

# Quantans Hill Wind Farm

Scoping Report  
Prepared by Natural Power on behalf of  
Vattenfall Wind Power Ltd.

Confidentiality class: None (C1)



**VATTENFALL**

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# 1. Introduction

This Scoping Report has been prepared by Natural Power Consultants Limited (Natural Power) with ornithological input from MBEC environmental consulting (MBEC) on behalf of Vattenfall Wind Power Ltd (Vattenfall). It is provided in anticipation of an application under Section 36 of the Electricity Act 1989 for a wind farm development at Quantans Hill in Dumfries and Galloway.

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 Scoping Report is to provide information to consultees for determining the scope of the Environmental Impact Assessment (EIA) and EIAR. Consultees will note that the Scoping Report contains a number of questions/comment boxes for which it would be useful to receive feedback. Not all questions will be relevant to all consultees, therefore we request that consultees provide feedback only on those questions appropriate to them. The questions should not be considered an exhaustive list, and consequently consultees are welcome to provide feedback on any issue they consider relevant to Quantans Hill wind farm (herein referred to as the proposed development). If consultees elect not to respond, Vattenfall will assume that consultees are satisfied with the approach adopted/proposed. Further consultation will happen with affected stakeholders throughout the EIA process, including with local communities.

The design of the proposed development to date is a result of maximising the potential wind resource on site whilst recognising site-specific and broader constraints as they are understood now. The layout presented in this Scoping Report is expected to be further refined during the EIA 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 in to the EIA process. Changes of this nature will be discussed with the relevant consultees, to ensure that they too are in agreement with Vattenfall's understanding and before

altering the inclusion or exclusion of features from the EIA. Further general information about embedded mitigation and layout iterations is provided in Chapter 6.

## 1.1. The Applicant

Vattenfall is a leading European energy company with approximately 20,000 employees, owned by the Swedish state. For more than 100 years Vattenfall has powered industries, supplied energy to people's homes and modernised the way its customers live through innovation and cooperation.

Vattenfall aims to make fossil-free living possible within a generation and is leading the transition to a more sustainable energy system through growth in renewables and climate-smart energy solutions for our customers.

Vattenfall has over 50 wind farms, onshore and offshore, across five countries and pioneered co-locating wind with solar and batteries. We have been in the UK since 2008, investing over £3.5 billion in enough wind to power nearly a million British homes. Vattenfall owns the largest onshore wind farm in England and Wales, Pen y Cymoedd, and in Scotland operates wind farms on the Isle of Skye and in Aberdeenshire. At a local level Vattenfall developed the consented South Kyle wind farm, near Dalmellington, lying within both East Ayrshire and Dumfries and Galloway, which is currently under construction and due to begin commercial operation in Q1 2023

## 1.2. Previous Application

An application was made to the Scottish Government for a development at Quantans Hill in January 2014, known as Quantans Hill wind farm by a different applicant. The proposed development's site boundary is larger but centres around the same area.

## Chapter 2 Proposed Development

### Quantans Hill Wind Farm

## 2. Proposed Development

The proposed development is located on Quantans Hill, located in Dumfries and Galloway, northeast of the village of Carsphairn and east of the A713. It covers an area of approximately 1,800 hectares. The maximum topographic height of the site is 797m, although this is not within the technically developable area of the site. Figure 1 illustrates the current proposed turbine layout, which is subject to change on the basis of environmental survey and stakeholder feedback, and location of the site. Figure 2 shows the regional context of the proposed development. Figure 3 presents the site constraints identified to date which will be considered in the design process.

Figure 4 shows the Zone of Theoretical Visibility (to tip height) for the current site layout. The proposed development presented in this Scoping Report is considered by Vattenfall to comprise the largest extent of land and the tallest and greatest number of turbines which is expected to be put forward for permission. It therefore represents what is likely to provide the most benefit in terms of electricity generation, climate mitigation, net biodiversity gain, supply chain, and community benefit, and be the 'greatest extent' with regard to potential adverse environmental effects.

The following key elements are currently being considered for the proposed development:

- Up to 21 wind turbines, tip heights expected to range from 200m to 250m in height to blade tip.
- Turbine foundations
- Crane hardstand and temporary laydown areas
- Upgrading of existing and creation of new access tracks
- Temporary borrow pits
- Underground electricity cables
- Anemometry mast(s)
- External transformer housing
- Signage
- Temporary construction and storage compounds, laydown areas, and ancillary infrastructure
- Drainage and drainage attenuation measures (as required)
- Substation, compound, and control building; and
- Battery/energy storage.

