Legislation

The LVIA will be prepared 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).

The methodology and assessment criteria proposed for the LVIA will be 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.”

The approach has therefore been developed specifically for this assessment to ensure that the methodology is fit for purpose. Consideration has also been given to the following documents:

- NatureScot (2022) Landscape Sensitivity Assessment Guidance (Methodology);
- NatureScot (2021) Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments;
- NatureScot (2020) General pre-application and scoping advice for onshore wind farms;
- NatureScot (September 2020) Assessing impacts on Wild Land Areas – technical guidance;
- Landscape Institute (2021) Assessing landscape value outside national designations, Technical Guidance Note 02/21;
- SNH (2017) Siting and Design of Wind farms in the Landscape, Version 3a;
- SNH (2017) Visual Representation of Wind farms Version 2.2;
- SNH (2018) A Handbook on Environmental Impact Assessment, Appendix 2: Landscape and Visual Impact Assessment, Version 5;
- Landscape Institute (2019) Technical Guidance Note 06/19, Visual Representation of Development Proposals; and
- Landscape Institute (2019) Technical Guidance Note 02/19, Residential Visual Amenity Assessment.

Full details of the methodology will be provided within the LVIA chapter of the EIA Report.

6.4. Proposed Scope of Assessment

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, its surroundings and 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 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.

6.5. Distinction between Landscape and Visual Effects

In accordance with the published guidance, landscape and visual effects will 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 Proposed 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.

6.6. Study Area

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 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 to blade tip height using a turbine height of 230 m and is presented at **Figures 6.1 and 6.2 (Appendix B)**.

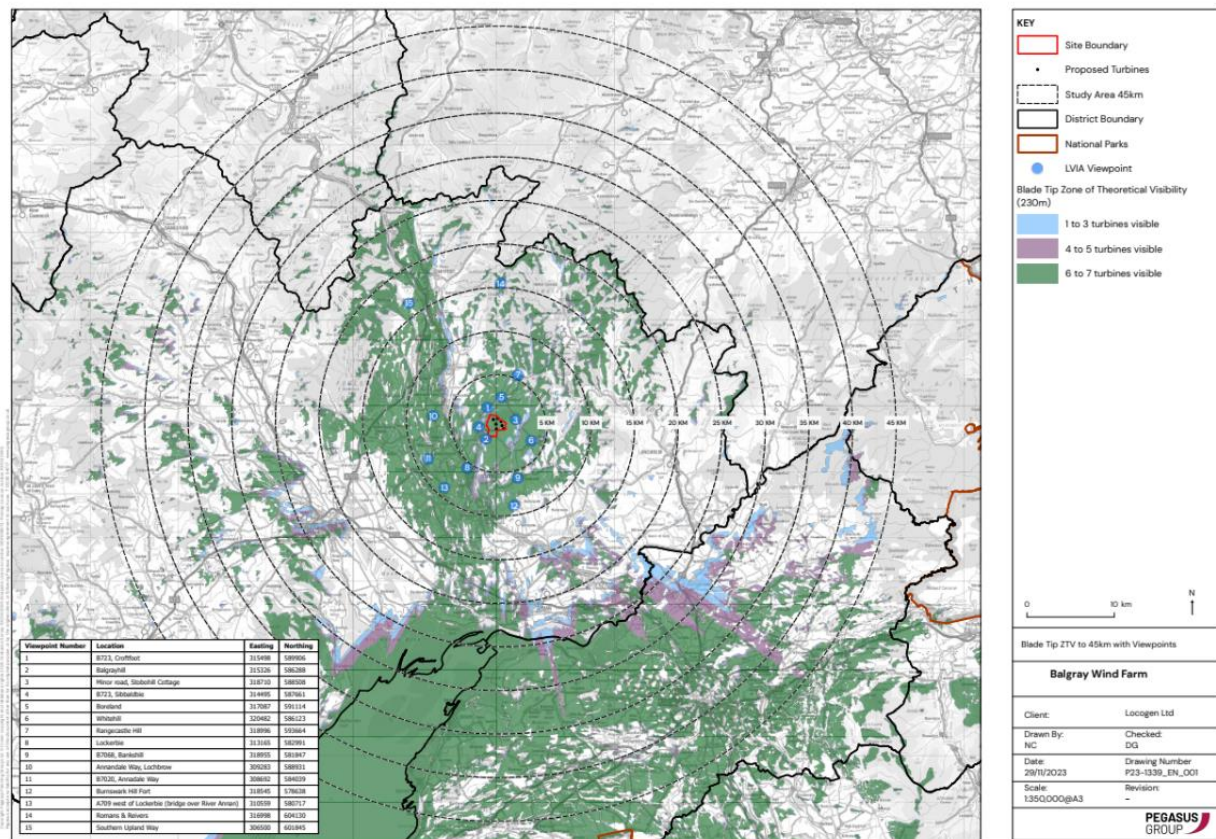


Figure 6.1 - Blade Tip ZTV to 45km with Viewpoints

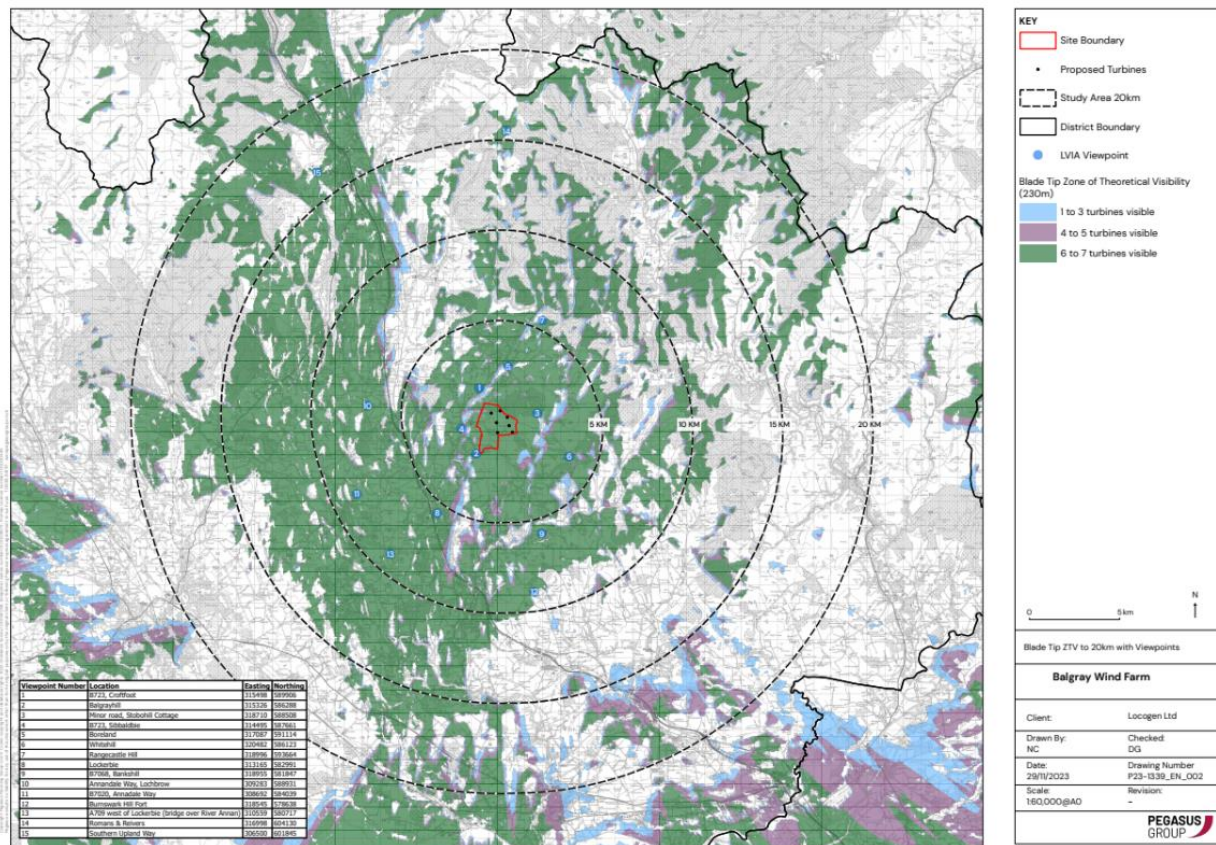


Figure 6.2 Figure 6.2 - Blade Tip ZTV to 20km with Viewpoints

With reference to Visual Representation of Wind Farms, Version 2.2¹ based on the preliminary blade tip height, an initial study area of up to 45 km should be considered for the purposes of establishing a preliminary evaluation of the likely receptors. However, the preliminary ZTV which accompanies this Scoping Report illustrates that visibility would be limited at distances greater than 20 km with large areas of no ZTV coverage to the west, north and east. It is therefore proposed that the LVIA will consider an initial 45 km radius LVIA 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 within which potential significant effects are most likely to occur.

The cumulative effect of the Proposed Development in association with other wind energy developments will also be considered. Consideration was initially given to a 60 km radius from the site, accounting for NatureScot² 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.

¹ Scottish Natural Heritage (February 2017) Visual Representation of Wind Farms Guidance. Version 2.2

² NatureScot (2021) Assessing the cumulative landscape and visual impact of onshore wind energy developments

6.7. Baseline Description

Initial studies have been undertaken to identify the potential landscape and visual receptors to be considered within the LVIA and the viewpoint locations to inform the assessment (15 proposed viewpoints are set out in **Table 6.1**). This is based on the initial ZTV (**Figure 6.2 (Appendix B)**) illustrating the initial 35 km study area and knowledge of the area surrounding the site.

The key receptors are outlined in turn below. For the final LVIA detailed baseline information on the landscape and visual resource will be gathered through a combination of desk studies, consultation and field surveys.

6.7.1. Landscape Character

The most up to date and relevant landscape character assessment covering the study area is the NatureScot 2019 landscape character assessment³.

The majority of the site and the proposed turbines are located within Landscape Character Type (LCT 175) Foothills - Dumfries & Galloway. Its key characteristics are described as:

- Generally undulating land between 170 and 250 metres, with rounded peaks. Higher in the west, up to nearly 550 metres with craggier peaks;
- Foothills dissected by incised valleys;
- Semi-improved pasture enclosed in medium-large fields by stone walls. Grazed by sheep and cattle. Some rough pastures and heath on higher ground;
- Trees in sheltered pockets with some copses on top of hills;
- Many scattered farmsteads and small settlements;
- Network of minor roads; and
- Numerous archaeological sites particularly Bronze Age funerary and ritual sites and Iron Age settlements and forts.

The western edge of the site also overlaps with LCT 172 - Upland Fringe - Dumfries & Galloway. Its key characteristics are described as:

- Elevated rolling pastures;
- Improved and rough grassland in close proximity;
- Hedgerow banks and treelines along roads in some lower areas;
- Dry stone dykes;
- Squared areas of forestry;
- Contrast between wide open areas and more intimate landform;
- Panoramic views over valley and coastal lowlands;
- Small bridges over incised burns; and
- Notable landmark features, including Iron Age fortifications, designed landscapes and grand houses.

³ NatureScot (2019 web-based resource) Scottish Landscape Character Types Map and Descriptions

6.7.2. Dumfries and Galloway Council Wind Energy Development Management Considerations Appendix C Dumfries & Galloway Wind Farm Landscape Capacity Study. Supplementary Guidance – February 2020

The Dumfries and Galloway Wind Farm Landscape Capacity Study (DGWLCS) assesses the sensitivity of landscape character types, and more locally defined character areas, to different sizes of wind turbine development.

The proposed turbines would fall within the ‘Very Large turbines over 150 m high’ typology and would be located within the Annandale unit of the Foothills (LCT 18). For LCT 18, the DGWLCS notes that:

“There is no scope for new developments of Very Large turbines (+150m) in the Annandale Foothills (18) or West Langholm Southern Uplands with Forest (19a) as these are less extensive upland landscapes and lie close to more sensitive settled valleys and dales and substantially larger turbines would not be appropriate in landscape terms.”

The LVIA will include an assessment of the sensitivity of landscape character, based on the LCTs contained in the DGWLCS. An assessment of the potential for the Proposed Development to result in significant effects on the character of each LCT will then be provided.

6.8. Landscape Designations

Landscape designations within the detailed 20 km LVIA study area are illustrated on **Figure 6.4 (Appendix B)**. The site is not located within a nationally or locally designated landscape. The nearest Regional Scenic Areas (RSA) are all located in excess of 10 km from the Proposed Development.

Torthorwald Ridge RSA is located approximately 11.9 km to the south west of the Proposed Development. The Langholm Hills RSA is located approximately 12.6 km to the east of the Proposed Development. The Moffat Hills RSA is located approximately 14.2 km to the north west of the Proposed Development.

With reference to the blade tip ZTV at **Figure 6.2 (Appendix B)**, there is very limited theoretical visibility from the Moffat Hills and Langholm Hills RSA. There is more extensive theoretical visibility from the eastern part of the Torthorwald Ridge RSA.

The Nith Estuary National Scenic Area (NSA) is located approximately 22.6 km to the south west of the Proposed Development and the East Stewart Coast NSA is located approximately 36.4 km to the south west.

6.9. Wild Land

WLAs are mapped and described by NatureScot⁴ and are considered sensitive to development. The Proposed Development is not located within a Wild Land Area (WLA). The nearest WLA is Talla-Hart Fell (WLA 2) located approximately 21.7 km to the north of the Proposed Development.

⁴ Available at: <https://www.nature.scot/wild-land-area-descriptions>

6.10. Gardens and Designed Landscapes

Raehills Garden and Designed Landscape (GDL) is located approximately 9.5 km to the north west, Kinmount GDL is located approximately 18.1 km to the south and Drumlanrig Castle GDL is located approximately 29.4 km to the north west.

6.11. Visual Receptors

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 proposed representative assessment viewpoints, which are listed in **Table 6.1**.

The LVIA will focus on the potential effects of the Proposed Development on different visual receptors comprising settlements, footpath users, recognised tourist routes, long distance walking routes, cycle routes, centres for tourism and road and rail routes.

6.12. Residential Visual Amenity

A number of residential properties are located within the vicinity of the Proposed Development. It is proposed that a Residential Visual Amenity Assessment (RVAA) will be undertaken as part of the LVIA. This will consider the visual effects on those properties located within 2 km of the Proposed Development and identify if any would experience an overbearing effect. The findings will be presented in a separate Technical Appendix to the LVIA chapter.

6.13. Proposed Viewpoints

It is proposed that the 15 locations set out in Table 6.1 and shown on **Figures 6.1** and **6.2 (Appendix B)** are included as assessment viewpoints in the LVIA. The viewpoints represent visual receptors, LCTs and landscape designations at a range of distances and directions from the site.

Table 6.1 Proposed LVIA Viewpoints

Viewpoint	Distance and Direction from nearest turbine	OS Grid Reference	Receptors
Viewpoint 1 - B723, Croftfoot	(T5) 1,526 m north west	315498, 589906	LCT 5 Intimate Pastoral Valley, residential, road users
Viewpoint 2 - Balgrayhill	(T2) 1,647 m south west	315326, 586288	LCT Upland Fringe, road users
Viewpoint 3 - Minor road, Stobohill Cottage	(T6) 1,690 m east	318710, 588508	LCT 18 Foothills, residential, road users
Viewpoint 4 - B723, Sibbaldbie	(T5) 1,865 m west	314495, 587661	LCT 5 Intimate Pastoral Valley residential, road users

Viewpoint 5 - Boreland	(T7) 2,495 m north	317087, 591114	LCT 5 Intimate Pastoral Valley, residential, road users
Viewpoint 6 - Whitehill	(T1) 3,432 m south east	320482, 586123	LCT 18 Foothills, residential, road users
Viewpoint 7 - Rangecastle Hill	(T7) 5,530 m north east	318996, 593664	LCT 18 Foothills, Scheduled Monument, visitors,
Viewpoint 8 - Lockerbie	(T2) 5,565 m south west	313165, 582991	LCT 6 Lower Dale, residential, road users
Viewpoint 9 - B7068, Bankshill	(T1) 5,849 m south east	318955, 581847	LCT 16 Upland Fringe, residential, road users
Viewpoint 10 - Annandale Way, Lochbrow	(T5) 6,877 m west	309283, 588931	LCT 7 Middle Dale, walkers on long distance route
Viewpoint 11 - B7020, Annandale Way	(T2) 8,516 m west	308692, 584039	LCT 6 Lower Dale, road users, walkers on long distance route
Viewpoint 12 - Burnswark Hill Fort	(T1) 8,910 m south south east	318545, 578638	LCT 16 Upland Fringe, residential, road users, Cultural heritage asset
Viewpoint 13 - A709 west of Lockerbie (bridge over River Annan)	(T2) 8,975 m south west	310559, 580717	LCT 6 Lower Dale, road users
Viewpoint 14 - Romans & Reivers	(T7) 15,477 m north	316998, 604130	LCT 19a Southern Uplands with Forest, walkers on long distance route
Viewpoint 15 - Southern Upland Way	(T5) 16,447 m north west	306500, 601845	LCT 18 Foothills, walkers on long distance route

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 visibility of the Proposed Development as receptors move through the landscape.

The viewpoints will be used as the basis for determining the effects on visual receptors within the study area. The sensitivity of different receptor groups will be set out in the LVIA methodology.

The level of effect experienced by different visual receptors will be determined by considering the sensitivity of the receptors with the magnitude of change resulting from the introduction of the Proposed Development.

6.14. Visualisations

Each viewpoint will be illustrated with visualisations prepared in line with the NatureScot best practice guidance⁵.

6.15. Night-time Lighting Assessment

Under Civil Aviation Authority (CAA) Regulations structures over 150 m in height are required to be lit with visible aviation lighting. Agreement will be sought for a reduced lighting scheme, but until formally reduced all turbines to have visible lighting and mid tower lighting.

In accordance with the NatureScot guidance⁶ 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.

It has been established in recent s 36 applications decisions (Crystal Rig IV Case reference: WIN-140-8) that the effects of visible aviation lighting is *“wholly a visual concern”* and that *“without being able to see and fully appreciate the features of the landscape and the composition of views it is not possible to carry out a meaningful landscape character assessment.”*⁷

Therefore the assessment of the visible aviation lighting will be concerned solely on the visual effects associated within the lighting. This consideration will be informed by a ZTV of the lit turbines, a turbine lighting intensity ZTV 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.

It is proposed that the following night-time visualisations will be produced:

- Viewpoint 4 - B723, Sibbaldie;
- Viewpoint 5 – Boreland; and
- Viewpoint 9 - B7068, Bankhill.

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

6.16. Cumulative Assessment

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

⁵ SNH (2017) Visual Representation of Wind farms Version 2.2

⁶ NatureScot (2020) General pre-application and scoping advice for onshore wind farms

⁷ The Scottish Government. Crystal Rig IV Report to the Scottish Ministers. (2021) page 8.

"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."

The EIA Regulations do not require the consideration of the potential for cumulative impacts in relation to other developments which are not yet consented.

However, it is acknowledged that current best practice guidance for cumulative impact assessment still 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."*

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.

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.

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 which also have visible aviation warning lighting.

In order that the cumulative assessment remains focussed on other developments that have the greatest potential to give rise to significant cumulative effects it is necessary at the outset to decide which developments need to be considered in detail, as to consider all developments within 35 km of the Proposed Development would detract attention from the key issues relating to the application. In this landscape and visual context wind farms over 20 km away are highly unlikely to give rise to significant cumulative effects. It is also considered appropriate and proportionate to scope out all turbines under 50 m, and any turbines between 50 m and 80 m which are located over 10 km distance from the site. The cumulative impact assessment will therefore focus primarily on developments within approximately 20 km of the Proposed Development.

The wind farms identified within Table 6.2 and shown on **Figure 6.5 (Appendix B)** are therefore the developments in which the of the cumulative assessment will be primarily focussed.

Table 6.2 Cumulative Sites within 20 km

Wind Farm	Status	No. of Turbines	Blade Tip Height	Approximate Distance and Direction from the Site
Craig Wind Farm	Operational	6	3 x 140 m 2 x 120 m 1 x 99.5 m	14.5 km east
Crossdykes	Operational	10	176.5 m	7.9 km east
Ewe Hill	Operational	22	111.5 m	9.1 km east
Harestanes	Operational	68	125 m	15.1 km north west
Minnygap	Operational	10	125 m	14.7 km north west
Minsca	Operational	16	120 m	7.5 km south east
Solway Bank	Operational	15	127 m	13.4 km south east
Hopsrig	Approved or Under Construction	12	140 m	9.6 km east
Little Hartfell	Approved or Under Construction	12	160 m	4.8 km east
Loganhead	Approved or Under Construction	8	135 m	11.2 km east
Fawside	In Planning	45	40 x 200 m 5 x 179.5 m	15.9 km north east
Bloch	In Planning	21	9 x 230 m 6 x 200 m 5 x 180 m	14.7 km south east
Callisterhall	In Planning	7	200 m	11.1 km south east
Hopsrig	In Planning	13	200 m	9.7 km east
Scoop Hill	In Planning	60	23 x 250 m 2 x 225 m 29 x 200 m 6 x 180 m	6.5 km north

6.17. Potential Mitigation

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).

The primary mitigation adopted in relation to landscape and visual matters is likely to be embedded within the design of the Proposed Development and will comprise the consideration 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’.

6.18. Potential Landscape and Visual Effects

The LVIA will consider the potential effects of the Proposed Development upon:

- individual landscape features and elements;
- landscape character;
- visual amenity and the people who view the landscape; and
- landscape designations as appropriate.

The LVIA will consider the effects at three different stages in the lifetime of the Proposed Development:

- during construction of the Proposed Development;
- during the operational lifetime of the Proposed Development; and
- during decommissioning of the Proposed Development.

Effects during the first and third of these phases are considered to be temporary and would have a short duration. Effects associated with the operational phase of the Proposed Development are considered to be long term effects.

Following the judgement of the sensitivity of the landscape or visual receptor, the LVIA will provide a judgement as to the magnitude of change and the level of the effect experienced by each receptor, along with a statement to clarify whether the effect resulting from the Proposed Development is significant or not.

6.19. Matters Scoped out of the Assessment

In order that the assessment remains proportionate and focuses on the key matters that have the potential to bring about significant effects, it is proposed that the following matters are scoped out of the assessment:

- **Effects on receptors located outside of the ZTV** - The Proposed Development would not result in any effects where there is no predicted visibility;
- **Effects during decommissioning** - Effects during decommissioning would be very similar in nature to those experienced during the construction phase, except in reverse;
- **Effects on LCTs outside of the proposed detailed 20 km LVIA study area** – There would be no potential for indirect significant effects due to the distance from the Proposed Development;
- **Effects on landscape character resulting from the proposed aviation lighting** - It has been established in recent appeal decisions that the effects of visible aviation lighting is “wholly a visual concern” and that “without being able to see and fully appreciate the features of the landscape and the composition of views it is not possible to carry out a meaningful landscape character assessment.” (The Scottish Government. Crystal Rig IV Report to the Scottish Ministers. (2021) page 8.);

- **Effects on settlements beyond 10 km** - Due to the distance from the Proposed Development and the limited theoretical visibility there is no potential for receptors to experience significant visual effects;
- **Effects on core paths beyond 10 km** - Due to the distance from the Proposed Development and the limited theoretical visibility there is no potential for receptors to experience significant visual effects;
- **Effects on RSAs** - Torthorwald Ridge RSA is located approximately 11.9 km to the south west of the Proposed Development. The Langholm Hills RSA is located approximately 12.6 km to the east of the Proposed Development. The Moffat Hills RSA is located approximately 14.2 km to the north west of the Proposed Development. Although it is acknowledged that there would be potential for some very distant limited views from parts of these RSAs, given the distance between the Proposed Development and the RSAs any effects would be limited and would not be of such a scale so as to undermine their special qualities;
- **Effects on NSAs** - The Nith Estuary NSA is located approximately 22.6 km to the south west of the Proposed Development and the East Stewarty Coast NSA is located approximately 36.4 km to the south west. Due to the distance from the Proposed Development and the limited theoretical visibility there is no potential for receptors to experience significant visual effects;
- **Effects on Wild Land** - Given the distance from the Proposed Development to the nearest WLA and with reference to Policy 4 (g) of National Planning Framework 4 that 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.” effects on wild land will be scoped out of the assessment; and
- **Effects on GDL** - Due to the distance from the Proposed Development and the limited theoretical visibility and intervening vegetation there is no potential for receptors to experience significant visual effects.

6.20. Scoping Questions to Consultees

The following are considered to be the key issues which require consideration by the consultees:

Are consultees in agreement with the proposed study areas?
Are consultees in agreement with the proposed list of viewpoint locations in Table 6.1?
Are consultees in agreement with the wind farm sites listed in Table 6.2, to consider as part of the cumulative assessment?
Do consultees agree with matters proposed to be scoped out of the assessment?
Do consultees agree that the proposed scope of assessment is appropriate?

7. Ornithology

7.1. Environmental Baseline and Potential Sources of Impact

7.1.1. Scope of Study

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

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

7.1.2. Baseline Conditions

The core ecological study area was defined to include all of the site plus a 500m buffer. The desk study considered a wider buffer; 5km for nationally important sites and 20km for internationally important sites. Additional field surveys were carried out to a wider 2km buffer for key species including black grouse and breeding raptors.

There are three statutory designated nature conservation sites in the search area around the Proposed Development (5km for nationally important Sites of Special Scientific Interests (SSSI) and 20km for internationally important European Protected Special Protection Areas (SPA) and Ramsar Sites):.

- Perchall Loch SSSI – 4.3km west from the site – notified for its wetland basin fen habitat and water beetle fauna but not for any ornithological interest features.
- Langholm - Newcastleton Hills SPA/SSSI – 20km east from the site – upland moorland designated for its breeding hen harrier population (SPA), its upland breeding bird assemblage, upland habitats and geological interest (SSSI). The Site lies well outside the core range of 2km for hen harrier, making any effect on this SPA unlikely, but this will be further informed by analysis of the baseline site survey data.
- Castle Loch, Lochmaben SPA/Ramsar/SSSI – 7.6km south-west from the site - 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 rather lower in more recent years, probably as a result of more geese roosting on the Solway Firth rather than at this site (Mitchell 2012, Frost et al. 2021). It also supports a nationally important wintering population of goosander (winter peak mean of 66, 1% of the British population).

The wintering bird surveys in 2021-22 and 2022-23 found a range of wintering bird populations of conservation importance but with generally only low numbers within/in proximity to the proposed wind farm site in numerical terms and/or in the context of their regional (NHZ) populations. Key wintering bird populations recorded included:

- Pink-footed Goose – a total of 3,237 flights were observed during the 2021-22 VP surveys, but 96% of those occurred during 6-8 October 2021. Fewer (399 flights) were recorded in 2022-23 (though that did not include the main October migration period). Apart from this brief period of activity, the only other records were of small numbers of migrant flocks over-flying the survey area.. There were no records of any feeding flocks within the survey area in either winter. There was no evidence of

any clear link to the Castle Loch SPA, with flights occurring in all directions across the site. As the potential wind farm site is clearly not within an important goose feeding area, the only impact of the potential development on this species would be collision risk, which, given the numbers observed, would be unlikely to be significant.

- Teal – regionally important numbers were recorded in 2022-23 (peak 170), though there had been fewer in the previous winter (peak 60). Most records were from Hallhills Loch in the northern part of the site, with a smaller number of records from the smaller loch just outside the south-eastern corner of the site.
- Other wintering wildfowl – the core walkover survey area was used by a range of other wintering waterfowl species but only in low (locally important) numbers. This included whooper swan, wigeon, mallard and goldeneye. As for teal, most records were from Hallhills Loch in the northern part of the site, with a smaller number of records from the smaller loch just outside the south-eastern corner of the site.
- Red Kite – this species was observed regularly hunting and over-flying the site, with a total of 323 flights recorded in 2021-23 and 98 in 2022-23. The site is clearly important for this species at this time of year.
- Golden Eagle – none were recorded during the 2022-23 surveys. However, five flights were observed during the 2021-22 VP surveys, all of the same juvenile bird and all between 10-16 December 2021. It is likely, given the location of the site, that this was a bird from the South Scotland Golden Eagle Project release scheme. Given the habitat present and the fact that it did not stay in the area, this would suggest that this area is not important for this species.
- Hen harrier – this species was regularly seen hunting over the site through the winter, with 21 flights in total in 2021-22 and 10 in 2022-23. No evidence was found of any night roost in the survey area in either winter, and most flights seen were below rotor height (so collision risk would be low).
- Goshawk – this species was observed regularly during the winter VP surveys, with 16 flights in total in 2021-22 and 13 in 2022-23. It was seen mostly over the forestry rather than the open ground of the site itself.
- Other scarce raptors and owls – osprey, peregrine, merlin, barn owl and short-eared owl were all recorded during the winter surveys, but only infrequently in low numbers. There was no indication that the survey area was important to any of these species at this time of year.

The 2021 and 2022 breeding bird surveys found that the survey area supports a range of upland breeding species and a regionally important assemblage. Four species specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act found breeding in the survey area red kite, goshawk, barn owl and common crossbill. All, though, were outside the potential wind farm site boundary (and outside the area where they would be likely to be affected by the wind farm).

Several additional high value Schedule 1 species were seen during the surveys, though the survey data did not indicate any evidence of nesting by any of them within the core or wider survey areas. Osprey was an occasional visitor to Hallhills Loch for fishing, and there were a small number of sightings of peregrine and merlin. None of these would be likely to be a major issue for a wind farm at this site.

7.1.3. Potential for Change in Baseline Conditions

As previously outlined in Section 2.2.2 we have been made aware of a potential forestry creation scheme. The ornithological surveys are reflection of the baseline conditions on site as surveyed, primarily open ground.

Should the forestry creation scheme be granted consent, this will result in a change in baseline and impact the site's suitability to support notable ornithological interests. The final impact assessment will consider the effects of the change in baseline, however it is considered that further survey effort would be inappropriate and not required to draw conclusions for the impact of the proposed wind farm development.

7.1.4. Potential Sources of Impact

The key issues for the assessment of potential ornithological effects relating to the 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.

7.1.5. Method of Assessment and Reporting

Baseline Data Collection

A comprehensive range of bird surveys is being undertaken at this site. Specific surveys for the Proposed Development are being undertaken over two years (2021/22 and 2022/23 winters plus and 2021 and 2022 breeding seasons), to give two full years of baseline bird data, in line with the current NatureScot survey guidance (SNH 2017).

Vantage Point (VP) Surveys (year-round)

These surveys are being carried out to determine flight activity within the proposed wind farm site to 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.

Two VPs are being used, to give sufficient coverage of the Site. The computer-generated viewsheds are shown in Figure 8.1. For each VP, the following surveys are being undertaken:

Breeding season:

- 2021 and 2022 - April-August - 36 hours/VP, plus an additional 6 hours/VP in April to cover goose migration.

Autumn/winter:

- 2021-22 - September - March - 72 hours/VP (including additional goose flight surveys)

- 2022-23 - November - March - 48 hours/VP (including additional goose flight surveys)
- 2023 – September and October – 24 hours/VP (including additional goose flight surveys)

Breeding Bird Surveys

The main breeding bird walkover survey is following the standard Brown and Shepherd moorland survey method but with two additional visits as recommended in NatureScot guidance (SNH 2017). These surveys are covering the proposed wind farm site plus a 500m buffer, where access is possible.

- 2021 - four visits, April-July;
- 2022 - four visits, April-July.

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 being 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 km². A route is chosen to ensure that all parts of the study area are covered to within about 100m of the observer, where access is possible. The survey route is being plotted onto the survey map as it is carried out.

The surveys are avoiding strong winds, heavy rain, fog and low cloud. Birds are located by walking, listening and scanning by eye and with binoculars. Standard BTO notation are 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.

Raptor and Black Grouse Breeding Surveys

As the survey area may be used by a range of scarce raptors, nightjar and black grouse, species-specific surveys were undertaken during April-August 2021, and are being repeated in 2022. Surveys are undertaken within the proposed wind farm site and a 2km buffer zone where access is possible and where potentially suitable breeding habitat for these species is present. This includes surveys for black grouse, hen harrier, short-eared owl, red kite, peregrine and merlin, following the standard methodologies given in Gilbert et al. (1998) and Hardey et al. (2013).

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 wind farm site and a 500m buffer. 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:

2021-22 - monthly surveys, September-March;

2022-23 - monthly surveys, November-March.

2023 - monthly surveys, September-October

Goose Feeding Distribution Surveys

Additional surveys were undertaken during 2021-22 and 2022-23 twice-monthly of all possible habitats that could be used by wintering waterfowl (including pink-footed geese, greylag geese and whooper swans) as feeding/roosting sites within 2km of the site (to give contextual information about where goose feeding flocks were located, and provide further information on possible linkage to SPAs). The site lies within the potential SPA connectivity distance from the Castle Loch SPA (for which pink-footed geese are a qualifying feature) (Mitchell 2012, SNH 2013).

Desk Study

The ornithological assessment will include a full desk study detailing the designated sites that could be affected by the development (as set out above), and available bird records from consultees including NatureScot, Royal Society for the Protection of Birds (RSPB), the local raptor study group and South-west Scotland Environmental Information Centre.

Consultation

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

- NatureScot;
- Dumfries and Galloway Raptor Study Group;
- South-West Scotland Environmental Information Centre;
- South Scotland Golden Eagle Project.
- RSPB.

7.1.6. Assessment of Effects

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

- 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 Regulations 2017.
- 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 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);
- PAN 60: Planning for Natural Heritage (Scottish Government 2000);
- 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 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; and
- The Scottish Biodiversity List (SBL) (NatureScot 2020: <https://www.nature.scot/doc/scottish-biodiversity-list>).

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 wind farm 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 2018) for the wider countryside, and the Chartered Institute for Ecological and Environmental Management (2018).

The sensitivity (conservation importance; as defined in Table 7.1) of the receptors present in the study area will be identified, then the magnitude of the possible effect on those receptors determined (as described in **Error! Reference source not found.**).

Table 7.1 Sensitivity (conservation importance) of bird species

Sensitivity	Definitions
Very High	Cited interest of SPAs, 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 (W&C 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 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.
Nil	Green-listed species (Eaton et al. 2009) 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 (pre-development) conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/habitat lost

Magnitude	Definition
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

The combined assessment of the magnitude of an impact and the sensitivity of the receptor has been used to determine whether or not an adverse impact is significant. These two criteria have been cross-tabulated to assess the overall significance of that impact (Table 7.3). 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 sensitivity used to test the significance of impacts. The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant impacts in terms of the EIA Regulations.

MAGNITUDE	SENSITIVITY				
		Very high	High	Medium	Low
	Very high	Very high	Very high	High	Medium
	High	Very high	Very high	Medium	Low
	Medium	Very high	High	Low	Very low
	Low	Medium	Low	Low	Very low
	Negligible	Low	Very low	Very low	Very low

The interpretation of these significance categories is as follows:

- Very low and low are not normally of concern, though normal design care should be exercised to minimise adverse effects;
- Very high and high represent adverse effects on bird populations which are regarded as significant for the purposes of EIA;

- Medium represents a potentially significant adverse effect on which professional judgment has to be made, though for which it is likely that mitigation will reduce it below the significance threshold.

The NatureScot (SNH 2018) 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 baseline population against which the assessment should be made for breeding birds is the SNH NHZ population. The site lies mainly within the ‘Border Hills’ NatureScot Natural Heritage Zone (NHZ20), though the south-western edge of the survey area is within the ‘West Southern Uplands and Inner Solway’ (NHZ19).

As the survey area is likely to support species 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 wind farm may have on these species will be included within the main EIAR ornithology chapter report (but without identifying nesting locations).

7.1.7. Approach to Mitigation

Ornithological sensitivities will be taken into account as hard constraints when developing the windfarm layout design, with the adoption of appropriate buffers. A range of ornithological mitigation measures are likely to be required, primarily for the construction phase to reduce impacts on breeding birds. 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.

7.1.8. Cumulative Assessment

A cumulative ornithological assessment will be undertaken following the NatureScot (SNH 2018) 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.

7.1.9. Matters Scoped Out

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.

7.1.10. References and Standard Guidance

Band, W, Madders, M, and Whitfield, D.P. 2007. Developing field and analytical methods to assess avian collision risk at wind farms. In: Janss, G, de Lucas, M and Ferrer, M (eds.) Birds and Wind Farms. Quercus, Madrid.

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

Eaton, M. A., Aebischer, N. J., Brown, A. F., Hearn, R. D., Lock, L., Musgrove, A. J., Noble, D. G., Stroud, D. A. & Gregory, R. D. 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds, 108: 708-746.

Gilbert, G., D. W. Gibbons, and J. Evans. 1998. Bird Monitoring Methods: a manual of techniques for key UK species. RSPB /BTO/WWT/JNCC/ITE/The Seabird Group.

Hardey, J., H. Q. P. Crick, C. V. Wernham, H. T. Riley, B. Etheridge, and D. B. A. Thompson. 2013. Raptors: a field guide to survey and monitoring. The Stationary Office Ltd, Edinburgh. Second Third Edition

Scottish Natural Heritage. 2016a. Assessing Connectivity with Special Protection Areas (SPAs) - Version 3. Vol. Version 3. SNH Guidance.

Scottish Natural Heritage. 2016b. Environmental Statements and Annexes of Environmentally Sensitive Bird Information Guidance for Developers, Consultants and Consultees. Version 2. SNH Guidance.

Scottish Natural Heritage. 2017a. Recommended bird survey methods to inform impact assessment of onshore wind farms. SNH Guidance.

Scottish Natural Heritage. 2017b. Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model. SNH.

Scottish Natural Heritage. 2018a. Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. SNH.

Scottish Natural Heritage. 2018b. Assessing the cumulative impacts of onshore wind farms on birds. Guidance. SNH.

Scottish Renewables. 2015. Good Practice during Wind Farm Construction.

SNH 2017. Survey methods for use in assessing the impacts of onshore windfarms upland bird communities. SNH Guidance.

SNH 2018. Assessing Significance of Impacts from Onshore Windfarms on Birds Outwith Designated Areas. SNH Guidance.

7.1.11. Questions

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?