The existing B729 road that leads to the site leaves the A713 approximately 0.5km to the east of Carsphairn.

These roads will be utilised and upgraded where necessary.

A 30-year operational period may be sought for the proposed development following which decommissioning of this project would be undertaken.

### 2.1. Wind Turbines

The specific turbine model has not yet been selected but it is expected to be a horizontal axis machine with three rotor blades. Current models have approximately 6MW generating capacity and by the time the project is constructed, such machines may be capable of generating more. Should the candidate turbine require it, external transformers will also be placed adjacent to each turbine.

### 2.2. Turbine foundations

Reinforced concrete gravity foundations may be used on the proposed development. A typical turbine foundation specification is typically an inverted T shape consisting of a large square pad with protruding upstand left approximately 200mm proud of the finished ground level. Detailed design specifications for each foundation would depend on site-specific factors such as ground conditions, the specific turbine used, and various other engineering considerations. Each turbine foundation would comprise of a volume of concrete reinforced with steel bar. Following construction of the foundations, a layer of peat, peat turfs, 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. Depending on the height of the water table at the foundation location, a drainage system may be installed around the foundation to prevent the build-up of water pressure under the foundation. Alternatively, in locations that were particularly sensitive to hydrological disturbance, it may be possible that a submerged foundation design could be employed which would not require a drainage system.

### 2.3. Crane hardstand and temporary laydown areas

To enable the construction and subsequent maintenance of the proposed wind turbines, crane hard stands and temporary laydown areas will be required. At this stage in the process the final design, location, and orientation of these has yet to be concluded but will be undertaken in

line with the principles identified elsewhere in this report and any potential residual impacts identified in the EIAR. 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. Access Tracks

Existing access tracks would be utilised where possible but additional site tracks would be required. The routes for 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 fall under two main categories, which can be categorised as follows:

1. 'Cut' track – superficial layers are removed, along with soft subsoils until reaching a competent bearing layer which can be used as a formation level. This construction method will be used on steeper topography where floating track is deemed unacceptable due to ground conditions or slope stability and will generally generate higher volumes of excavated material.
2. 'Floating' track – superficial layers and subsoils are left in-situ with the track built off 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 will be minimised as far as possible and where these cannot be avoided then indicative water crossings will be identified and assessed.

## 2.5. Temporary Borrow Pits

Temporary borrow pits on site may be used to reduce the potential effects on the environment and transport network associated with transporting stone to site. Using site-won stone is less likely to affect the pH of groundwater systems on site. The EIAR will include search areas of the proposed locations for on-site borrow pits.

The EIAR will present high-level 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.

## 2.6. Underground Electricity Cables

The transformers may be linked to a substation via high voltage underground cables placed in trenches which would generally follow the route of the on-site tracks. In addition, where appropriate, the transformers would connect to the substation via underground cables across open ground with electrical marker posts used to identify their locations.

## 2.7. Anemometry Mast(s)

Anemometry masts are used to monitor wind speed and direction across wind farm sites in order to ascertain the available wind resource on any given site. This allows for a greater degree of certainty within the gathered data, overcoming seasonal variations in wind flow and addressing the potential for mechanical or electrical failure. In larger sites, particularly those with a complex wind regime, there is often a need to move masts around the site in order to gain a fuller understanding of wind characteristics across the site.

## 2.8. External Transformer Housing

The proposed wind turbines would produce electricity at 690 –1,000 Volts. The electricity would then be transformed to 33,000 Volts (33kV) via a transformer located externally to the tower of each turbine, depending on the final turbine model used. The transformers are likely to be linked to an on-site substation via the high voltage underground cables.

## 2.9. Temporary Construction and Storage Compounds, Laydown Areas and Ancillary Infrastructure

To facilitate construction, temporary compounds may need to be developed strategically in the site. Infrastructure ancillary to the construction and operation of the proposed development will be required. These would be constructed in accordance with best practice

and relevant guidelines, and to minimise environmental impact.

## 2.10. Drainage and Drainage Attenuation Measures (as required)

Drainage design will incorporate sediment management measures to attenuate and treat runoff from wind farm infrastructure.

## 2.11. Substation, Compound and Control Building

A control building would serve as an operational hub. Its compound would provide for services including waste storage and car parking. A substation will step up the electricity generated on site for connection to the national grid.

## 2.12. Battery/energy storage

A battery energy storage facility primarily consisting of a container/s with some external ancillary equipment may be proposed to store excess electricity generated by the proposed development and export it when required. It is likely to be akin to a shipping container with lithium-ion battery cells inside, although alternative technologies may become available.

## 2.13. Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) would be created and agreed with Dumfries and Galloway Council prior to construction commencing through an appropriately worded suspensive condition in order to ensure the impacts from construction are kept to a practical minimum. The CEMP would set out the method statements for constructing site infrastructure, measures that would be undertaken by contractors to ensure good site practice with regards to construction practices, and environmental management. Such measures would include for the transport and storage of potentially polluting substances such as oils and lubricants as well as waste management for example.

In the past, the use and implementation of a CEMP has ensured that the environment and in particular the integrity of drinking water reservoirs and catchments have not been significantly adversely affected. Should the proposed development be consented similar best practice guidelines and method statements will be adopted to ensure again that the development does not impact negatively on elements of the local environment.

## 2.14. Forestry

At the time of writing there is no commercial forestry within the site boundary of the proposed development.

However, in the event that landowners elect to plant commercial forestry on site, the applicant would consult Forestry and Land Scotland.

## 2.15. Grid Connection

Connection of the proposed development to the national grid will be subject to a separate application.

## 2.16. Operational Period

The proposed development would in general operate automatically but would be monitored by an experienced team at a control building onsite and by Vattenfall's remote operations team. Each individual turbine would operate independently from the others. Within the operational wind speed range the pitch angle of the turbine blades of each individual turbine would be automatically adjusted by the control system within the turbine, as appropriate for the measured wind speed.

Should 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. If the cause of the shutdown is high wind speeds then the turbine would automatically recommence operation once average wind speeds fell to 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 technological improvements may allow for operation during stronger winds. Under other causes of shutdown the turbine would remain offline and in a safe condition until manually restarted by a member of the operations and maintenance team.

The lifetime of the project is envisaged to be 30 years from commissioning to decommissioning. Turbines are now generally designed with a warranty life in excess of

30 years although advances in technology and understanding of turbine maintenance may prolong this. To ensure that turbines continue to operate with acceptable availability, in addition to maintenance in the event of malfunctions, regular pre-planned maintenance and servicing programmes are performed at the site on each turbine. Minor scheduled maintenance checks tend to be carried out every six months with major services being performed annually throughout the lifetime of the turbine.

Each turbine would contain lubricating and hydraulic oils. These are often 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 until it can be appropriately cleaned up. Spill kits would be made readily available on site.

Storage of other potentially polluting substances at the site during the operational period of the wind farm would only take place where agreed with the relevant authorities.

Maintenance and operation staff on site would make use of the control building for work-related activities and welfare.

## 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 will be utilised at this time. Vattenfall expects a planning condition regarding decommissioning to be attached to the consent. Should the proposed development be consented, its restoration fund may include salvage from turbine components. The provision of the fund should be made so as to not unnecessarily create duplication for 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.



# Chapter 3 Consultation

## Quantans Hill Wind Farm

## 3. Consultation

### 3.1. Community Consultation

Vattenfall considers consultation with the community to be a crucial part of the wind farm development process and will engage with the local community throughout the application process. Vattenfall has already engaged a local Regional Liaison Officer to help better understand the local context, seek feedback, and provide information about the project.

A programme of statutory and public consultation will be undertaken to provide information to, and seek feedback from, interested parties. This may include public exhibitions, virtual meetings and webinars, a project website, online consultation, one-to-one meetings with local stakeholders, leaflet drops and an established contact for project information requests.

It is also proposed to establish a Community Liaison Group comprising representatives from relevant community councils in the area and other local representatives. The engagement process will include outlining the findings of the baseline studies and assessment process. These meetings will be designed to provide a medium for two-way communication for the project and address any questions or concerns that representative community groups wish to raise. Public information events may be organised for the local community later in the EIA process, designed to present the concepts of the scheme.<sup>1</sup> These will be followed by further public consultation as the design evolves through the EIA process. Vattenfall proposes to prepare a Pre-Application Consultation (PAC) Report to accompany the Section 36 application, detailing the key outcomes of the consultation process.