8. Ecology

8.1. Introduction

Locogen Consulting have been appointed to undertake the ecology impact assessment of The Proposed wind farm. Locogen have sub-appointed Nadarra Ecology Ltd., David Dodds Associates, Tringa Ecology and Caledonian Ecology Ltd. to assist on the field survey elements of the assessment, all involved companies are experienced and specialist ecological surveyors who have worked on a variety of wind farm developments across Scotland.

Initial feasibility assessments concluded that there are no environmental designations on site and the only designations within 10km of the developable area are Perchall Loch SSSI and Castle Loch Special Protection Area (SPA) & Ramsar.

The site lies within the catchments of the Water of Milk and Dryfe Water, both are designated salmon rivers and subsequently will require further assessment.

8.2. Early consultation

Prior to this submission of a scoping report, Locogen's Head of Ecology and Environmental Compliance, Jack Bell wrote to both the local NatureScot office and the Galloway Fisheries Trust to open initial project consultation and agree an outline survey scope.

NatureScot:

The letter issued on 20 July 2023 detailed the following survey scope for review prior to the commencement of surveys:

- Habitat surveys:
 - UKHab surveys
 - National Vegetation Classification (NVC)
- Protected mammals' surveys:
 - Badger surveys
 - Pine marten surveys
 - Red squirrel
 - Otter surveys
 - Water vole surveys
- Great crested newt surveys:
 - Environmental DNA assessment (eDNA)
 - Habitat Suitability Index (HSI)
- Bat surveys:
 - Preliminary bat roost assessment (PRA)
 - Static detector deployment
- Fisheries surveys:
 - Fisheries walkover survey

It was proposed that the final reporting elements of the assessment would be comprised of the following elements:

- Ecological Impact Assessment (EclA)
- Ecological Desk Study:
 - Statutory designated sites within 10km
 - Non-statutory designated sites within 2km
 - Bat data within 10km (all available years)
 - Protected species data within 2km (all available years)
 - Ancient Woodland within 2km
- Outline Habitat Management Plan (OHMP)

A copy of this consultation letter has been provided in full as an appendix (Appendix C) to this Scoping report.

On 31 July 2023 a written response was received, via email, from Dylan DeSilva Operations Officer – Southern Scotland. Mr DeSilva disclosed that NatureScot do not hold any specific data in relation to the site location and stated that Locogen had addressed most elements detailed in NatureScot's Scoping and Pre-application Guidance for Onshore Windfarms.

Mr DeSilva noted that the only element not to be addressed specifically was peatland resource and assessment, however this is to be covered the appointed hydrology, hydrogeology and geology consultant and will be assessed as part of the EIA. Further comments were made in relation to ornithological interest however this will also be addressed separately.

A final comment was made in relation to the use of UKHab methodology, NatureScot expressed that although this assessment methodology is currently not supported in Scotland (but is in the wider UK-context), due to it not meeting EUNIS classification criteria, the dual use of NVC survey will allow EUNIS criteria to be met. At the time NatureScot did not perceive the proposed habitat survey scope as a limiting factor.

Furthermore, in September 2023 the Scottish Government announced that NatureScot had been tasked with adapting the Department for Environment, Farming and Rural Affairs (DEFA's) existing biodiversity metric currently in place in England for use in Scotland. The metric will be used to evidence projects under NPF4 Policy 3 b. The use of UKHab as survey methodology therefore aims to futureproof the survey scope, as it is likely that UKHab will translate into a Biodiversity enhancement tool more easily.

Overall NatureScot accepted the proposed survey approach and declined an invitation for a meeting to discuss the project further at this initial stage.

Galloway Fisheries Trust:

On 20 July 2023 a letter detailing the proposed fisheries survey scope was submitted to the Galloway Fisheries Trust, this correspondence also aimed to open further consultation regarding the possible requirement for further specialist assessment including electrofishing.

A full copy of this letter has been provided as an Appendix C for review.

Following the submission of the letter, an online meeting was held on 01 August 2023 between Jamie Ribbens, Senior Biologist at the Galloway Fisheries Trust and Jack Bell, Head of Ecology & Environmental Compliance, Locogen.

Following the meeting it was agreed to complete specialist surveys in line with current Marine Scotland Guidance (2021). The Galloway Fisheries Trust have been appointed to undertake this assessment and have subsequently designed and implemented the survey scope to their satisfaction.

Survey work to be undertaken includes:

- Electrofishing assessment
- Invertebrate sampling

8.3. Change in baseline.

Locogen has recently been made aware of a commercial forestry creation proposal, which if consented and implemented will substantially change the baseline conditions of the Proposed Development area.

To our current knowledge, as informed through discussions with the forestry agent and landowner, the majority of the developable area is to be covered by the proposed forestry creation scheme. Subsequently, there is a high possibility of a significant change in baseline habitat type's, characteristics and coverage.

Locogen has already undertaken habitat surveys for the site during late August / early September 2023, these surveys provide a reliable and representative audit of the habitat categories on site including their current condition.

Should the forestry proposal gain consent prior to the proposed wind farm, we suggest that there should be no requirement to update the habitat surveys to accommodate for changes in baseline. If successful, the forestry scheme will be created in line with approved planting plans, as such we would intend on informing the ecological chapter from this pre-approved information.

While the habitat categories currently on site will still be present during the establishment period of the forestry area (years 1 – 10). Current habitats categories viability in defined tree planting zones will be limited in the short term and non-viable in the long term. As such, when calculating habitat loss areas for the wind farm, we propose to calculate habitat loss based on the approved forestry planting scheme (if consented) for areas within tree planting zones.

We consider that there should be no changes or impacts to our proposed survey scope, out with habitat considerations, due to impacts from this possible change in baseline. However, we seek NatureScot's and other Statutory Consultees agreement on our proposed approach to tackling this potential change in baseline.

8.4. Ecology information from other proposals

Locogen has been advised that survey work undertaken in support of the forestry proposal (Section 8.3) highlighted the presence of Marsh Fritillary (*Euphydryas aurinia*) within the development boundary. If correct, this is potentially a significant record and the identification of a population out with the species recognised range.

Marsh Fritillary is;

- Butterfly Conservation priority: High

- UK Biodiversity Action Plan (UKBAP) species
- Scottish Biodiversity List species.
- Fully protected by UK legislation; Schedule 5, 1981 Wildlife & Countryside Act
- Listed in the European Union (EU) Habitats & Species Directive (Annex II)

8.5. Desk study methods

The data searches for the desk study followed Chartered Institute of Ecology and Environmental Management (CIEEM) best practice guidelines (CIEEM, 2016; CIEEM, 2017). The background data aims to provide the following information:

- Designated site information;
- Existing records of protected/priority/notable species for the site;
- Existing records of protected/priority/notable species for the surrounding area;
- Habitat information where available.

Designated sites information:

Sites with conservation designations located within a 10km of the Study Area were identified through the South West Scotland Environmental Information Centre (SWSEIC) record search. The record search identified statutory sites within a 10km search radius including:

- Sites of Special Scientific interest (SSSI)
- Special Protection Areas (SAP)
- Special Areas of Conservation (SAC)
- Ramsar sites.

Additionally, non-statutory sites within 2km of the development site were searched. NatureScot's SiteLink website (accessed November 2023) was used to determine qualifying features of each designated site.

Existing species records for the Search Area:

Species records were obtained by commissioning data from the local biological records centre, as per best practice guidelines (CIEEM, 2016). SWSEIC were commissioned in July 2023 to search for biological records within the Search Area. Provision of the data by the recorders is neutral and should not be regarded, either explicitly or implicitly, as approving or opposing any project informed by the data. No attempt has been made to verify these records. Common (vernacular) names are used where they have been provided by the recorder.

Existing habitat records for the Search Area and surrounding area:

The SWSEIC data was used to identify ancient woodland within 2km of the Development Area.

8.6. Desk Study results

Designated site information:

A total of five designated sites within a 10km radius of the Development Area have been identified, further detail can be found below in Table 8.1.

Locations of designated sites in relation to the Development Area can be found below in Table 8.1

Table 8.1 Designated sites within 10km of development area

Site	Designation	Distance from Site (km)	Reason for designation
Dryfe Water	SSSI	6.8	Biological: <i>Woodlands:</i> Upland mixed ash woodland
Perchall Loch	SSSI	5.4	Biological: <i>Fens:</i> Basin fen <i>Invertebrates:</i> Beetles, water beetles' assemblage
Lochmaben Lochs	SSSI	10	Biological: <i>Freshwater habitats:</i> Eutrophic loch <i>Fens:</i> Open water transition fen <i>Invertebrates:</i> Beetle assemblage <i>Invertebrates:</i> Fly assemblage
Castle Loch	RAMSAR	9	Pink-footed goose (<i>Anser brachyrhynchus</i>) (1987/1988 to 1991/1992, an average peak of 8,300 individuals, 4% of the Eastern Greenland/Iceland/UK biogeographic population).
Castle Loch	SPA	9	Supporting an internationally important wintering population of Icelandic/Greenlandic pink-footed geese (<i>Anser brachyrhynchus</i>). In the five-year period 1987/88 to 1991/92 the average peak count was 8,300, representing 4% of the British and total world population.

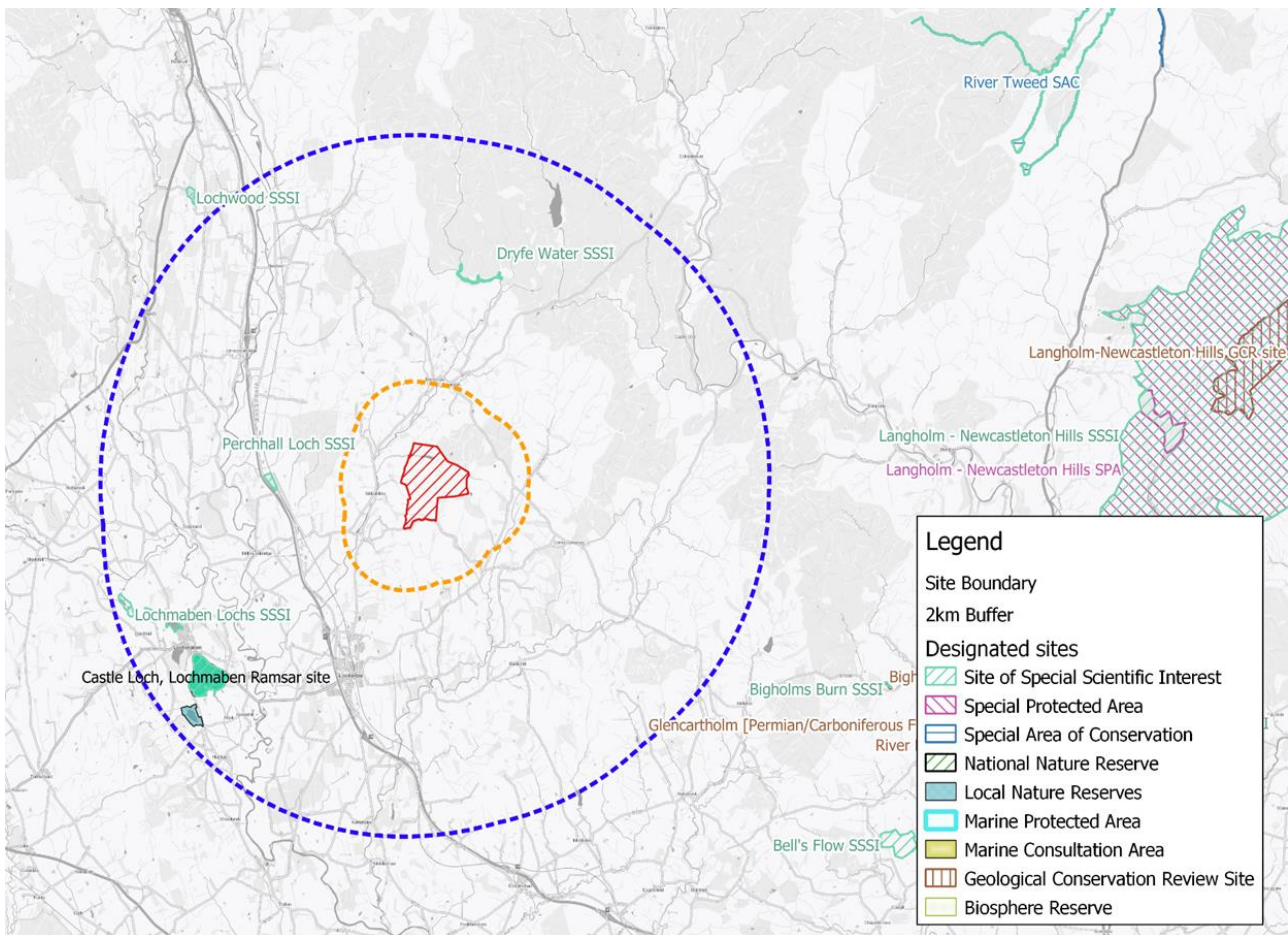


Figure 8.1. SWSEIC Map showing designated sites within 10km of the Development Area.

There are no non-statutory sites within 2km of the Development Area.

8.7. Existing species records for the Search Area.

SWSEIC data:

SWSEIC searched for all biological records within the defined Search Area. 405 records, across 22 different taxonomic groups were returned, including records for 22 mammal species, 74 bird species, 75 insect species, one reptile species, and three amphibians. In addition, 122 flowering plant species were identified. 30 legally protected species were identified within the search area, including European otter (*Lutra lutra*), soprano pipistrelle (*Pipistrellus pygmaeus*), and Noctules (*Nyctalus noctule*), all of which are Schedule 2-European protected species of animals (*The Conservation (Natural Habitats, &c.) Regulations 2010 (Schedule 2)*) and Schedule 5 species of the *Wildlife and Countryside Act 1981*.

An overview of protected species records within 2km can be found below.

Otter:

13 records for otter (*Lutra lutra*) were returned from the 2km data search. All records are historical, dating between 1955-1991; no records relate directly to the site.

Red squirrel:

Red squirrel (*Sciurus vulgaris*) have been frequently recorded within the 2km search area. Overall, 393 records, dating between 1997-2021 were returned from the data search. No records relate directly to the site. A low number of records are from woodlands adjacent to the site's boundaries. The bulk of the records are in the vicinity of the B723 road west of the site and are likely a result of biological recording by local residents.

Badger:

The record search identified two badger (*Meles meles*) records within the surrounding area. However, the records are historical, dating from 1960.

Amphibians:

A total of nine records for three amphibian species were returned. Eight of the records relate directly to the site, and are all associated with Hallhills Loch, and its immediate surroundings. Common Frog (*Rana temporaria*), common toad (*Bufo bufo*) and palmate newts (*Lissotriton helveticus*) were recorded in 2020-2021.

Reptiles:

One record for common lizard (*Zootoca vivipara*) was returned from the SWSEIC data search. The record is from 2021 and falls within the site boundary. The record is located in an area along the northern boundary close to the adjacent coniferous plantation, approximately 450m east of Hallhills Loch.

Bats:

High numbers of bat records were returned from the extended 10km data search. 677 records relating to bat activity were identified, recorded species include brown long-eared (*Plecotus auratus*), pipistrelle species, Noctules (*Nyctalus noctule*), and myotis species including Natterer's, Daubenton's and whiskered/Brandt's. Records for pipistrelle species were the most abundant, with a total of 373 records returned. Notable records include maternity roosts of soprano pipistrelles within Hightae, Lockerbie in 2008 and 2013; numbers exceeding 300+ individuals for both records.

Five roost records were identified within 2km of the site, soprano pipistrelles and brown long-eared bat roosts were recorded. Only one record is complete and is for a soprano pipistrelle transitional roost supporting low numbers (six) of bats. All significant identified bat roosts are located greater than 2km from the site.

Invertebrates:

The SWSEIC record search returned 138 invertebrate records, pertaining to several taxonomic groups, including butterfly, moths, lacewings (*Neuroptera*), dragonfly (*Odonata Sp*), and beetles (*Coleoptera Sp*). No records for legally protected species were returned, however several UK Biodiversity Action Plan (BAP) and Scotland Biodiversity List (SBL) species have been recorded within the search area. Notable species include Small Pearl-bordered Fritillary (*Boloria selene*), small heath butterfly (*Coenonympha pamphilus*), and latticed heath moth (*Chiasmia clathrate*).

Water vole:

One water vole (*Arvicola amphibious*) record, for a single individual in 2009 was returned from the data search. The record is for Torbeckhill Reservoir, outside of the site sites boundary.

8.8. Ancient woodland records for the Search Area and surrounding area

SWSEIC records show that within 2km of the site there are areas of ancient semi-natural woodland, ancient woodland and plantation on ancient woodland. Polygons of woodland along the south boundary of the Development site are designated as ancient woodland. Furthermore, an area of Plantation on Ancient Woodland Site (PAWS) is present within the site. Figure 8.2 below shows areas of ancient woodland in relation to the site.

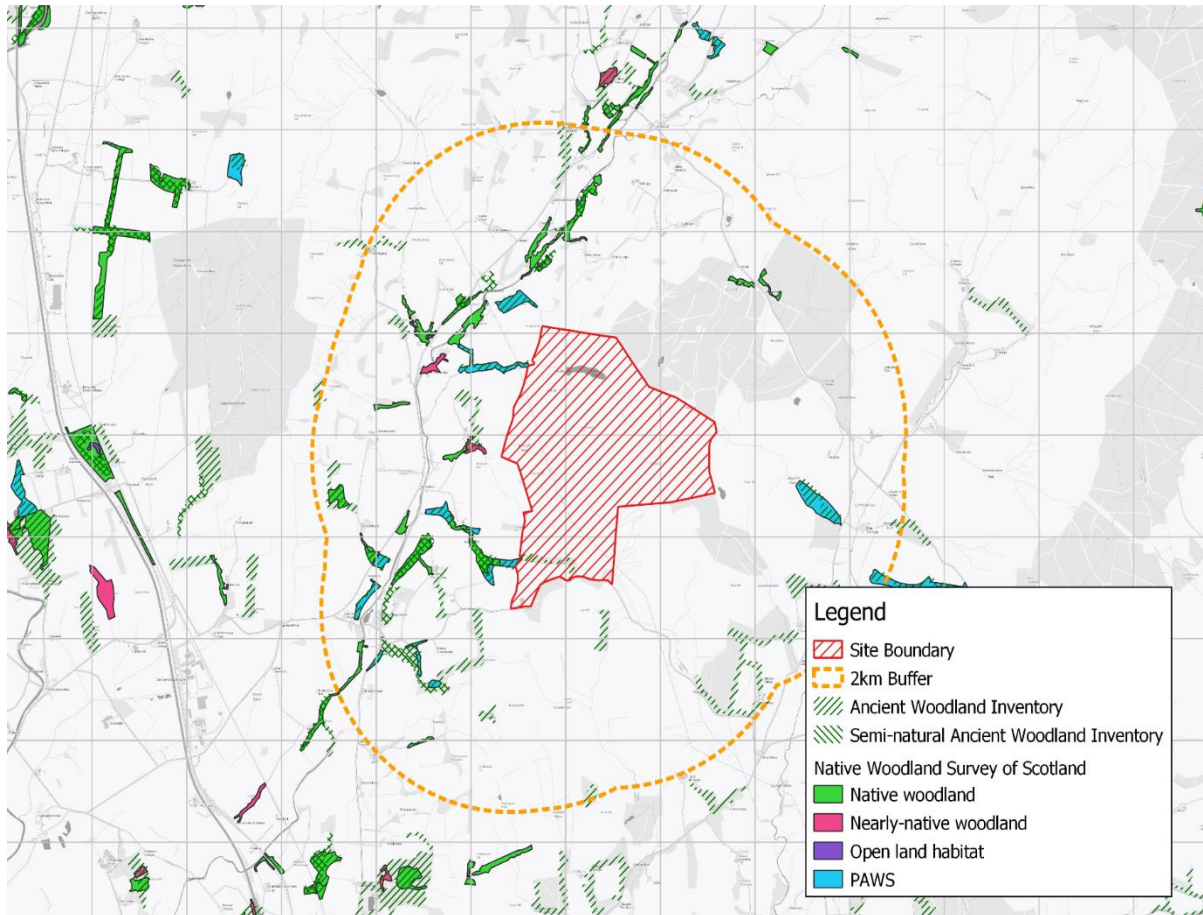


Figure 8.2 SWSEIC Map: Ancient woodland within 2km of Development Area

8.9. Desk study discussion:

This desk study has identified several important ecological sensitivities within the Search Area, as far as existing and freely available data allows. Desk-based studies of this nature have limitations, such as the reliability of third-party records and the coverage of reported studies.