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***Do consultees have any comments in relation to public consultation?***

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### 3.2. Stakeholder Consultation

Vattenfall considers consultation with statutory and non-statutory consultees as an integral part of the iterative

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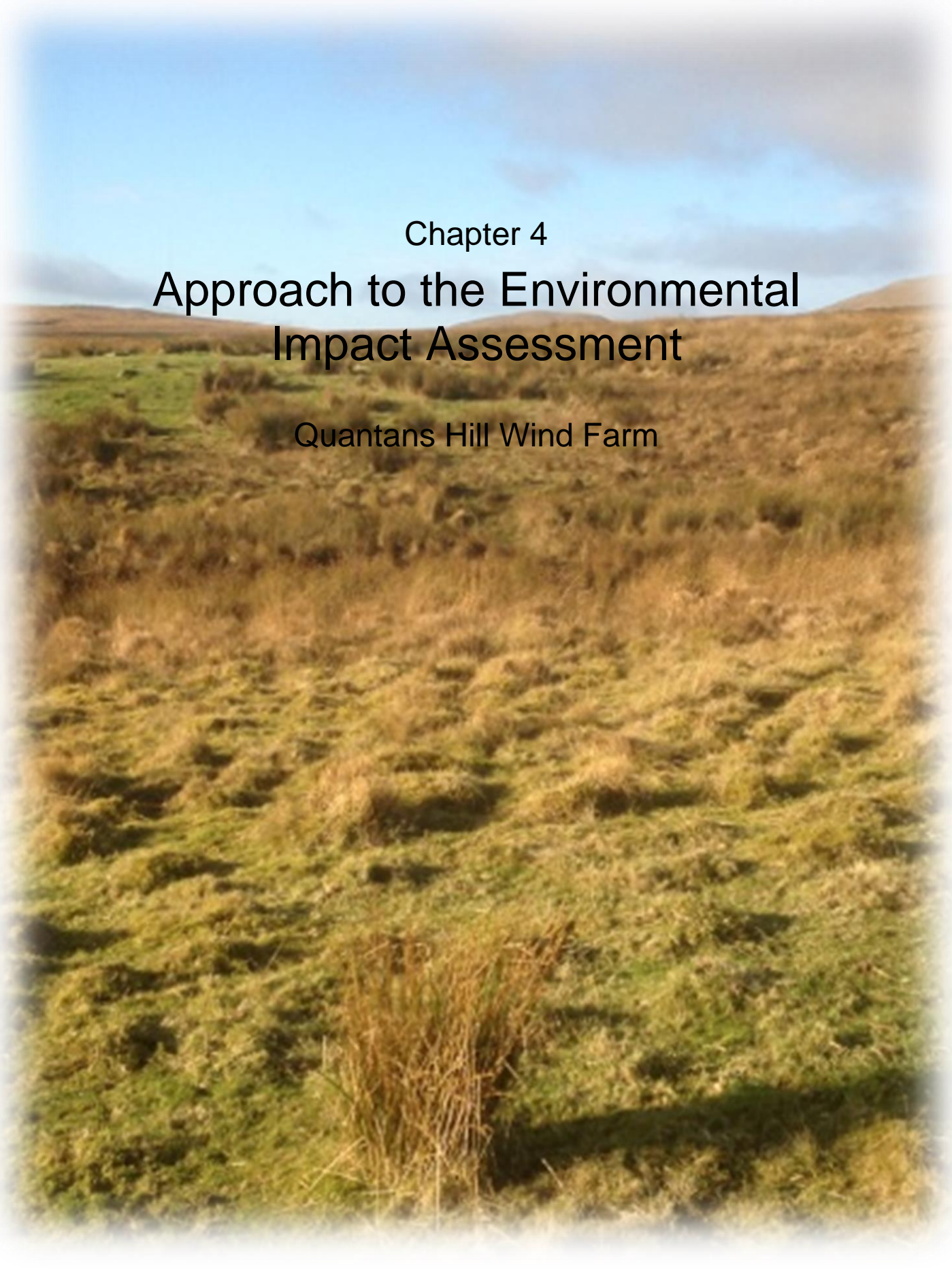
<sup>1</sup> At the time of writing, Vattenfall is monitoring the threat from Covid-19 and, due to public health risks, public gatherings such as exhibitions are not allowed under UK law for the foreseeable future. Vattenfall is assessing alternative means of communicating project information

EIA process and recognises the benefits in carrying out early consultation with all concerned parties.