Overall, 30 protected species have been recorded within the 2km of the site, however, records for protected species relating directly to the site are limited to amphibian and reptile records. Common toad, common frog and palmate newts are protected under *Schedule 5 of the Wildlife and Countryside Act*, and common toads are SBL species. All records relate to Hallhills Loch and its immediate surroundings.

No other protected species records were directly related to the site. Several of the records (badger & otter) are historical and are unlikely to portray an accurate representation of species distribution within the area.

Furthermore, a lack of records should not be used to confirm absence. Low numbers/a lack of records for some protected species, particular uncharismatic taxonomic groups

(invertebrates) are likely to be a result of under recording rather than absence. In contrary to charismatic species (i.e., red squirrel) which are likely to be well recorded particularly when present in residential areas, as demonstrated by SWSEIC data search.

8.10. Final ecology survey scope

Following the completion of early consultation with both NatureScot and the Galloway Fisheries Trust the following items remain scoped-in to the assessment as previously outlined:

- Habitat surveys:
 - UKHab surveys
 - National Vegetation Classification (NVC)
- Protected mammals' surveys:
 - Badger surveys
 - Pine marten surveys
 - Red squirrel
 - Otter surveys
 - Water vole surveys
- Great crested newt surveys:
 - Environmental DNA assessment (eDNA)
 - Habitat Suitability Index (HIS)
- Bat surveys:
 - Preliminary bat roost assessment
 - Static detector deployment
- Fisheries surveys:
 - Fisheries walkover survey

Additionally following advice from the Galloway Fisheries Trust, the following riverine and fisheries assessment will be undertaken, in line with current Marine Scotland standing advice:

- Electrofishing surveys on appropriate watercourses within the development boundary.
- Macroinvertebrate surveys undertaken in conjunction with electrofishing surveys.

Locogen has sub-appointed the Galloway Fisheries Trust to undertake the aforementioned survey effort inline with current guidance.

Furthermore, due to the notable potential for the Developable Area to support a population of Marsh Fritillary (*Euphydryas aurinia*) the Applicant has appointed specialist surveyors Caledonian Ecology to undertake the following assessment:

- Marsh fritillary habitat assessment
- Marsh fritillary transects (weekly, mid-May to July 2024)
- Larval web search fieldwork (three visits, late August, September, and early October 2024).

The format of the reporting will remain as previously outlined:

- Ecological Impact Assessment (EclA)
- Ecological Desk Study:
 - Statutory designated sites within 10km
 - Non-statutory designated sites within 2km
 - Bat data within 10km (all available years)
 - Protected species data within 2km (all available years)
 - Ancient Woodland within 2km
- Outline Habitat Management Plan

As well as the EclA all surveys will be accompanied by detailed specialist appendices. As standard all surveys and assessments will be undertaken to the relevant and appropriate industry guidance at the time of writing.

No items have been scoped out of the assessment since early consultation with relevant consultees.

8.11. Questions for Consultees

Do the Consultees agree with the assessment approach set out in the ecology section?
Do the Consultees agree with the ecology approach in terms of possible changes in baseline?
Do Consultees agree with the need to assess impacts on <i>Rhopalocera</i> , namely Marsh Fritillary?

9. Hydrology, Geology and Hydrogeology

9.1. Introduction

This section of the Scoping Report considers the hydrology, geology and hydrogeology of the site area, and the effects of the Proposed Development on the baseline environmental setting.

The assessment shall be undertaken by experienced consultants who have extensive experience in assessing the effects of Wind Farms on Hydrology, Geology and Hydrogeology.

9.2. Baseline Conditions

The site is comprised of 3 summits: Firtree Hill (250m AOD); Mid Hill (221m AOD) and one smaller unnamed summit in the south east of the site. The site is mainly open moorland with the exception of a small area of forestry plantation in the south of the site.

The majority of the site drains west to Dryfe Water. In the north of the site this is via a small surface water body, Hallhills Loch, which drains to Hewke Burn and confluences with Dryfe Water 1.0km west of the site. A wetland area is present in the centre of the site, which is drained by the Kirkcroft Burn and its tributaries, confluencing with the Dryfe Water 0.8km west of the site boundary. A small area on the south-east of the site drains south: a valley on the southern slopes of Firtree Hill contains further wetland, drained by the Hope Burn which eventually confluences with the Corrie Water 3.1km south east of the site boundary. The Dryfe Water confluences with the River Annan 7.8km further south west, as does the Corrie Water around 15km south of the site boundary. The River Annan eventually discharges to the Solway Firth at Annan around 25km south of the site. The Corrie Water, Dryfe Water and the River Annan downstream of their confluence are classified by SEPA as having Poor Overall Condition.

Perchhall Loch Site of Special Scientific Interest (SSSI) lies 4.5km west of the site boundary, designated for its basin fen habitat and beetle population.

The site west of the summit of Firtree Hill is underlain by Carghidown Formation metasandstone and metamudstone bedrock. East of the summit of Firtree Hill is underlain by Hawick Group wacke sedimentary bedrock. The summits and upper slopes are generally devoid of superficial deposits whilst Langholm Till Formation diamicton till is present in the basins south and west of Firtree Hill, and across lower slopes in the west and north of the site.

There are multiple small springs and historic named wells and current Private Water Supplies (PWS) on and adjacent to the site. The groundwater body has 'Good' overall Water Framework Directive (WFD) status. There are potentially further unregistered PWS which have potential to be in connectivity.

The SNH Carbon and Peatland 2016 map maps an area of Class 3 peaty soil on the eastern slopes of Firtree Hill. Class 3 soil is described as predominantly peaty soil some/mostly peat forming vegetation. Vegetation in Class 3 habitat is described as peatland with some heath.

This Scoping Report is supported by Phase 1 Peat Probing, illustrated within Appendix D, which has assessed the site peat profile against the Scoping Layout (Figure 2.2). The peat probing indicates that the developable area is not likely to impact deep peat, and deep peat across the site is extremely localised to the periphery.

These details highlight the likelihood of a number of sensitive receptors potentially connected to the site including the potential for groundwater dependent terrestrial ecosystems and private water supplies, however peat is likely to be absent.

9.3. Potential Sources of Impacts

The Proposed Development has the potential to impact on the local hydrology, hydrogeology and geology during the construction, operation and decommissioning phases. These impacts may include:

- changes in surface or groundwater quality due to oil and fuel spills or leaks, other chemicals stored on site and sediment release;
- alteration of the network and form of drainage;
- alteration of watercourse flow rates, sediment loading and geomorphology;
- impacts on the recharge and flow within shallow and deep groundwater systems;
- change to the geological resource, and
- change to the peat and soils of an area through removal, erosion or dewatering.

These impacts could potentially affect water users (private water supplies for domestic, livestock or irrigation), fisheries or aquatic habitats, water dependent habitats and the status of water bodies.

9.4. Method of Assessment & Reporting

Based on the information obtained from the baseline assessment and the site inspections the scoping report layout will be assessed for potential impacts. Where these are significant, mitigation measures will be proposed. The significance of the effect will be considered through receptor sensitivity and magnitude of likely effect in accordance with the guidance contained in Section 6, Landscape and Visual Amenity.

The EIAR chapter will provide detailed assessment of the potential effects, significance of these effects and the mitigation required (if any). Figures will be included to present the various components of the chapter including a detailed water features map along with a photographic inventory of all main watercourse crossings.

A preliminary assessment of GWDTE is included and will be based on the NVC mapping by the ecologist. It is unlikely that areas of moderate or high potential GWDTE will actually be groundwater dependent based on our understanding of the site's hydrogeological regime, however if there are areas that are confirmed to be groundwater dependent and they are in close proximity to proposed site infrastructure additional studies may be required to further assess their groundwater dependency, refine their actual extent and conceptualise the hydrogeology if SEPA request this additional information.

The following figures as part of the report:

- Environmental Setting;
- Soils map;
- Carbon Rich Soils map;
- Superficial Geology;
- Bedrock Geology;
- Hydrological features with zoomed in areas where additional detail is required,
- Hydrogeological Regime;
- GWDTE, if required;
- Depth of Penetration at Probing Locations;

- Estimated Peat Depth, and where necessary;
- Peat Storage Area Constraints and Peat Restoration Areas.

In addition, the findings from any private water supply assessment or flood risk assessment if undertaken, will be incorporated into the chapter with these documents included as appendices.

9.5. Further Assessment Requirements

At this stage no hydrological, hydrogeological or geological receptors have been scoped out of the proposed EIAR.

The phase 1 peat depth survey undertaken as part of the preparation of this Scoping Report demonstrates the general absence of peat, peaty soils / carbon rich soils across the majority of the Proposed Development. Targeted detailed surveys would be completed for infrastructure where on-site surveys have indicated the presence of peat.

Depending on the findings of the detailed surveys, the EIAR may need to be supported by a Peat Management Plan (PMP) and or a Peat Landslide Hazard Risk Assessment (PLHRA). The requirement for these would be discussed with the Dumfries and Galloway Council and SEPA prior to the submission of the EIAR.

Based on a review of SEPA Flood Maps, it is noted that flood risk is highly unlikely to be increased as a result of the Proposed Development, either through development taking place on areas considered to be at risk of flooding or through an increase in flood risk downstream. As such, it is expected the assessment of flood risk would form part of the EIAR chapter without the need for separate reporting. This would include a conceptual description of Sustainable Drainage System (SuDS) measures to be employed at the Proposed Development to ensure runoff rates from the site are not increased. However, if assets are found to be at significant flood risk, or, should the Proposed Development be found to have a potential impact on flood risk in the surrounding area, a detailed Flood Risk Assessment would be prepared.

A detailed assessment of potential flow rates at proposed watercourse crossing locations would be carried out by the contractor at the detailed design stage after consent, such that all of the watercourse crossings identified for the Proposed Development would be designed in compliance with requirements of The Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended. The design of watercourse crossings would also take account of the future 'with climate change' baseline and (to avoid altering the flow regime) would be sized for a 1:200 year plus climate change flood event. Detailed flow rate calculations will not be carried out within the EIAR, however likely licencing requirements under CAR would be presented in a sperate technical appendix.

In the event that PWS within the Proposed Development which are outwith a 250 m buffer of infrastructure and construction activity, there will be no requirement for a separate detailed risk assessment for PWS abstractions (in line with SEPA Land Use Planning System (LUPS) SEPA Guidance Notes 4 and 31). If PWS are identified, a risk assessment of the PWS will be incorporated into the hydrology chapter of the EIAR.

9.6. Questions for Consultees

Do the Consultees agree with the assessment approach set out in the Hydrology, Geology and Hydrogeology section?

10. Noise

10.1. Introduction

This section of the scoping report summarises the proposed scope of the noise and vibration assessment for the proposed Balgray Wind Farm. The chapter has been prepared by Ion Acoustics Ltd for Locogen.

Wind turbines are not noisy when compared to other environmental sources experienced by people living in urban areas or close to a motorway. It is possible to stand at the base of a turbine tower and hold a normal conversation. However, wind turbines are often situated in rural environments where there are few other sources of noise. Under these circumstances, wind turbine noise can be audible and noise limits are provided to protect amenity.

There will also be a short-term noise impact from the construction of the wind turbines and associated access tracks and borrow pits. Noise will be generated from traffic movements associated with the delivery of construction materials and turbine components. However, construction works will generally be carried out during daytime hours and only over a temporary period.

10.2. Operational Noise

Operational noise from wind turbines includes aerodynamic noise from the movement of the blades through the air, and mechanical noise from the turbine components including the generator and gearbox (where present). Over the years, manufacturers have been able to control some of the mechanical sources, while for most modern wind turbines, aerodynamic noise is also restricted by control systems which regulate the pitch of the blades such that there is no increase wind turbine noise above the rated power of the turbines.

Noise from wind turbines increases with wind speed up to rated power, however, the background noise (for example wind in trees) also increases with wind speed. Under very windy conditions the background noise can exceed wind turbine noise levels. Planning conditions are used to control wind turbine noise within specified limits which can be an absolute value, or be set in relation to the background noise, or a combination of the two.

Dumfries and Galloway Council's Supplementary Guidance Wind Energy Development from February 2020 requires consideration of noise impacts from the construction and operation of wind farms. Paragraph E11 states:

"Generally schemes can be sited with sufficient distance from noise sensitive development to ensure ambient noise levels are acceptable. For all large and medium turbines a full site-specific noise impact assessment following ETSU-R-97 and Institute of Acoustics methodology (or subsequent accepted national guidelines), which includes cumulative impact, would be required for all appropriate noise sensitive properties as agreed with Environmental Health. Manufacturer's noise information data should be provided for all schemes which include turbines below 50m in height to blade tip."

10.3. The Assessment and Rating of Noise from Wind Farms (ETSU-R-97)

The assessment methodology for operational noise is described in ETSU-R-97 'The Assessment and Rating of Noise from Windfarms'. The basic aim of ETSU-R-97 is to provide:

"Indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities".

The ETSU limits are set in terms of the LA90 noise parameter. This is defined as the noise level exceeded for 90% of the measurement time. It is taken to represent the 'background noise', that is the underlying noise level in the absence of short-term events. This unit was chosen to assess turbine noise, which is fairly steady, because extraneous short-term events such as discrete car passes, and aircraft do not usually affect the LA90 value. For wind turbine noise, the LA90 is typically 2 dB less than the LAeq parameter. The LAeq can be regarded as an average noise level over a time period.

The ETSU report provides a method for assessing wind turbine noise and in particular, the setting of external noise limits which are either:

- relative to the background noise (LA90 dB), or
- fixed at an absolute limit when background noise levels are otherwise very low.

In most rural locations, the background noise depends on the wind speed. For rural environments, the "fixed" part of the ETSU limit usually applies at low wind speeds. At high wind speeds, noise from wind in the trees and flowing over local features such as roofs can be considerable and is often sufficient to mask the sound of wind turbines. Therefore, it is often at lower wind speeds that the turbines are more audible.

The ETSU-R-97 limits set relative to the background noise are derived separately for 'amenity hours' daytime periods and for the night-time periods, defined as 11pm to 7am. The amenity hours daytime periods are chosen to reflect periods when people might be outside in their gardens and are defined as:

- All evenings from 6pm to 11pm
- Saturday afternoons from 1pm to 11pm and
- All day Sunday (7am to 11pm)

For the daytime amenity hours periods, the suggested noise limits are 35 to 40 dB LA90 or 5 dB above the prevailing background, whichever is the greater. A degree of judgment is required in determining the fixed limit within the 35 to 40 dB LA90 range and ETSU-R-97 states that this will depend on:

- The number of dwellings in the neighbourhood of the wind farm
- The effect of noise limits on the number of kWh generated
- The duration and level of exposure

For night-time periods, the ETSU noise limit is 43 dB LA90 or 5 dB above the background, whichever is the greater. The 43 dB LA90 limit was derived from a sleep disturbance limit of 35 dB LAeq (internally) with an allowance of 10 dB for the attenuation of an open window to derive the corresponding external noise level and with 2 dB subtracted to account for the use of the LA90 noise index rather than the LAeq.

The ETSU-R-97 night-time limit was partly based on an early World Health Organisation (WHO) internal noise standard of 35dB LAeq. Since the publication of ETSU-R-97, a later WHO document 'Guidelines for Community Noise' reduced the internal night-time noise standard to 30dB LAeq "to avoid negative effects on sleep". The same WHO guidelines recommend that "at night-time, outside sound levels approx. 1 metre from facades of living spaces should not exceed 45dB LAeq, so that people may sleep with bedroom windows open". This was based on a reduction of 15dB for the sound level difference between the inside and outside with an open window. The WHO 45dB LAeq external noise limit at 1m from a façade translates to a limit of 42dB LAeq in free-field conditions, away from the façade, or 40dB LA90 if this applied to wind turbine noise. Therefore, there is an argument for reducing the ETSU-R-97 external noise limit to 40 dB LA90 to protect sleep.

For single turbine schemes, or for remote sites a long way from residential properties, ETSU-R-97 reports the opinion of the noise working group that:

“if the noise is limited to an LA90, 10min of 35 dB(A) up to wind speeds of 10m/s at 10m height, then this condition alone would offer sufficient protection of amenity and background noise surveys would be unnecessary”.

However, for locations where a background survey has been carried out, the ETSU-R-97 noise limits derived from the background noise in relation to the measured wind speed can apply.

ETSU-R-97 allows for a higher limit where the residents are ‘financially involved’ with the wind turbine development. The suggested limit is 45 dB LA90, or 5 dB above the background noise, whichever is the greater, for both the day-time and night-time periods.

Where audible tones are present in the noise spectrum, ETSU-R-97 stipulates that a tonal penalty of up to 5 dB be added to the turbine noise levels. The magnitude of the tonal penalty depends on the audibility of the tone.

10.4. Institute of Acoustics Good Practice Guide

In May 2013, the Institute of Acoustics (IoA) published the ‘Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise’ . The document was prepared with the purpose of agreeing current good practice in the application of the ETSU-R-97 methodology and predicted turbine noise levels (which was not addressed in ETSU-R-97). The document was prepared by a specialist working group and reviewed by a peer group of professionals working in a variety of relevant disciplines. A discussion of ETSU-R-97 noise limits was excluded from the remit of the working group as these are a matter of UK Government policy.

The Scottish Government has formally endorsed the IoA Good Practice Guide (GPG) and accepts that the guide represents current industry good practice. Since May 2013, a number of supplementary guidance notes have also been published providing further detail. The IoA GPG and the supplementary guidance notes should be regarded as a refinement of the ETSU-R-97 guidance to ensure consistency and the noise assessment will follow the guidelines stated therein.

The Good Practice Guide (GPG) provides general advice on noise monitoring and data processing for noise surveys. It also clarifies a number of issues including the following:

- The background noise survey should be of sufficient duration that no fewer than 200 valid data points are obtained for each of the amenity hours and night-time periods with no fewer than five valid points in any 1 m/s wind speed bin.
- The background noise measurements (and thereby noise limits) should preferably be corrected for wind shear by correlating the background noise measurements with the standardised wind speed at 10m height. The standardised wind speed is defined as the wind speed at 10m height which is derived from the hub height wind speed using a standard equation.
- That ISO 9613-2 is to be used for wind turbine noise predictions, with certain stipulations and limitations as follows:
 - The turbine sound power levels should be stated, and information provided on whether these are measured levels, measured levels with an allowance for measurement uncertainty, warranted levels or generic levels;
 - Downwind propagation should normally be considered to represent the worst case.