The consultation will progress with the circulation of this Scoping Report and will continue for the duration of EIA process.

Vattenfall will discuss the Quantans Hill project with a broad range of interested organisations including government bodies and agencies, local businesses, interest groups, and charities.

virtually to comply with these regulations and will try to engage in person at the right time if and when regulations are lifted.



Chapter 4  
Approach to the Environmental  
Impact Assessment

Quantans Hill Wind Farm

## 4. Approach to the Environmental Impact Assessment

The EIA is a statutory procedure which draws together in a systematic way an assessment of the potential significant environmental effects arising from a proposed development. As the process has numerous steps, it allows for the opportunity to ‘design out’ adverse environmental effects at an early stage through the design of the project. This of course is generally preferable to mitigation or remedy at a later stage.

An iterative design approach is already underway for this project and will continue throughout the EIA process, which will allow the proposed development to have a design that works well for both the local environment and environmental resources within the area as well as being an economically viable scheme. The steps taken for informing and developing the EIA process are identified in the flow diagram below (Diagram 4.1).

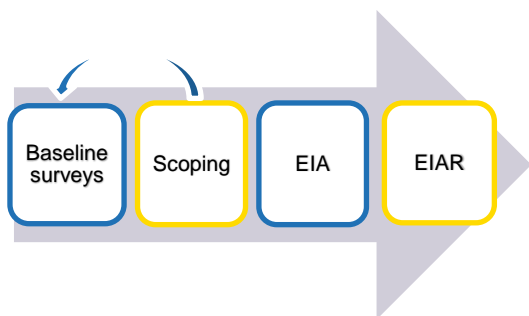


Diagram 4.1: EIA Process

Feasibility studies have been undertaken and some baseline surveys commenced, see Chapter 8 for example.

Consultees are requested to respond where possible to scope in those features and topics that are likely to experience a significant impact, and thus ‘scope out’ the rest. In doing so the impact assessment will be focussed on those effects that will influence the determination.

The impact assessment will determine for those assessed receptors what the impact may be from the project, either directly or indirectly, by comparing the baseline conditions with the conditions that would prevail should the proposed development be constructed, operated (and decommissioned). The environmental effects of the proposed development will be predicted in

relation to environmental receptors (i.e. people), built resources, and natural resources.

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

- ‘Impacts’ mean the predicted change to the baseline environment attributable to the scheme; and
- ‘Effects’ which are the consequence of impacts on environmental resources or receptors.

### 4.1. What will the EIA Assess?

The EIA will address the construction phase of the wind farm which may last approximately 12 to 18 months, the operational and maintenance phase which would last approximately 30 years, and the decommissioning phase which is expected to take around two years.

The geographical coverage of the EIA will take account of the following:

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

### 4.2. Gathering Baseline Information

Baseline data is being collected for this project and the assessment team will ensure that sufficient data is obtained to enable a robust assessment, appropriate to the nature and scale of the proposed development. The extent of the baseline assessment will be determined using both professional judgement and industry and consenting authority best practice. The EIA 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 landscaping).

The collection of baseline data will be achieved through desk study, consultation, field survey, and monitoring and will be clearly reported in the subsequent sections, or within the EIAR (should there be an expected significant impact from the development). In line with the regulations, the EIAR will also indicate any difficulties encountered in compiling environmental baseline

conditions; such as access to land to carry out surveys where permission was not granted.

### 4.3. Prediction and Evaluation of Impacts and Effects

The prediction of impacts examines the change to the baseline environment that could result from the construction and operation of the proposed development. The effects will be classified in to 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 only due, for example, to particular construction activities;
- Permanent effects that result from an irreversible change to the baseline environment 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 development projects.

There is no statutory definition of what constitutes a significant effect. A significant effect may be broadly defined as an effect which, either in isolation or combination with others, should be taken into account 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 tends to 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.

### 4.4. Mitigation of Environmental Effects

Mitigation measures will be considered for each significantly adverse effect. The EIAR will include a description of the measures envisaged 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 their efficiency in reducing environmental impacts. Where practical, mitigation measures will be set out as commitments, which will ensure they are implemented.

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 attribute under consideration. The magnitude of change will be evaluated in accordance with Table 4.1.

|            |  |
|------------|--|
| 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  |

Table 4.1: Magnitude of Change

Where applicable in carrying out individual assessments, a scale of increasing sensitivity of the resource or receptor will be defined. This may be defined in terms of quality, value, rarity or importance and can be classed as 'Low', 'Medium' or 'High'. For certain assessment areas, guidance will be taken from the value attributed to elements through designation or protection under law. Where assessment of this nature takes place the correlation of magnitude against sensitivity will determine a qualitative expression for the significance of the residual adverse effect. This is demonstrated in the matrix in 4.2 Significance of Effect

#### 4.2 Significance of Effect

Those residual adverse **effects indicated as Major and Moderate/Major will be regarded as being significant** effects in terms of the relevant legislation. However, other factors may have to be considered including the duration and the reversibility of the effect.

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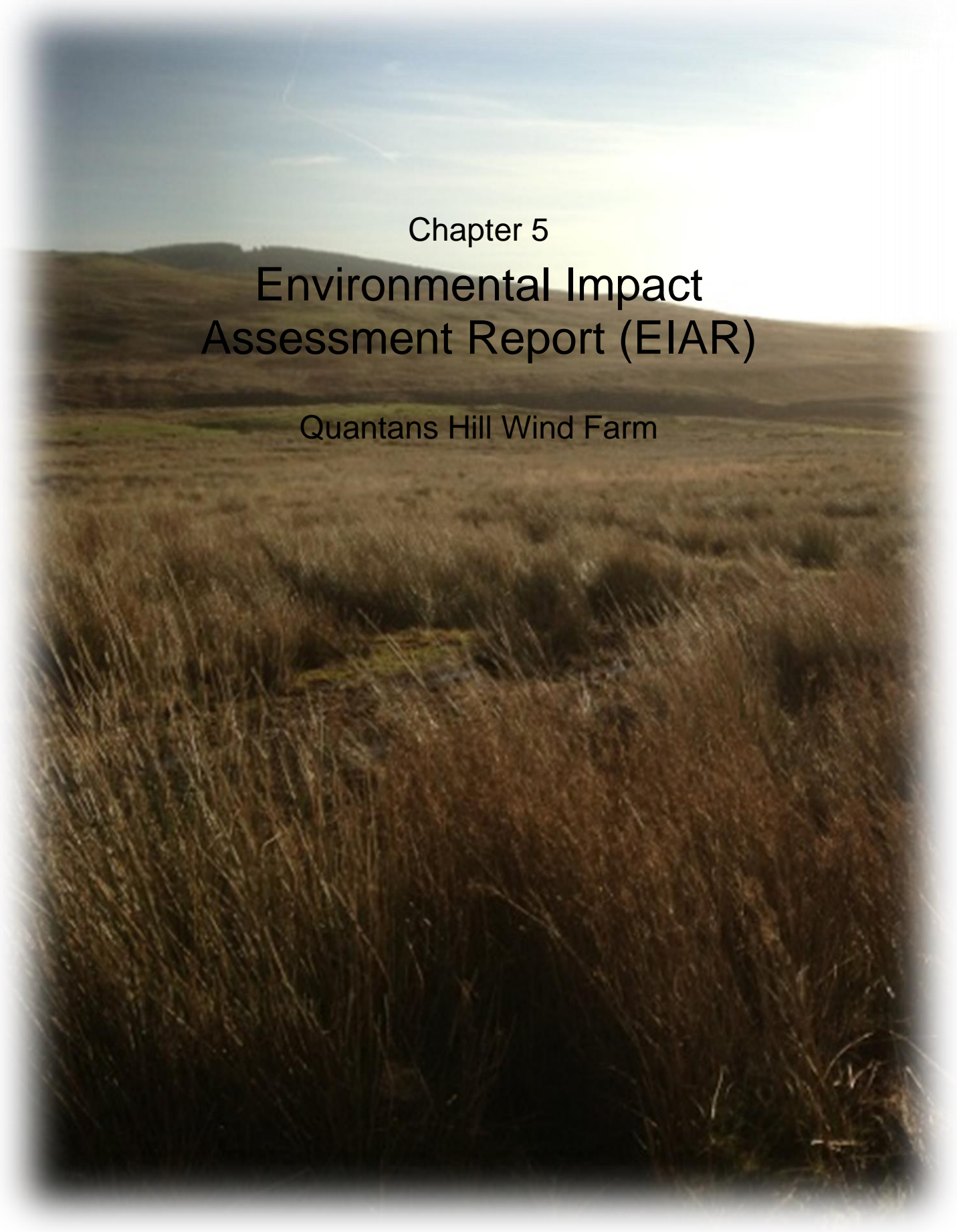
#### ***Do consultees have any comments in relation to the approach to the Environmental Impact Assessment?***