- The atmospheric conditions assumed should be stated, with 10°C and 70% Relative Humidity preferred;
- The ground factor assumed should be either (i) $G = 0$ (hard ground), together with measured sound power levels; or (ii) $G = 0.5$ (mixed ground); together with a receiver height of 4.0 m and either manufacturer's warranted sound power levels or measured sound power levels plus an allowance for measurement uncertainty.
- Barrier attenuation (where applicable) should be limited to 2dB; and
- The predicted noise levels ($LA_{eq,t}$) may be converted to the required $LA_{90,10min}$ by subtracting 2 decibels (dB).
- Consideration of cumulative noise issues including:
 - How noise impacts from existing and consented wind farm schemes must be assessed.
 - The use of directivity corrections for specific situations so that the effect of wind direction on noise propagation can be accounted for. This is important in respect of cumulative noise level as some receptor location which cannot be downwind of all turbines at the same time.

10.5. Dumfries and Galloway Consultation

Ion Acoustics spoke with William Jackson, an Environmental Health Officer at Dumfries & Galloway Council in relation to the scheme. William confirmed that the Council would seek to impose the lower ETSU noise limits on the development (35 dB(A) or 5 dB(A) above the background noise whichever was the greater. This is accepted. Further consultations will be made during the EIA process to agree noise monitoring positions and other details in relation to the assessment.

10.6. Methodology for Operational Noise Assessment

To carry out a noise assessment in accordance with ETSU-R-97 and the IoA Good Practice Guide, the following steps are required:

- Specify the number and locations of the wind turbines and the initial layout;
- Identify the locations of the nearest, or most noise sensitive, receptors (typically dwellings);
- Determine the background noise levels as a function of site wind speed at the nearest neighbours, or at least at a representative sample of the nearest noise-sensitive receptors;
- Determine the quiet day time and night-time noise limits from the background noise levels identified at the nearest receptors in consultation with Dumfries and Galloway Council;
- Calculate the noise levels due to the operation of the wind turbines as a function of site wind speed at the nearest receptors;
- Compare the calculated noise immission levels with the derived criterion curves and assess in the light of relevant planning requirements;
- Identify potential mitigation measures including changes to layout, turbine type and the use of low noise modes as required.
- Identify any cumulative noise issues associated with other existing, consented and proposed schemes and if necessary, reconsider mitigation.

Additionally, an investigation of the planning status of sites in the area will be carried out to identify all noise sensitive locations.

10.7. Cumulative Assessment

ETSU-R-97 states that the noise limits that it recommends apply to the cumulative effect of noise from all wind turbines that may affect a particular location. Therefore a search will be undertaken, in consultation with Dumfries and Galloway Council, to identify any wind energy developments, either operational, consented or in planning, which may require consideration in the assessment process. At present the existing schemes to the east, south-east and north-west are too far away to make a contribution to the noise climate.

10.8. Other Features of Wind Turbine Noise

10.8.1. Low Frequency Noise and Infrasound

Infrasound typically refers to noise which is below the audible frequency range of human hearing (typically less than 20Hz), whereas low frequency noise typically refers to low frequency (20 to 200 Hz) noise in the audible spectrum. A study, published in 2006, by Hayes McKenzie on behalf of the DTI investigated low frequency noise from wind turbines. This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines. Further international studies include a large study from Health Canada have not found any health effects from low frequency noise or infrasound.

Measured vibration levels are far below the thresholds for human perception even on the wind farm sites.

It is therefore not considered necessary to carry out specific assessments of low frequency noise, infrasound, or perceptible vibration. However, further supporting information on these subjects including summaries of more recent international studies will be provided in the ES.

10.8.2. Amplitude Modulation

Since 2005 / 2006 a phenomenon known as Amplitude Modulation (AM) was found to be a factor in some noise complaints in ways not anticipated by ETSU-R-97. This was also noted in the Hayes McKenzie Low Frequency Noise and Wind Turbine report (BWEA 26 8th July 2004) as it is typically a low frequency effect. ETSU-R-97 described blade swish, which is a form of amplitude modulation by is only heard relatively close to the turbines. The term Other Amplitude Modulation (OAM) is sometimes used to differentiate low frequency, far-field amplitude modulation from blade swish, but is not necessary to make a distinction when monitoring amplitude modulation at residential properties.

Amplitude modulation is defined as periodic fluctuations in the level of audible noise from a wind turbine (or wind turbines), the frequency of the fluctuations being related to the blade passing frequency of the turbine rotor(s). For a three-bladed turbine rotating at 20 rpm, this equates to a fluctuation in noise once per second. The wind industry trade body, Renewable UK, in December 2013 published research into Amplitude Modulation . This included theoretical research on mechanisms causing the phenomenon and subjective tests to determine a dose-response relationship. More recently, the Institute of Acoustics has published an agreed numerical rating method and a further Government-commissioned report by WSP PB has considered how the issue might be addressed in respect of planning. The conclusions of this research are:

- That OAM is caused by the tip of the rotor blade going into transient stall (or flow separation) at the highest point on its arc under certain conditions. This can result in a periodic 'whoomping' or 'thumping' noise and, for a turbine with three blades rotating at 20 rpm, this will occur approximately once per second. The

phenomenon is primarily a downwind effect with low frequencies prevalent. Upwind amplitude modulation is sometimes experienced however for receptors relatively close to the turbines.

- Stall occurs when the air flow becomes detached from the surface of the blade. These transient stall conditions can occur during high wind shear conditions, when the difference in the wind speed between the lowest part of the rotor's arc varies significantly from the wind speed at the highest point. Therefore, AM is more prevalent at night when wind shear tends to be higher (and background noise lower). In these circumstances, the blade pitch settings may not reflect the high wind speeds at the top of the blade. However, there are likely to be other conditions when transient stall occurs.
- Subjective tests undertaken at the University of Salford as part of Renewable UK research have indicated that the modulated sounds are subjectively more annoying than non-modulated sounds, although the overall level of the sound is still an important factor in the overall annoyance.
- The IoA Amplitude Modulation Working Group has published an agreed rating method for amplitude modulation. This rating method has been adopted in the WSP PB report, with recommendations on how a penalty mechanism might be incorporated into a planning condition. A wording of a proposed planning condition was published in Acoustics Bulletin. The form and application of any penalty scheme is still being studied, however.
- Although, at present it is not possible to assess the likelihood of AM occurring at the planning stage, the provision of a published rating mechanism and the emergence of a possible planning condition provides some comfort that AM, should it occur, can be controlled in planning. If it were to occur, then mechanisms can be implemented to mitigate AM, for example by limiting certain turbines under specific wind conditions.

10.8.3. Construction Noise

The following legislation and standards are of particular relevance to construction noise:

- The Control of Pollution Act 1974 (CoPA 1974);
- BS 5228: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

CoPA 1974 provides local authorities in Scotland, England and Wales with powers to control noise and vibration from construction sites. Section 60 of the Act enables a Local Authority to serve a notice to a contractor of its requirements for the control of site noise. Section 61 of the Act allows for those carrying out construction work to apply to the Local Authority in advance for consent to carry out the works.

Construction noise can be assessed using British Standard BS 5228 which provides a calculation method and general guidance on controlling noise and vibration from construction sites. The standard:

- Refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction sites;
- Recommends procedures for noise and vibration control in respect of construction operations; and
- Stresses the importance of community relations, stating that early establishment and maintenance of these relations throughout the site operations will go some way towards allaying people's fears.

There are no noise limits within the main text of BS 5228 and in fact, the preferred approach is to use best practicable means to reduce noise rather than setting limits. This means that everything practicable should be done to reduce noise. This strategy will be adopted here.

However, Annex E of the BS 5228-1 gives "example criteria for the assessment of the significance of noise effects" e.g. for use in Environmental Impact Assessments. For quiet areas, where the existing ambient noise levels are low, a significant noise effect is deemed to occur if the construction noise (plus the ambient noise) exceeds the following threshold values:

- 65 dB LAeq Daytime (07.00-19.00) and Saturdays (07.00-13.00)
- 55 dB LAeq Evenings and Weekends (19.00-23.00 Weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays)
- 45 dB LAeq Night-time (23.00-07.00)

Noise can also occur during construction from traffic on local roads including the transportation of construction materials and turbine components. Where traffic data is available the increase in noise due to construction traffic can be calculated according to the Government guidance "The calculation of road traffic noise" CRTN.

The acceptability of construction noise is likely to be affected by the location of the site, relative to the noise sensitive premises; existing ambient noise levels; the duration and working hours of site operations; the characteristics of the noise produced and the attitude of local residents to the site operator. It is not always necessary to consider construction noise within the scope of an Environmental Assessment.

10.9. Proposed Effects Scoped Out of the Assessment

It is considered that the following subjects can be scoped out of the assessment:

- Operational noise from traffic and transport. These will be negligible due to the low and infrequent traffic numbers envisaged.
- Operational vibration. Although turbines can produce vibration, the effects are below human perception thresholds even on the wind farm sites.
- Construction noise (excluding blasting) and vibration on the wind farm site.

10.10. Key Questions for Consultees

Key questions for the Council and Statutory Consultees are:

Do the Council agree with the proposed method of assessment?
The proposed daytime limit will be set at 35 dB(A) or the background noise level + 5dB(A) whichever is the higher. There is no intention to have a higher limit at night-time, but can a different limit be set for cumulative effects?
Can consultees confirm there are no other energy developments that should be taken into consideration in the cumulative noise assessment?
If construction is limited to normal working hours, can a construction noise assessment be scoped out?

11. Socio-Economic Assessment

11.1. Introduction

This section of the Scoping Report considers the potential socio-economic, tourism, recreation and land-use effects of the Proposed Development arising during construction and operation and maintenance phases.

The chapter will be compiled by MKA Economics who has led the socio-economic, tourism, recreation and land use assessment of over 30 onshore wind farms across Scotland, a number of which being located in Dumfries and Galloway. MKA Economics also brings local knowledge from leading other economic development studies, including the Dumfries and Annan regeneration masterplans, event impact assessments (SkiffyWorlds, Wickerman, food and drink festivals, farmers' markets and motor rallies for example) and the evaluation of regional funding programmes (food and drink fund, small business loan scheme and foot and mouth fund).

This section provides a brief introduction of potential socio economic, tourism, recreation and land-use effects of the construction and operation of the Proposed Development. This includes a consideration of employment and Gross Value Added (GVA) generation, tourism effects and any indirect supply chain economic effects from the Proposed Development. It also considers the effects on the recreational and land use assets associated with the Proposed Development.

The assessment will include a description of the current socio-economic, tourism, recreation and land-use baseline with the local area. This will include a summary of economic performance data for each study area and a description of the relevant tourism, recreation and land-use assets that will be covered in the assessment.

This scoping report forms the start of the consultation process; further consultation may be undertaken as required during the EIAR preparation process.

11.2. Baseline Description

The baseline environment will cover and compare three study areas:

- Local Area, comprising the local ward of Annandale North that covers the location of the development and nearest settlements (for instance Lockerbie to the south and Moffat to the north);
- The local authority, Dumfries and Galloway Council (DGC); and
- Scotland.

The economic impacts will be quantified and presented for DGC, Scotland and UK spatial areas. The tourism, recreation and land-use assessment will consider assets within 10 km from the site boundary.

The baseline study will cover:

- The demographic profile of the local area within the context of the regional and national demographic trends;
- Employment and economic activity in the local area within the context of regional and national economies;
- The industrial structure of the local area within the context of regional and national economies;
- The role of the tourism sector in the local and regional economy;

- An analysis of tourism statistics in Scotland, DGC and the local area (North Annandale and the settlements of Lockerbie and Moffat);
- Identification of local tourism assets, including accommodation providers, visitor attractions and assets;
- Wage and salary levels within the regional economy compared to the national level; also including educational attainment levels within the regional area and compared to the national level; and
- An assessment of relative deprivation based on a review of the Scottish Index of Multiple Deprivation (Scottish Government, 2020), over the period from 2004, through to 2020, to show how the local area has changed over time, compared to the national level.
- Tourist attractions and accommodation will be identified within 10 km of the site boundary. Tourist attractions include permanent fixtures (e.g., museums, attractions, castles and trails) as well as temporary events (e.g., music, sport, cultural or arts festivals). We do not anticipate any negative tourism effects, repeated studies demonstrate no negative effects, but on balance we will include as it may be the expected norm, but also given the additional positive benefit potential of visitors seeing the Dumfries and Galloway as a sustainable destination playing a strong role in tackling climate change.

The purpose of the socio-economic audit will be to highlight the capacity of the local area to directly benefit from contracts awarded during the development and construction of the project.

Important attractions attributed to the Dumfries and Galloway and North Annandale will also be identified due to their increased sensitivity. A specific focus will be on tourism assets within 10 km of the site boundary.

In terms of recreation and land-use assets and activities, these will also be assessed in terms of their vicinity to the Proposed Development. This will be based on a review of recreation and land-use assets within 10 km of the Proposed Development, including hill summits and walks and land uses such as agriculture, crofting and forestry.

The tourism, recreation and land-use assessment will cross reference the Landscape and Visual and Cultural Heritage Chapters.

11.3. Guidance and Legislation

There is no established guidance for conducting a socio-economic, tourism, recreation and land-use assessment as part of the EIA process. It is therefore proposed that the assessment uses desk-based information sources to assess the likely scale of effects, supplemented by consultation with local stakeholders, informed by professional judgement. Cross-reference would be made to other technical assessments to consider potential effects on recreational and land-use assets and other leisure and tourism attractions in the vicinity.

Socio-economic effects will be considered based on the guidance from Environmental Impact Assessment Handbook (NatureScot, 2018). A range of existing surveys and assessments of socio-economic and visitor profiles, land use and ownership, and public attitudes will be collated to provide background information against which to assess the potential for significant effects.

Socio-economic impacts associated with onshore wind farms primarily relate to job creation, use of local services and income spent in the locality of a project, and community benefit. These impacts can have both short and long term, direct beneficial effects for surrounding local communities. This aspect will be completed in line with National Planning Framework

4 (NPF4) (Scottish Government, 2023) policy on energy developments, which states at Policy 11c “Development proposals will only be supported where they maximise net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.”

As noted above a desktop socio-economic assessment will consider the potential direct and indirect effects of the Proposed Development, during both construction and operation phases. During the construction of the Proposed Development, local sourcing will be preferred where possible, bringing direct economic benefits from the Proposed Development. Similarly, operational jobs will inherently be targeted at people residing close to the Proposed Development, either local people or people relocating to the area for these job opportunities. An estimate of economic benefits will be provided in the EIA Report.

An assessment of effects upon tourism receptors will also be undertaken and will take into account published data on visitor numbers and the value of tourism to the economy of the Dumfries and Galloway and North Annandale. This will also include consultations with local businesses such as accommodation associations and providers, tourism businesses, transport operators and visitor attraction and tourism agencies such as VisitScotland, Dumfries and Galloway Council, South of Scotland Destination Alliance, South of Scotland Economic Partnership, Borderlands Partnership and other relevant consultees within the vicinity of the Proposed Development.

A cumulative assessment will also be presented, and this will take into account other similar renewable and infrastructure projects ongoing or planned in the local area. This will assess the cumulative impact of such investments, including the Proposed Development.

The applicant is committed to implementing accepted good practice measures during construction and operation, thereby ensuring that many potential adverse social and economic effects can be avoided or reduced. Possible mitigation measures may include the following:

- The programming of the transportation of abnormal loads wherever practicable to avoid peak visitor, or other busy periods to mitigate the effect of the Proposed Development on particularly sensitive locations, tourist/visitor viewpoints, and road corridors.
- Local sourcing of construction materials where possible to reduce the import and export of materials to and from the Site, limiting traffic movements on the surrounding road network and hence minimising related adverse effects upon visitors and locals.

It is considered that there are opportunities to enhance positive effects resulting from the Proposed Development, including:

- Local promotion of contract and supply chain opportunities during construction and operation to maximise the use of local business and labour.
- Skills development and training programmes to increase local take up of training, apprenticeship and employment opportunities associated with the Proposed Development.
- Establishing effective links with local employability programmes and initiatives.
- Promotion of the wider area and its opportunities as part of the marketing of the Proposed Development.
- Seek to develop the potential for maximising the recreational amenity of the site, based on its proposed location and examples of similar best practice.

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

- National Strategy for Economic Transformation (Scottish Government, 2022);
- National Planning Framework 4 (Scottish Government, 2023);
- Net Economic Benefits and Planning (Scottish Government, 2016);
- Onshore Wind Policy Statement (Scottish Government, 2022);
- Draft Energy Strategy and Just Transition Plan (Scottish Government, 2023);
- Regional Economic Strategy (South of Scotland Regional Economic Partnership, 2020);
- Borderlands Inclusive Growth Deal (Borderlands Partnership, 2021);
- Tourism Scotland 2030 (Scottish Tourism Alliance, 2020);
- South of Scotland Development Alliance Operating Plan (SSDA, 2023); and
- Baseline Report on Community Benefit and Shared Revenue from Onshore Wind Projects to Communities in the South of Scotland (2023)

These policy documents would also allow for the relevant baseline to be identified

11.4. Proposed Scope of Assessment

In terms of construction related effects, these will be based on dialogue with the Applicant, their technical consultants as well as drawing on the economic consultant's own knowledge from other onshore wind farms in Scotland. Where required we will draw on case study evidence from RenewableUK research on the economic benefits of onshore wind farms (RenewablesUK 2012, 2015 and 2019). In order to calculate the economic effect of new jobs, the GVA per head for civil engineering related projects in Dumfries and Galloway and Scotland will be utilised. These figures will be sourced from the Scottish Annual Business Statistics (Scottish Government, 2021). The economic impact assessment will also take displacement and multiplier effects into consideration to provide a net economic impact figure at the regional, national and UK levels.

In terms of operational effects, employment levels will be provided by the Applicant, and backed up with evidenced from RenewableUK modelling and assumptions. The employment impacts associated with the mature operation phase will be presented by occupation type. In order to calculate the economic effect of new jobs, the GVA per head for civil professional, scientific and technical work in Dumfries and Galloway and Scotland will be utilised. These figures are also drawn from the Scottish Annual Business Statistics and the resultant economic impact will be presented at the Dumfries and Galloway and Scotland levels.

As noted in the construction phase, economic impact assessments must also consider the effects of displacement. For the Proposed Development, displacement levels are not expected to be as significant as the construction related activity and it is assumed that displacement would be low during the during operation and maintenance at both the regional and national levels. Multiplier effects will also be built into the economic impact assessment, and these will be sourced from the Type II Output, Income, Employment and GVA Multipliers, produced by the Scottish Government (Scottish Government, 2022).

In addition to the stated economic opportunities at the construction and operational phases, there is also a variety of wider economic impacts which are excluded from the construction and operational economic impact assessment. The wider impacts which should also be noted as having positive effects on the regional and national economies include:

- Supporting national, regional and local policy objectives;

- Local supply chain opportunities;
- Pre-development costs, such as consultancy fees and legal costs;
- Exchequer impacts;
- Perception benefits, promoting the area as a place to work and invest; and
- Community benefits, linked to the community benefit commitment made by the Applicant within the EIAR and typically referenced in a successful application. This assessment will be completed in line with Scottish Government policy on community benefits of onshore wind farms (Scottish Government, 2019), including:
 - Consideration of the current community benefits landscape in the immediate local area and relative scale of funds available to communities;
 - Highlighting examples within the local community of where community ownership options have been offered and if these have progressed; and
 - Outlining an approach, based on best practice, for engaging communities to maximise the possible benefits of any fund offered.

In terms of land use, this will discuss the potential of overlaps between the financial benefits of the proposal and the wider land use and environmental benefits including, but not limited, to biodiversity net gain by supporting potential alternative approaches to land management. These would be agreed between the landowner and the Applicant before being implemented through a land/biodiversity management plan secured by an appropriately worded planning condition.

The link between renewable developments and the tourism sector is a subject of debate. However, the most recent research has not found a link between tourism employment, visitor numbers and renewable developments. For example, research completed by the Scottish Government (Scottish Government, 2008) found that there is no relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at the local authority level nor in the areas immediately surrounding developments.

11.5. Assessment Methodology

The issues that will be considered in this assessment will include the potential socio-economic, recreation, tourism and land use effects associated with the Proposed Development.

A socio-economic impact analysis will be undertaken using the methodology developed by RenewablesUK and deployed by MKA Economics, which has been used to assess over 30 renewable developments across Scotland. The potential socio-economic effects that will be considered are:

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

The tourism sector is an important contributor to the Scottish economy and whilst repeated studies and operational experience indicates no negative effect on tourism from onshore wind farms, there is merit in considering whether the Proposed Development will have any effect (positive and negative) on the tourism sector, with particular reference to ensuring the construction phase minimises any disturbance to tourist routes.

This assessment will consider the potential effects that the Proposed Development could have on tourism attractions, tourism businesses, local accommodation, tourism and recreational trails and hill summits and hill walks.

This will consider the implications of any effects identified for the tourism sector in the local area and wider region. The assessment should also be read in conjunction with the Recreation and Land Use Assessment as in many cases the tourism assets are also recreational assets and therefore this assessment will, in part, assessment similar receptors when assessing tourism/recreational trails and routes.

Other issues, such as the implications for the agricultural and forestry sectors, may emerge during the assessment and will require consideration. Effects will be considered based on the guidance from guidelines for Environmental Impact Assessment Handbook.

The assessment will consider effects during construction and operational phases. Further, each assessment must consider the potential for cumulative effects. The projects to be considered cumulatively with the Proposed Development will be agreed and be in line with those considered in other technical assessments.

The predicted socio-economic, tourism, recreation and land-use effects of the Proposed Development are assessed, using the significance criteria outlined in Table 11.1. As there are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic or tourism effects of a project of this nature, professional judgement, with reference to commonly used methodologies, and recognised approaches to quantifying economic effects, is used to determine the significance criteria. Major or moderate effects are defined as significant in EIA terms.

Table 11.1 Significance Criteria

Significance	Description
Major	Major loss / improvement to key elements / features of the baselines conditions such that post development character / composition of baseline condition will be fundamentally changed. For example, a major long-term alteration of socio-economic conditions, a major reduction / improvement of tourism recreational assets, or a substantial change to tourism spend.
Moderate	Loss / improvement to one or more key elements / features of the baseline conditions such that post development character / composition of the baseline condition will be materially changed. For example, a moderate long-term alteration of socio-economic conditions, a moderate reduction / improvement in the tourism recreational asset, or a moderate change to tourism spend.
Minor	Changes arising from the alteration will be detectable but not material; the underlying composition of the baseline condition will

Significance	Description
	be similar to the pre-development situation. For example, a small alteration of the socio-economic conditions, a small reduction / improvement in the tourism recreational asset, or a small change in tourism spend.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

11.6. Proposed Mitigation

Where required, mitigation measures will be presented. These will only be presented where there are any moderate or major adverse effects. Where relevant, mitigation measures will be presented to aid the delivery of any moderate or major beneficial effects, such as for example, community funding and ‘Meet the Buyer’ and local procurement type events and activities.

11.7. Potential Impacts

Potential impacts will be presented across socio-economic, tourism, recreation and land-use aspects. The socio-economic effects will be presented in the form of GVA, jobs, turnover and inward investment levels. Tourism, recreational and land-use effects will be based on the review of the area’s tourism, recreation and land-use baseline, a review of secondary sources and other technical assessments will be undertaken to measure the scale of these effects.

Receptors and Impacts Scoped In and Out of Assessment

The long-term impacts associated with the decommissioning phase of the Proposed Development are not assessed given the significant time lapse between planning and decommissioning phases.

11.8. Scoping Questions to Consultees

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

- DGC (Access, Tourism and Economic Development Teams);
- VisitScotland (as national tourism lead body);
- South of Scotland Destination Alliance (as the Destination Management Organisation (DMO) for tourism across the south of Scotland);
- South of Scotland Regional Economic Partnership (as the regional economic development service provider);
- The Scottish Rights of Way and Access Society (ScotWays);
- Mountaineering Scotland; and
- Any local recreation, land-use and tourism groups.

The following questions are proposed:

Do ECU, DGC and Statutory Consultees agree that the range of proposed assessments is sufficient and appropriate?

Are the ECU, DGC and Statutory Consultees aware of any specific key sensitive receptors that should be taken into account?

Are the ECU, DGC and Statutory Consultees aware of any particular stakeholders in the area who may wish to provide comment on the scope of this assessment?

11.9. References

Borderlands Partnership (2021). *Borderlands Inclusive Growth Deal*. Available at: <https://www.borderlandsgrowth.com/> Accessed 04 September 2023

NatureScot. (2018). *Environmental Impact Assessment Handbook*. Available at: <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf> Accessed 04 September 2023

RenewableUK (2012 and 2015). *Onshore Wind: Direct and Wider Economic Impacts*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48359/5229-onshore-wind-direct--wider-economic-impacts.pdf Accessed 21 August 2023 Accessed 04 September 2023

RenewableUK (2019). *Quantifying the benefits of onshore wind to the UK*. Available at: <https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/media/Quantifying the Benefits of O.pdf> Accessed 21 August 2023 04 September 2023

Scottish Government (2008). *Economic impacts of wind farms on Scottish tourism*. Available at: <https://www.gov.scot/publications/economic-research-findings-economic-impacts-wind-farms-scottish-tourism/> Accessed 04 September 2023

Scottish Government (2016). *Net Economic Benefit and Planning*. Available at: <https://www.gov.scot/publications/draft-advice-on-net-economic-benefit-and-planning/> Accessed 04 September 2023

Scottish Government (2019). *Community benefits from onshore renewable energy developments*. Available at: <https://www.gov.scot/publications/scottish-government-good-practice-principles-community-benefits-onshore-renewable-energy-developments/pages/2/> Accessed 04 September 2023

Scottish Government. (2020). *Scottish Index of Multiple Deprivation (SIMD)*. Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> Accessed on 04 September 2023

Scottish Government (2021). *Onshore Wind: Policy Statement*. Available at: <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/> Accessed 04 September 2023

Scottish Government (2021). *Scottish Annual Business Statistics*. Available at: <https://www.gov.scot/publications/scottish-annual-business-statistics-2021/> Accessed 04 September 2023

Scottish Government (2022). *National Strategy for Economic Transformation*. Available at: <https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/> Accessed 04 September 2023

Scottish Government (2022). *Supply, Use and Input-Output Tables: 1998-2019*. Available at: <https://www.gov.scot/publications/input-output-latest/> Accessed 04 September 2023

Scottish Government (2023). *National Planning Framework 4*. Available at: <https://www.gov.scot/publications/national-planning-framework-4/> Accessed 04 September 2023

Scottish Government (2023). *Draft Energy Strategy and Just Transition Plan*. Available at: <https://www.gov.scot/publications/draft-energy-strategy-transition-plan/pages/15/> Accessed 04 September 2023

Scottish Tourism Alliance (2020). *Scotland Outlook 2030*. Available at: <https://scottishtourismalliance.co.uk/scotland-outlook-2030-overview/> Accessed 04 September 2023

South of Scotland Development Alliance (2023). *South of Scotland Development Alliance Operating Plan*. Available at <https://www.ssdalliance.com/operational-plan/> Accessed 04 September 2023

South of Scotland Regional Economic Partnership (2020). *Regional Economic Strategy*. Available at: <https://sosrep.dumgal.gov.uk/article/21953/Regional-Economic-Strategy> Accessed 04 September 2023

12. Cultural Heritage

12.1. Introduction

Locogen Consulting have been appointed to undertake the cultural heritage assessment of the proposed Balgray wind farm.

This section of the Scoping report has been written alongside the Historic Environment Scotland's guidance document, 'Managing Change in the Historic Environment: Setting' (HES, 2020) and 'Designation Policy and Selection Guidance' (HES 2020).

This section considers the potential impacts of the Proposed Development on archaeology and cultural heritage. It sets out the study areas proposed for the impact assessment and the cultural heritage baseline, established through an initial appraisal of current data drawn from the Dumfries and Galloway Council Historic Environment Records (HER). The methodology to be adopted for the impact assessment within the EIA Report is set out and potential impacts are identified. Assets most likely to have their settings affected are identified. Standard and additional mitigation measures in relation to potential direct impacts are also set out.

Study Areas

Two study areas will be used for the assessment:

- The Inner Study Area: the Proposed Development site, defined by the site Red Line Boundary, within which turbines and associated infrastructure are proposed, will form the study area for the identification of heritage assets that could receive direct effects arising from the construction of the Proposed Development and/or indirect effects arising from post-construction.
- The Outer Study Area: a wider study area extending 10km from the outermost red edge will be used for the identification of cultural heritage assets whose settings may be affected by the Proposed Development (including cumulative effects). Consideration will also be given to designated heritage assets beyond 10km where long distance views and intervisibility are considered to be an important aspect of their settings.

12.1. Baseline Conditions

12.1.1. Inner Study Area (Table 12.1)

The Proposed Development site lies within area of improved grassland currently used for pasture. It is an elevated site, with the Fir Tree Hill trig point located within the east of the Site. There are several watercourses within the Proposed Development Site, such as Hewke and Kirkcroft Burns and Hallhills Loch reservoir to the north.

Initial information relating to archaeology and cultural heritage has been gathered through a preliminary desk top search using available online resources and HER information from Dumfries and Galloway to indicate potential features of interest, as listed in Table 12.1. The Proposed Development Site appears to have been settled since the Early Bronze Age, with two settlement/ hill forts (including **SM2265**) associated with the Iron Age. From the medieval period, assets associated with agriculture are noted, followed by the post medieval farmstead of Balgrayhill Farmhouse to the south of the Proposed Development Site.

There is one Scheduled Monument ‘**SM2265**’ Firtree hill, fort’ (**MDG7107**) associated with the Iron Age within the Proposed Development Site.

Initial research of the Dumfries and Galloway Historic Environment Record (HER) noted the preliminary research noted a further 19 non-designated assets (Figure 12.2) within the Proposed Development Site. These have an assigned significance by the HER,. Those designated ‘National’, ‘Regional’ and ‘Local’ by the HER are as such to be considered within the EIA assessment (Table 12.1). Non-Designated Assets that have been designated ‘National’ significance by the HER are to be assessed for Scheduled Monument designation and as such the HES Guidance is relevant to them.

Where Non-Designated Assets have been assigned ‘None’ or ‘Unknown’ levels of significance, these reflect data, such as that from LiDAR or historic Ordnance Survey mapping, as well as features of local interest that have yet to be entered into the HER at this current time. These assets will be assessed within the desk-based assessment for direct and indirect impacts of construction, however will be scoped out of the Setting assessment.

Further guidance on the Council HER designations of archaeological assets is detailed in Policy HE4 of the Dumfries and Galloway Local Development Plan2.

Buffer zones will be placed around these assets in line with recommendations from the HER to prevent direct impacts.

HER/ Reference	HES	Name	Site Type/ Assoc. Period	Significance
MDG7107/ SM2265		Firtree Hill,Fort	Prehistoric Domestic And Defensive: Fort (Includes Hill And Promontory Fort). Iron Age	National
MDG9703		Shielstead Hill / Firtree Hill	Settlement. Early Bronze Age To Roman	National
MDG9858		Shielstead Hill / Firtree Hill	Scooped Settlement/ Iron Age	National
MDG8575		Shielstead Hill / Firtree Hill	Scooped Settlement/ Iron Age	National
MDG11764		Shielstead Hill	Linear Earthwork/ Unknown Period	National
MDG5284		Shielstead Hill	Enclosure/ Medieval To 19th Century	Regional/Local
MDG7108		Roseburrair	Enclosure; Settlement/ Early Bronze Age To Roman	Regional/Local
MDG9860		Shielstead Hill	Cultivation Terrace; Enclosure/ Medieval To 19th Century	Regional/Local
MDG9917		Balgrayhill	Ridge And Furrow; Enclosure/ Iron Age To 19th Century	Regional/Local
MDG8663		Shielstead Hill	Ring Enclosure/ Medieval To Modern	Regional/Local
MDG5276		Shielstead Hill	Cord Rig/ Iron Age	Regional/Local
MDG9859		Shielstead Hill / Firtree Hill	Enclosure/ Medieval To 19th Century	Regional/Local
MDG9704		Shielstead Hill	Enclosure?/ Iron Age To 19th Century	Regional/Local

MDG9909	Firtree Hill	Building; Enclosure/ Medieval To 18th Century	Regional/Local
MDG9706	Firtree Hill	Burnt Mound/ Early Bronze Age To Late Bronze Age	Regional/Local
MDG21835	Firtree Hill	Enclosure?/ Late Prehistoric To 19th Century	Unknown
MDG11475	Balgrayhill	Farmstead; Farmhouse/ Post Medieval To Modern	Unknown
MDG17084	Mid Hill	Field/ Post Medieval To 18th Century	Unknown
MDG17085	Mid Hill	Field/ Post Medieval To 18th Century	Unknown
MDG5240	Blood Moss / The Gall, Boreland/ White Hill	Stone Quarry/ Medieval To Modern	None

Table 12.1: Non-designated assets within the Proposed Development Site.



12.2 Heritage Assets within Inner Study Area

Prehistoric Period

There is one Scheduled Monument (**SM2265**) and nine further non-designated assets which are associated with the Prehistoric Period. There are a three examples of Early-Bronze Age settlement (MDG9706, MDG9703 and MDG7108) within the Proposed Development Site

suggesting the landscape was settled long-term, as well as neolithic findspots recorded within 1km outwith the Proposed Development Site.

There are two fortification/ settlement sites within the Proposed Development Site consisting of the Scheduled Monument fort and potential settlement site (**SM2265**) and the potentially earlier fort/ settlement site of Roseburra (MDG7108) to the south-west of the Scheduled Monument. There are several other settlement/ fort sites within the surrounding elevated landscape, suggesting a series of inter-connected defensive and domestic landscapes. These fort/ settlement sites are broadly associated with the Iron Age. Within the Proposed Development Site there are a further two Iron Age Scooped Settlements (**MDG9858** and **MDG8575**),.

There are several examples of agricultural activities dating from the Prehistoric period, with examples of 'cord rig' (**MDG5276**), Ridge and Furrow (MDG9917) and 'Enclosures' (**MDG9704** and **MDG21835**). These suggest the long-term use of the settled landscape for agricultural purposes, which continues to present-day activities.

Medieval or Later Settlement and Agriculture

There are 6 heritage assets recorded through the HER which are associated with medieval agricultural practices (MDG9909, MDG5284, MDG9860, MDG9859 and MDG8663 and MDG5240) and three post-medieval assigned agricultural assets (MDG17084, MDG17085), including the surviving post-medieval Balgrayhill Farmstead at the south of the Proposed Development Site (MDG11475). There is one feature included in the HER which is of 'unknown' significance, which is currently undergoing HER assessment (MDG11764).

There are several examples of sheepfolds, field boundaries, enclosures, and quarries both named and existing within the Proposed Development Site., Indicating the agriculturally diverse nature of the historic use of the landscape.

12.1.2. Outer Study Area

There are no World Heritage Sites or Inventoried Battlefields, situated within 10 km. The following nationally designated assets as defined by Historic Environment Scotland (HES) are sited within the 5km and 10 km Study Areas (Table 12.3). There is one 'Property in Care' located within 10km of the Red Line Boundary, however this has been scoped out as it is associated with the Scheduled Monument 'Lochmaben Castle' and will be assessed as part of the Scheduled Monument.

The majority of listed buildings lie within urban settings, most of those being within the townscape of Lockerbie, to the southwest of the Proposed Development site.

12.1.3. Potential Impacts

Direct Impacts

The Proposed Development could potentially directly impact upon one or more of the non-designated heritage assets recorded within the Inner Study Area.

It is possible that there could be other, unknown, and buried remains of archaeological interest within the site and any such remains could be directly affected by construction of the Proposed Development.

Setting Impacts

The Proposed Development could give rise to potentially adverse impacts on the settings of Designated Heritage Assets within the Inner and Outer Study Area (as defined above).

Scoped In

It is proposed that the assessment will include consideration of potential impacts of the Proposed Development on the settings of:

- Scheduled Monuments, Category A and B Listed Buildings, Conservation Areas, and Inventory Gardens and Designed Landscapes, where present within 10km of the Red Line Boundary;
- Category C Listed buildings and Non-Inventory Designed Landscapes (NIDLs) within 5km of the Red Line Boundary;
- All Designated Assets outwith to 1km of the Inner Study Area;
- SM2265 'Firtree Hill, fort' within the Inner Study Area; and
- All Non-Designated Assets assigned 'National' significance by the Dumfries and Galloway HER within the Inner Study Area.

Distance	No. and Type of Designated Asset
1km	1 x Scheduled Monument
	5x Category B, 2 x Category C Listed Buildings
5km	25x Scheduled Monuments
	1 x Category A, 33 x Category B and 18x Category C Listed Buildings
10km	1x Garden and Designed Landscape
	1 x Conservation Area
	60x Scheduled Monuments
	17x Category A and 92x Category B Listed Buildings

Table 12.3: Designated Assets outwith to 10km from the Red Line Boundary

Consideration will be given to designated heritage assets beyond 10km where long distance views and intervisibility are an important aspect of their settings.

Consideration will also be given to designated heritage assets where there is no predicted visibility from the asset but where views of or across the asset are important factors

contributing to its cultural significance. In such cases, consideration will be given to whether the Proposed Development could appear in the background to those views.

Those assets that are most likely to be affected are those where wide-ranging views, or prominence in the landscape, are important aspects of their settings. Initial appraisal has identified several Iron Age Scooped Settlements and Settlement/ Fort sites which have similar qualities as those within the Inner Study Area.

Scoped Out

It is proposed that impacts on the settings of listed buildings that lie within non-designated urban settings can be grouped within the assessment on the basis that their settings are constrained to, and defined by, their locations within the built environment and their relationships with surrounding buildings and the local townscape.

It is proposed that Category B and Category C Listed Buildings, which lie outwith the ZTV within an isolated setting outwith other designations or urban environments can be scoped out on the basis there will be no visibility of the Proposed Development Site and their settings are constrained to and defined by a singular location.

12.2. Assessment Methodology

12.2.1. Guidance

The assessment will be carried out with reference to the following guidance documents:

- Dumfries and Galloway Council Local Development Plan 2 (October 2019)
- NatureScot (previously Scottish Natural Heritage) & Historic Environment Scotland (2018) 'Environmental Impact Assessment Handbook';
- IEMA (2021) 'Principles of Cultural Heritage Impact assessment in the UK';
- Chartered Institute for Archaeologists (2014, updated 2020) 'Standard and Guidance for Historic Environment Desk-Based Assessment';
- Historic Environment Policy for Scotland (HEPS) (2019);
- Historic Environment Scotland (2019, updated 2020) 'Designation Policy and Selection Guidance';
- Historic Environment Scotland (2016, updated 2020) 'Managing Change in the Historic Environment: Setting'; and
- Scottish Government (2011) 'Planning Advice Note (PAN) 2/2011: Planning and Archaeology'.

12.2.2. Desk-based Assessment Method

A desk-based assessment will be conducted covering the Inner Study Area (as defined above). The purpose will be to identify all known heritage assets, designated or otherwise, that could be directly affected by the Proposed Development, and to inform an assessment of the archaeological potential of the Proposed Development site.

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

- Dumfries and Galloway Council Historic Environment Record (DGHER)
- Historic Environment Scotland's (HES) on-line GIS Spatial Data Warehouse
- National Record of the Historic Environment (NRHE) and Canmore datasets;
- Historic maps held by National Library of Scotland
- Modern aerial photographic imagery available online
- Historic Land-Use Assessment Data for Scotland (HLAmap)
- Readily accessible published sources, including any reports referenced in HER/NRHE records.

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

12.2.3. Field Survey Method

A full walkover survey of the Inner Study Area can be scoped out of the DBA due to a recent survey undertaken by Rathmell Archaeology (2020) on the Proposed Development Site which confirmed the location, status and character of known and the potential of currently unrecorded, buried archaeological assets within the Proposed Development Site.

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

12.2.4. Assessment Method

The effects of the Proposed Development on heritage assets will be assessed based on their type (direct effects, impacts on setting and cumulative impacts) and nature (adverse or beneficial). The assessment will consider the value/sensitivity of the heritage asset, and its setting, and the magnitude of the predicted impact.

- Adverse effects are those that detract from or reduce cultural significance or special interest of heritage assets.
- Beneficial effects are those that preserve, enhance, or better reveal the cultural significance or special interest of heritage assets.

Where the setting of an asset may undergo significant adverse impact, the HES 'Managing Change' (202) document notes the most effective way to prevent impacts on setting is during the site selection and early design process. If significant adverse effects are identified after the site selection and early design process, the integrity of

setting, will be assessed in accordance with the National Planning Policy and EIA Regulations

Assigning Sensitivity to Heritage Assets

Cultural heritage assets are given weight through the designation process. Designation ensures that sites and places are recognised by law through the planning system and other regulatory processes. The level of protection and how a site or place is managed varies depending on the type of designation and its laws and policies (HES, 2020).

Table 12.4 summarises the relative sensitivity of heritage assets (including their settings) relevant to the Proposed Development.

Sensitivity of Asset	Definition / Criteria
High	Assets valued at an international or national level, including: Scheduled Monuments Category A Listed Buildings Inventory Gardens and Designed Landscapes Inventory Historic Battlefields Non-designated assets that meet the relevant criteria for designation
Medium	Assets valued at a regional level, including: Archaeological sites and areas that have regional value (contributing to the aims of regional research frameworks) Non-Inventory Designed Landscapes (NIDL) (where these are identified in Local Authority records) Category B Listed Buildings Conservation Areas
Low	Assets valued at a local level, including: Archaeological sites that have local heritage value Category C listed buildings Unlisted historic buildings and townscapes with local (vernacular) characteristics
Negligible	Assets of little or no intrinsic heritage value, including: Artefact find-spots (where the artefacts are no longer in situ and where their provenance is uncertain) Poorly preserved examples of particular types of features (e.g. quarries and gravel pits, dilapidated sheepfolds, etc)

Table 12.4 Sensitivity of Heritage Assets

Criteria for Assessing the Significance of Effects

The magnitude of impact (adverse or beneficial) will be assessed in the categories, high, medium, low and negligible (HEPS 2019) and described in Table 12.5,

Magnitude of Impact	Criteria	
	Adverse	Beneficial
High	Changes to the fabric or setting of a heritage asset resulting in the complete or near complete loss of the asset's cultural significance. Changes that substantially detract from how a heritage asset is understood, appreciated, and experienced.	Preservation of a heritage asset in situ where it would otherwise be completely or almost completely lost. Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated, and experienced.
Medium	Changes to those elements of the fabric or setting of a heritage asset	Changes to important elements of a heritage asset's fabric or setting,

	that contribute to its cultural significance such that this quality is appreciably altered. Changes that have limited potential to significantly detract from how a heritage asset is understood, appreciated, and experienced.	resulting in its cultural significance being preserved (where this would otherwise be lost) or restored. Changes that improve the way in which the heritage asset is understood, appreciated, and experienced.
Low	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is slightly altered. Changes that do not significantly adversely impact the integrity of the setting.	Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed. Changes that result in a slight improvement in the way a heritage asset is understood, appreciated, and experienced.
Negligible	Changes to fabric or setting of a heritage asset that leave its cultural significance unchanged and do not affect how it is understood, appreciated, and experienced.	

Table 12.5 Magnitude of Impact

The sensitivity of the asset (Table 12.4) and the magnitude of the predicted impact (Table 12.5) will be used to inform an assessment of the significance of the effect (direct effect or effect on setting), summarised using the formula set out in the matrix in Table 12.6. The matrix employs a graduated scale of significance (from Negligible to Major effects) and where two outcomes are possible through application of the matrix, professional judgement supported by reasoned justification, will be used to determine the level of significance.

Magnitude of Impact	Sensitivity of Asset			
	High	Medium	Low	Negligible
High	Major	Major / Moderate	Moderate / Minor	Minor / Negligible
Medium	Major / Moderate	Moderate	Moderate / Minor	Minor / Negligible
Low	Moderate / Minor	Moderate / Minor	Minor	Negligible
Negligible	Minor / Negligible	Minor / Negligible	Negligible	Negligible

Table 12.6 Significance of Effects

Major, Major/Moderate and Moderate effects are considered to be 'significant' in the context of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2018 (EIA Regulations). Minor and Negligible effects are considered to be 'not significant'.

Assessment of Effects on Setting

Historic Environment Scotland's guidance document, 'Managing Change in the Historic Environment: Setting' (HES, 2020), notes that:

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

“Setting often extends beyond the property boundary or ‘curtilage’ of an individual historic asset into a broader landscape context”.

The guidance also advises that:

“If Proposed Development is likely to affect the setting of a key historic asset, an objective written assessment should be prepared by the applicant to inform the decision-making process. The conclusions should take into account the significance of the asset and its setting and attempt to quantify the extent of any impact. The methodology and level of information should be tailored to the circumstances of each case”.

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

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

Adopting this approach, the turbine blade tip and hub height ZTVs for the Proposed Development will be used to identify those heritage assets from which there would be theoretical visibility of one or more of the proposed wind turbines, and the degree of theoretical visibility.

Cumulative Assessment

The assessment of cumulative effects on heritage assets will be based upon consideration of the effects of the Proposed Development on the settings of assets with statutory designations and non-statutory designations within 10km of the outermost turbines, in addition to the likely effects of other developments that are under construction, those that are consented but not yet built and those that are currently at the application stage (and for which sufficient detail is available upon which to develop an assessment). Proposed Developments at the scoping or pre-application stage will not be included in the assessment, as such proposals are not fully formed and may be subject to changes that cannot be foreseen. The schemes to be included in the cumulative impact assessment will be those identified through the LVIA consultations with Dumfries and Galloway Council and NatureScot.

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

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

Mitigation Measures

Planning Advice Note 1/2013: Environmental Impact Assessment (PAN1/2013) describes mitigation as a hierarchy of measures: prevention, reduction, compensatory (offset) measures. Prevention and reduction measures can be achieved through design, whilst compensatory measures can offset impacts that have not been prevented or reduced through design.

Historic Environment Policy Scotland (HEPS) (2019) contains policies (notably HEP2 and HEP4) that are relevant for conservation and preservation of the historic environment.

- HEP2 requires that “decisions affecting the historic environment should ensure that its understanding and enjoyment as well as its benefits are secured for present and future generations”.
- HEP4 requires that “changes to specific assets and their context should be managed in a way that protects the historic environment. Opportunities for enhancement should be identified where appropriate. If detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored, and mitigation measures should be put in place”.

The emphasis in Planning Advice Note 2/2011: Planning and Archaeology (PAN2/2011) is for the preservation of important remains in situ, where practicable, and by record where preservation is not possible. The mitigation measures presented below recognises this planning guidance and provide options for mitigation of potential impacts.

Standard Mitigation / Best Practice Measures

Standard mitigation measures that will be applied to the Proposed Development, and incorporated into the CEMP, include the following:

- A professionally qualified Archaeological Contractor will be appointed to act as an Archaeological Clerk of Works (ACoW) during the construction phase. The role of the ACoW will be to provide advice to the appointed Construction Contractor regarding archaeological matters as they might arise, and to undertake archaeological monitoring of topsoil stripping operation in areas designated and approved by the Council’s Archaeological Advisors. The activities of the ACoW would be carried out according to the scope of work and terms specified in a Written Scheme of Investigation (WSI) submitted to and approved by Dumfries and Galloway Council, prior to any construction works (including enabling works) commencing on-site;
- Implementation of the scope of works outlined in the WSI during the construction phase; and
- Any heritage asset identified as potentially being affected by construction works that can be avoided would be marked out for avoidance, where possible, or other

mitigation to be agreed with Dumfries and Galloway Council, would be implemented to reduce and offset unavoidable impacts.

Written guidelines would be issued for use by all construction contractors, outlining the need to avoid causing unnecessary damage to known heritage assets. The guidelines would set out arrangements for calling upon retained professional support if buried archaeological remains of potential archaeological interest (such as building remains, human remains, artefacts, etc.) should be discovered in areas not subject to archaeological monitoring. The guidelines would make clear the legal responsibilities placed upon those who disturb artefacts or human remains.

Additional Mitigation

Archaeological Investigations / Excavation/ Watching Briefs

If discoveries are made during any required pre-construction archaeological investigations, or construction phase watching briefs, and if preservation in situ is not possible, the scope of any required set-piece excavations would be agreed through consultation with Dumfries and Galloway. Details of the agreed scope of work would be set out in a separate WSI for the approval of Dumfries and Galloway and would be implemented in accordance with the terms of the agreed WSI.

Post-excavation assessment and reporting

If new, archaeologically significant discoveries are made during any archaeological investigations or watching briefs, and it is not possible to preserve the discovered remains in situ, provision would be made for the excavation, where necessary, of any archaeological deposits encountered. The provision would include the consequent production of written reports on the findings, with post-excavation analysis and publication of the results of the works, where appropriate.

12.2.5. Questions for Consultees

Do Consultees agree with the proposed scope of the assessment, including the proposed Study Areas?
Do Consultees agree with the proposed assessment methodology?
Do Consultees agree with the Standard and Additional mitigation measures proposed?
Are Consultees satisfied that those designated heritage assets identified are those most likely to have their settings adversely affected?
Do Consultees agree with the proposal to 'scope out' impacts on the settings of listed buildings outwith the urban environment?

Are there any other designated heritage assets outwith the 10km Outer Study Area in the surroundings of the Proposed Development that they consider could have their settings adversely affected?

13. Traffic and Transport

13.1. Introduction

This chapter sets out the proposed approach to the assessment of potential environmental effects associated with increased road traffic during the construction of the Proposed Development, including identification of possible measures to minimise disruption to the local and strategic road network.

This chapter has been written by SYSTRA Limited.

13.2. Consultation

Consultation will be undertaken with both Dumfries and Galloway Council and Transport Scotland to inform the assessment of effects in relation to the local and strategic road network respectively.

13.3. Methodology and Guidance

Assessment of effects in relation to Access, Traffic and Transport will be undertaken in line with current guidance and best practice. The following legislation, guidance and published data sources will be used to inform the assessment including:

- Guidelines for the Environmental Assessment of Traffic and Movement (IEMA, 2023);
- Transport Assessment Guidance (Scottish Government, 2012);
- Planning Advice Note 75: Planning for Transport (Scottish Government, 2005);
- Design Manual for Roads and Bridges (DMRB)

13.4. Baseline

The Proposed Development is located in a relatively rural part of Dumfries and Galloway but road access to the site is relatively good with the A74(M) Motorway, the B723 road and Breckenry Road lying to the west of the site. The B723 and Breckenry Road provide the main link between the motorway and the site with short sections of the B7068 and B7076 used to access the motorway at Junction 17.

The A74(M) motorway will also be the key strategic route for the importation of other construction materials that will be required to construct the windfarm. It provides excellent linkage to the central belt of Scotland as well as a direct linkage to the M6 motorway that extends into the north of England.

The B723 extends northwards from Lockerbie to Eskdalemuir through the village of Boreland.

Breckenry Road extends northeast from the B7076 to the B723 close to the Proposed Development and acts as an attractive route to and from the A74(M) motorway. The B7076 and B7068 sit adjacent to the motorway and provide a link between Breckenry Road and Junction 17 of the motorway to the west of Lockerbie.

The A74(M), Breckenry Road, the B7068, B7076 and B723 will be used as construction routes to access the Proposed Development with materials coming from both the north and south. The B723 between Lockerbie and the site will be used as a construction route and there may be a small percentage of development traffic using the B723 north of the site.

The Proposed Development site itself will be accessed from an Unclassified Road that extends eastwards from the B723 to the south of the Development site. A new access junction would be formed on this road with a new access track constructed to take traffic northwards to the turbine locations.

Abnormal Loads carrying blade components are likely to be transported from KGV docks in Glasgow to site by road. The route would involve vehicles travelling along the local road network to the M8 and then south to the A74(M) to Lockerbie. At Lockerbie, the vehicles would exit the motorway at Junction 17 to join the B7068 before heading northwards on the B7076 and north eastwards on Breckenry Road to the B723. At the junction of the B723, vehicles would cross the B723 onto an Unclassified Road to head eastwards before turning north into the site.

The access, traffic and transport chapter of the EIA report will provide a detailed description of each road link within the study area.

13.5. Proposed Study Area

The study area for the assessment of traffic and associated environmental effects will include the following road links and associated corridors:

- A74(M)
- B723
- Breckenry Road
- B7076
- B7078
- Unclassified Road providing access to the Proposed Development Site

The main sensitive receptors to increased traffic levels and associated environmental effects are likely to be residents of the isolated dwellings along the road corridors and those who use the road for leisure and recreational purposes (cyclists etc).

13.6. Desk and Field Surveys

The scope of survey works relating to access, traffic and transport is likely to include the desk-based collation of publicly available traffic count data for the A74(M). It is anticipated that count data can be obtained directly from the Transport Scotland Database and the validity of the data will be investigated before use.

For the local road network, we will investigate whether any historical data exists within the DfT database. If no data is available then new count data will be collected by means of new 7 day ATC surveys.

Accident data will also be obtained for the last five years from Transport Scotland for the A74(M) whilst the CrashMap database will be used to obtain information for the local road network.

An Abnormal Loads Assessment (ALA) will be undertaken to examine the access routes to site. This report will be submitted as a technical appendix to the EIAR identifying where road improvements will be required to accommodate abnormal loads between the port (or ports) of entry and the Proposed Development.

13.7. Potential Effects

The main potential effects of the Proposed Development are associated with increased traffic flows, or changes to the traffic composition, as a result of traffic movements during

construction. These traffic effects may arise during the construction phase. The greatest volume of construction traffic will likely be experienced over the first few months of the construction period as materials are delivered for access tracks and site establishment. The EIAR chapter will set out the key construction activities and will identify the volume of vehicle movements associated with each of these activities.

13.8. Scoped Out Effects

On the basis of the detailed desktop study, the professional judgement of the EIA team and experience from other relevant projects and policy guidance, the following effects will be scoped out of the access, traffic and transport assessment:

- Operational Stage - Once the Proposal is operational, the amount of traffic associated with a wind turbine is minimal, relating to maintenance of the turbine only. It is estimated that on average there will be just a small number of 4x4s accessing the Application Site on an infrequent basis. Therefore, the effect of vehicle movements during the operational phase will be negligible. In respect of access, traffic and transport, the operational phase of the Proposed Development will therefore not be assessed in this Chapter.
- Decommissioning Stage - Planning permission for the Proposed Development is sought for a defined timeline, after which the Development will be decommissioned unless a further application is submitted for an operational extension. Traffic associated with the decommissioning stage is anticipated to be significantly less than that generated during construction. Given the timescales involved and the likelihood for changes to the baseline situation during this period, the access, traffic and transport effects of wind farm decommissioning will not be assessed in this Chapter.

13.9. Impact Assessment

The effect of the increase in construction vehicle traffic movements will be quantified through comparison of existing traffic flows and vehicle composition (baseline data) with the flows predicted as a result of the construction of the Development.

Consideration of the potential effect on other road users will also be undertaken where road links are affected by construction traffic.

The 2023 IEMA guidelines on the Assessment of Traffic and Movement set out a list of environmental effects which should be assessed for significance in relation to the transport resource (if the identified thresholds are exceeded, i.e. 'Rule 1' or 'Rule 2' described below), as follows:

- Severance of communities
- Road vehicle driver and passenger delay
- Non-motorised user delay
- Non-motorised amenity
- Fear and intimidation on and by road users
- Road user and pedestrian safety
- Hazardous/large loads

The assessment will explore whether potential effects are likely to be significant based upon two tests contained within the IEMA Guidelines. The guidelines suggest that, in order to determine the scale and extent of the assessment and the level of impact that the

development will have on the surrounding road network, the following two 'rules' should be applied:

- Rule 1 - Include highway links where 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.

These rules will be used as a screening exercise to determine whether a detailed assessment of effects on the routes within the study area is necessary. Where a detailed assessment is required, sensitivity and magnitude criteria will be used in order to determine the significance of effects.

In addition, the potential for cumulative effects will be considered with other wind farms which are proposed to use the same public roads as the Development during construction.

13.10. Consultee List

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

- Dumfries and Galloway Council as local roads authority;
- Transport Scotland as trunk roads agency; and
- Structures owners / operators along the site access route via the ESDAL consultation undertaken as part of the AIL assessment.

13.11. Questions for Consultees

Confirmation of the acceptability of scoping out operational and decommissioning effects in respect of access, traffic and transport is requested.
Confirmation that the routes to be assessed within the study area are appropriate.
Please confirm details of any developments which should be considered in terms of the Cumulative assessment of access, traffic and transport effects.

14. Climate Change

The needs case for an increase in renewable energy generation to replace the use of fossil fuels in the UK's energy mix is now well established in legislation and policy which trickles down from UN, European, to UK and Scottish Government levels and to Dumfries and Galloway Councils own commitment to address Net Zero.

Part e of Policy 11 in NPF4 states that when considering the impacts of renewable energy proposals that *'significant weight will be placed on the contribution of the proposal to renewable energy generation targets and on greenhouse gas emissions reduction targets'*.

The Proposed Development is defined as a National Development 3 under NPF4. Therefore whilst the EIAR will take into account the current electrical generation mix and assess the potential savings in terms of carbon emissions that can be made and the contribution that the Proposed Development can make towards greenhouse gas emissions reduction targets, it will stop short of seeking to make a specific needs case for this development.

In light of this it is not proposed to undertake a Carbon Balance Assessment of the Proposed Development as it is clear from the use of this tool over the last decade that in order to be economically viable a renewable energy project must be capable of paying back the carbon inherent in its fabrication and construction. The outcome of an assessment for a renewable energy generating project will always therefore be positive and significant.

14.1. Questions for Consultees

Do the Consultees agree that the proposed Climate Change methodology is acceptable?

15. Aviation, Telecommunications and Eskdalemuir

15.1. Introduction

This section provides an indication of the potential effects of the construction and operation of the Proposed Development on aviation. Further, it provides a summary of the full assessment methodology to be adopted and the key reference documents covering legislation, policy and guidance.

15.2. Baseline Description

The Site lies approximately 40km north-east of the Carlisle Lake District Airport, 90km southwest of Prestwick Airport and 35km north of both Kirkbride airfields. The assessment needs to consider potential impacts to the NATS radars at Lowther Hill and potentially Great Dun Fell.

The Proposed Development lies outside of any known safeguarded MOD Radars. It is, however, within an area identified as a “High priority military low flying area likely to raise considerable and significant concern.”

It is beyond the limits of the area used by Prestwick for radar based services and well beyond the limits of safeguarding areas for any navigational aids or radio communication stations.

Regarding telecommunications, the Proposed Development is considered unlikely to interfere with any known Wireless Telegraphy Register (WTR) links. The land area considered for the Proposed Development is over 1km from the nearest known link. This is to the southeast of the Proposed Development, and appears to be a fixed link of >12GHz, spanning 27km in the northeast/southwest direction. There is also a cluster of register points c. 13km southwest of the Proposed Development, however these do not appear to transmit in the direction of the site.

The Proposed Development is within the 50km MOD consultation zone for the Eskdalemuir Seismic Monitoring Array, with the turbines being between 19 and 20 km from the centre of the Array. At present, the MOD has allocated all budget for seismic ground vibration for the Array.

The Onshore Wind Sector deal for Scotland states ‘Via the Eskdalemuir Working Group, we will work collaboratively with the MOD to finalise a new approach to seismic noise budget management which will include reaching an agreement with the MOD regarding their acceptance of technical studies being conducted on behalf of Government, and to develop new guidance, with a view to enabling the development of a new safeguarding approach and management tool. This new approach will aim to support the consenting of projects via deliverable suspensive conditions, if necessary, that provide appropriate protection to MOD while maximising efficient wind energy generation. Guidance for the onshore wind sector will be issued for public consultation no later than January 2024’.

Technical analysis is currently being undertaken on the Proposed Development layout in line with the above forthcoming guidance and results will be included the EIAR.

15.3. Guidance and legislation

There are a number of publications providing key legislation, policy and guidance. Together these place a responsibility on the Scottish Ministers, planning authorities and the developer

to assess potential impacts on aviation. The summary below highlights the main generic documents; it is not exhaustive.

CAA guidance, within CAP 764 (CAA Policy and Guidance on Wind Turbines), sets out recommended consultation and assessment criteria for the impacts of wind turbines on all aspects of civil aviation. Note that the CAA involvement in the Wind Farm Pre-Planning Consultation Process has ceased; CAP 764 now states that “developers are required to undertake their own pre- planning assessment of potential civil aviation related issues” and that “it is incumbent upon the developer to liaise with the appropriate aviation stakeholder to discuss – and hopefully resolve or mitigate – aviation related concerns without requiring further CAA input.”

Scottish Onshore Wind Policy Statement, December 2022. This notes the potential impacts of wind developments, especially on radar, mitigation methods; and has led to the formation of OnWARD 30 to foster cooperation between the onshore wind and aviation sectors.

Civil Aviation Authority (CAA) CAP 393, The Air Navigation Order and Regulations, specifies the statutory requirements for the lighting of onshore wind turbines over 150 m tall;

Planning Circular 2/03, Safeguarding of Aerodromes, Technical Sites and Military Explosives Storage Areas, contains annexes which describe the formal process by which planning authorities should take into account safeguarding, including in relation to wind energy developments. As a statutory consultee, the MOD will be consulted through the Section 36 scoping application. They publish a guidance document on www.gov.uk called ‘Wind farms: MOD safeguarding’, Updated July 2021. The MOD wind energy team liaises with a broad range of experts to formulate a comprehensive MOD response. Where the MOD has concerns about a development the team will work with the developer to look for ways to mitigate them.

Civil Aviation Authority (CAA) CAP 793, Safe Operating Practices At Unlicensed Aerodromes, provides guidance to manage impacts on the Kirkbride Airfield. The KirkCAP recommends that there are no obstacles greater than 150 ft above the average runway elevation within 2,000 m of the runway mid-point, and further that “Anything that, because of its height or position, could be a hazard to an aircraft landing or taking off should be conspicuously marked if it cannot be practicably removed or minimised.”

NPF4 states that consideration should be given to the “impacts on aviation and defence interests including seismological recording”.

15.4. Assessment Methodology and Potential Impacts

The acceptability of the Proposed Development, in terms of net effects on aviation related interests, is established through direct consultation with all relevant stakeholders within the consenting process. The initial task is to independently assess the potential effects and where significant effects may occur, to enter a dialogue with the affected stakeholders. Where impacts are of concern additional analysis may be required and where impacts are deemed unacceptable, mitigation solutions identified and explored with the goal of reducing impacts to acceptable levels. While the aim of this dialogue is to enable the approval of all stakeholders before full submission, this is not always possible. In the case of impacts, typically solutions are identified but do not reach full maturity in terms of the assessment by the stakeholders and the contracting of mitigation (where required) until formal consent applications have been submitted.

The initial impact assessment aims to exhaustively identify all potential issues and the associated stakeholders affected by the Proposed Development. This involves considering all military and civil aerodromes in the wider area out to circa 60 km, all radar installations out to the limit of their range, all navigational aids, air-ground-air communications stations and low flying activities. All wind turbines of greater than 150m in height require visible, red aviation lights, and the intention is the scheme will be developed in consultation with Civil Aviation Authority (CAA) and agree a reduced lighting scheme before the application is submitted. A provisional lighting design will be generated to inform the LVI assessment. This will need to be finalised post consent, through agreement with the CAA before construction.

15.5. Anticipated Impacts

It is considered that there will be no impact on any MOD radars. It is also likely that there will be no impacts to the Carlisle Lake District Airport or Prestwick Airport radars nor operations, as the Proposed Development lies beyond the historic range of interest set by the airport.

The Proposed Development may potentially impact Lowther Hill and Great Dun Fell NATS radars (including the Primary Surveillance Radar), with noted partial visibility for any turbines exceeding 80m tip height specifically in the northwest of the Proposed Development site.

The Proposed Development may also raise concerns for the MOD with regards to military low-flying operations.

15.6. Mitigation

There are a number of potential means of mitigating the impacts to NATS radar services. NATS generally work closely with radar manufacturers to develop modifications to release renewable capacity, as well as exploring solutions such as changing airspace design. Several consented wind energy developments, including offshore projects, are actively working with NATS to discharge radar mitigation scheme conditions. Mitigation is likely either through radar upgrade or the use of an additional sensor.

To mitigate any risk to civil and military low flying, both infra-red and visible spectrum lighting will be specified. The visible spectrum lighting will only operate under conditions of low light, principally from dusk to dawn. Every effort will be made to reduce lighting impacts, by minimising the number of turbines lit, their intensity and the hours of operation. The potential for an Aircraft Detection Lighting Scheme will be considered. ADLS aims to greatly reduce periods of lighting at night by triggering the lights only when an aircraft is in the vicinity at low altitude.

15.7. Consultation

The scoping submission will generate an initial view from the MoD and NATS.

The other key consultees relate to the design and approval of an aviation obstacle lighting scheme. This will require consultation with local airspace users such as Police Scotland and the Scottish Air Ambulance Service, with responses supporting a scheme to be provided to the CAA for their assessment and approval.

15.8. Questions for Consultees

Do the Consultees agree with the assessment approach set out in the aviation section?

16. Shadow Flicker

16.1. Shadow Flicker Assessment

Under certain combinations of geographical position, time of day and time of year, the sun may pass behind a turbine rotor and cast a shadow over neighbouring properties. When the blades rotate a shadow forms for short periods and this effect is known as 'shadow flicker'. Shadow flicker is considered an issue when the blade shadow passes over a narrow opening, such as a neighbouring property's window. The main cause for concern is the potential annoyance to homeowners. This is an issue that can be completely mitigated, if required, through understanding the periods of concern and controlling the turbines appropriately during these periods.

A shadow flicker assessment is generally required if any properties lie within 10 rotor diameters of the wind farm. This is in line with Scottish Government online renewables planning advice on 'onshore wind turbines' which states that "where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), 'shadow flicker' should not be a problem."

For the purpose of initial assessment, a candidate turbine with a rotor diameter of 162m is currently proposed for Balgray Wind Farm. 19 properties are located within 10 rotor diameter distance (1,620m) from the wind farm. The details of these dwellings are provided in Table 16.1 and Figure 16.1 below.

Label	Easting	Northing	Label	Easting	Northing
A	314549	588581	K	315943	589934
B	314594	588618	L	316195	589794
C	314597	588973	M	316221	589800
D	314672	588792	N	316483	589749
E	314797	588382	O	316904	590040
F	314819	587750	P	316970	590092
G	314914	588007	Q	317814	589654
H	314963	587981	R	318111	589407
I	315469	589912	S	318773	587783
J*	315535	586352			

Table 16.1 Properties to be assessed for shadow flicker impacts (* - no shadow flicker impact expected at the property location)

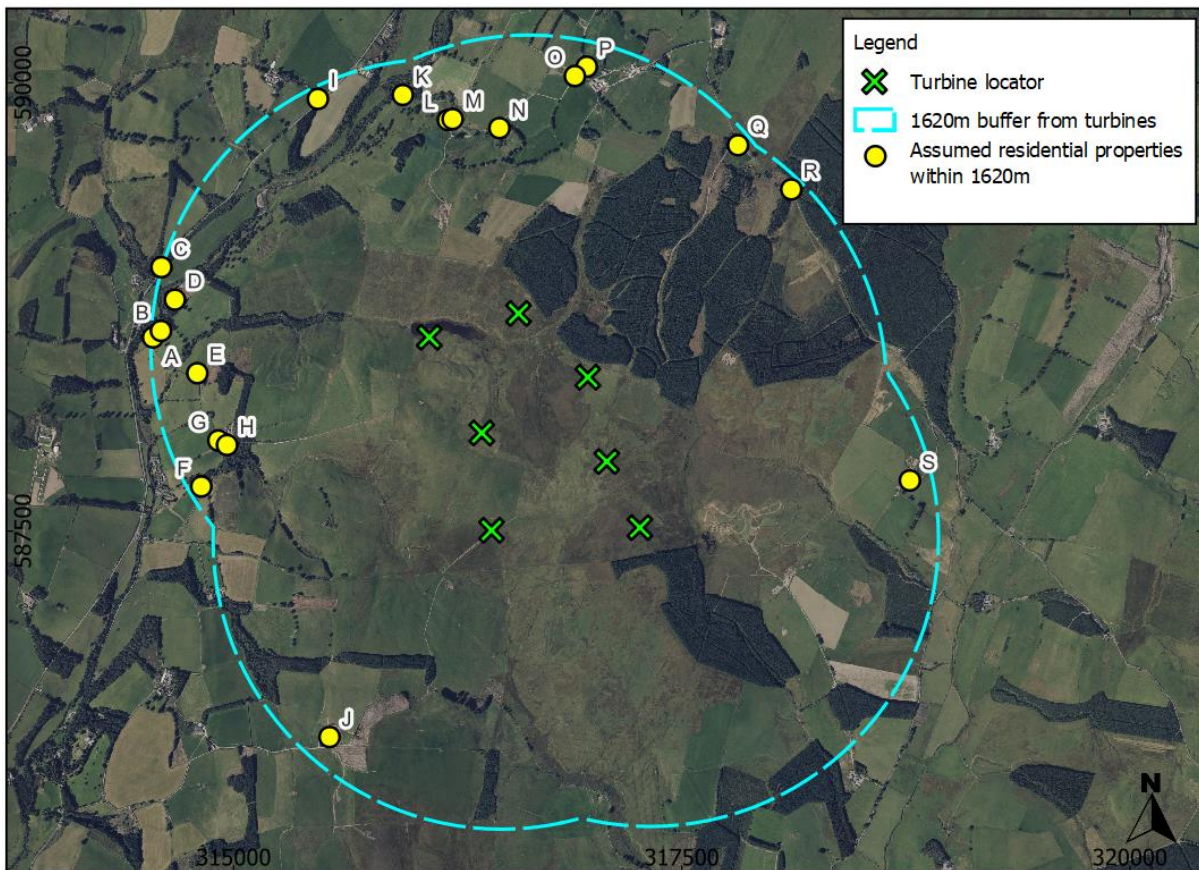


Figure 16.1 Map showing properties to be assessed for shadow flicker impacts

An assessment will be undertaken of the potential for shadow flicker to occur at properties within the 10 rotor diameter separation distance.

Where significant effects are likely, and to mitigate the issue of shadow flicker for the site, turbines can be programmed to shut down for the relevant periods of the year when shadow flicker would occur. Whilst it is unlikely that significant effects would occur, a shadow flicker calculation would be carried out and reported upon within the EIA Report. This will consider any variation away from the candidate size proposed at this stage.

16.2. Questions for Consultees

Do the Consultees agree with the assessment approach set out in the shadow flicker section?

17. EIAR Accompanying Documents

17.1. Non-Technical Summary

The preparation of non-technical summary (NTS) is required by regulation 5(2)(e) of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. The NTS outlines the main components of the Proposed Development and summarises the main findings of the various studies and assessments carried out to build and operate the Proposed Development. The NTS is intended to be an easily read and understood document that will convey the most important and significant elements of the EIA to any interested party without the need for the reader to have specialist background knowledge. In addition, the NTS will also contain maps that provide the extent and geographical location of the development providing further context.

17.2. Planning, Design & Access Statement

Planning and Design and Access Statements will be produced. The Design and Access Statement will highlight how the design has evolved and highlight the overall principles and concepts behind the Proposed Development. They will reveal how the Applicant has applied these principles and concepts to the Proposed Development in alignment with feedback from the consultation process and will assess how successful the Proposed Development has been in fulfilling the design strategy.

The Planning Statement will consider the Proposed Development against Energy Policy, the Statutory Development Plan National and other material considerations.

17.2.1. Pre-Application Consultation Report

Although not a statutory requirement for applications submitted under Section 36 of the Electricity Act 1989, the Applicant intends to submit a Pre-Application Consultation (PAC) Report to accompany the application in line with the procedures outlined in Planning circular 3/2022: development management procedures.

The PAC report will:

- outline the consultation programme including who has been consulted, when they were consulted and by which method;
- confirm how the consultation programme complies with legislation and best practice standards;
- demonstrate how the applicant has responded to the comments received, including whether or the extent to which the proposals have changed due to the PAC process;
- provide documentary evidence that the planned consultation programme has taken place e.g. copies of advertisements of the public events and reference to display materials and records of responses from events and feedback forums;
- Indicate that steps were taken to explain the nature and purposes of PAC - that it does not replace the formal application process whereby representations can be made to the determining authority; and
- summarise the success and outcomes of the pre-application consultation activities.

18. Responding to this Scoping Report

Consultee responses to this report should be directed to the Energy Consents Unit to allow the Scottish Ministers to adopt a scoping opinion. The Applicant will base the preparation of the EIAR for the Proposed Development on the adopted scoping opinion and further consultation to be undertaken with each consultee as the EIAR preparation progresses.

Members of the public making representations in respect of this scoping report are encouraged to do so electronically rather than in paper form where possible.

All representations may be submitted electronically either through the online portal at www.energyconsents.scot, or by emailing representations@gov.scot.

Otherwise, representations in paper form should be sent to:

Energy Consents Unit

5 Atlantic Quay

150 Broomielaw

Glasgow

G2 8LU

18.1. Scoping Report Questions

The following questions were asked in the relevant sections of the report:

Are consultees in agreement with the proposed L&V study areas?
Are consultees in agreement with the proposed list of viewpoint locations in Table 6.1?
Are consultees in agreement with the wind farm sites listed in Table 6.2, to consider as part of the cumulative assessment?
Do consultees agree with matters proposed to be scoped out of the L&V assessment?
Do consultees agree that the proposed scope of L&V assessment is appropriate?
Do the consultees confirm if the ornithology survey and assessment methodologies are appropriate for the site and in relation to the Proposed Development?
Do the Consultees agree with the assessment approach set out in the ecology section?
Do the Consultees agree with the ecology approach in terms of possible changes in baseline?
Do Consultees agree with the need to assess impacts on <i>Rhopalocera</i> , namely Marsh Fritillary?

Do the Consultees agree with the assessment approach set out in the Hydrology, Geology and Hydrogeology section?
Do the Council agree with the proposed noise method of assessment?
The proposed daytime limit will be set at 35 dB(A) or the background noise level + 5dB(A) whichever is the higher. There is no intention to have a higher limit at night-time, but can a different limit be set for cumulative effects?
Can consultees confirm there are no other energy developments that should be taken into consideration in the cumulative noise assessment?
If construction is limited to normal working hours, can a construction noise assessment be scoped out?
Do ECU, DGC and Statutory Consultees agree that the range of surveys carried out to date is sufficient and appropriate?
Are the ECU, DGC and Statutory Consultees aware of any specific key sensitive receptors that should be taken into account?
Are the ECU, DGC and Statutory Consultees aware of any particular consultees in the area who may wish to provide comment on the scope of this assessment?
Do Consultees agree with the proposed scope of the Cultural Heritage assessment, including the proposed Study Areas?
Do Consultees agree with the proposed Cultural Heritage assessment methodology?
Do Consultees agree with the Cultural Heritage Standard and Additional mitigation measures proposed?
Are Consultees satisfied that those designated heritage assets identified are those most likely to have their settings adversely affected?
Do Consultees agree with the proposal to 'scope out' impacts on the settings of listed buildings outwith the urban environment?
Are there any other designated heritage assets outwith the 10km Outer Study Area in the surroundings of the Proposed Development that they consider could have their settings adversely affected?
Confirmation of the acceptability of scoping out operational and decommissioning effects in respect of access, traffic and transport is requested.

Confirmation that the routes to be assessed within the study area are appropriate.
Please confirm details of any developments which should be considered in terms of the Cumulative assessment of access, traffic and transport effects.
Do the Consultees agree that the proposed Climate Change methodology is acceptable?
Do the Consultees agree with the assessment approach set out in the aviation section?
Do the Consultees agree with the assessment approach set out in the shadow flicker section?

Appendix A. Not Used

Appendix B. Landscape and Visualisation Figures

Appendix C. Ornithology and Ecology Letters of Engagement

Appendix D. Peat Probing Interpolation