**As per the aim of the Scoping Report, we intend to focus the EIAR on the significant effects and will therefore seek agreement that non-significant effects can be scoped out.**

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## 4.5. Securing Commitments and Mitigation through Planning Conditions

Where commitments have been discussed within this Scoping Report they will form part of the EIAR and therefore ensure that they are secured if the proposed development receives consent through specific planning conditions. These conditions may include, for example, requirements for detailed documents including a Construction Environmental Management Plan (CEMP) to be produced prior to construction.



Chapter 5  
Environmental Impact  
Assessment Report (EIAR)

Quantans Hill Wind Farm

# 5. Environmental Impact Assessment Report (EIAR)

## 5.1. EIAR Production

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 also be accompanied by a Non-Technical Summary (NTS). A Pre-Application Consultation (PAC) Report and a Planning, Design and Access Statement are likely to also be provided.

The EIAR is likely to follow the structure below:

- Chapter 1: Introduction
- Chapter 2 Approach to EIA
- Chapter 3: Site Selection and Design Evolution
- Chapter 4: Project Description
- Chapter 5: Legal & planning policy and carbon balance context
- Chapter 6: Landscape and Visual Impact Assessment (LVIA)
- Chapter 7: Ecology
- Chapter 8: Ornithology
- Chapter 9: Hydrology, Geology and Hydrogeological
- Chapter 10: Noise

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<sup>2</sup> The assessment of population and human health includes consideration of noise, shadow flicker, ice throw, lightning, private water supplies and socio-economics. Such factors are assessed throughout

- Chapter 11: Cultural Heritage
- Chapter 12: Traffic and Transport
- Chapter 13: Aviation and Existing Infrastructure
- Chapter 14: Socio-economics
- Chapter 15: Population and Human Health<sup>2</sup>
- Chapter 16 Synergistic Effects, Summary of Mitigation and Residual Effects

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***Do consultees have any comments in relation to the proposed chapters to be included in the EIAR?***

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

different areas of the EIAR and will be summarised in Chapter 16.



## 5.2. Legal and Policy Context

The application will conform to the statutory requirements legislated by Section 36 of the Electricity Act 1989 and The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (referred to in this report as the EIA Regulations). Deemed planning permission will be sought by the Scottish Ministers under section 57(2) of the Town and Country Planning (Scotland) Act 1997 as amended.

Planning policy will be covered by an appropriate chapter in the EIAR including carbon balance. In addition to this a Planning Statement is likely to accompany the application for consent. This would assess the proposed development in a legal and policy context against the relevant legislation and planning policies in force. The Planning Statement would assess such documents at international, national, regional and local levels, where applicable, including but not limited to:

- Paris Agreement (effective of November 2016);
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, which amends the Climate Change (Scotland) Act 2009;
- Scottish Energy Strategy (2017)
- Onshore Wind Policy Statement (2017)
- National Planning Framework for Scotland 3 (NPF3);
- Scottish Planning Policy 2014 (SPP);
- Draft National Planning Framework for Scotland 4 (NPF4), depending on timescales;
- Dumfries and Galloway Local Development Plan 2 (adopted October 2019).

## Chapter 6

# Embedded Mitigation and Further Layout Iterations

Quantans Hill Wind Farm

## 6. Embedded Mitigation and Further Layout Iterations

The design of the proposed development has generally avoided environmental and physical constraints which have been identified during initial feasibility studies (embedded mitigation). These will be refined as the EIA progresses.

Throughout the remainder of the EIA process, until the submission of the EIAR, the layout presented here in the Scoping Report will further develop, especially in light of the Scoping Opinion and public consultations. It should be noted that the layout presented within this Scoping Report represents a 'greatest extent scenario' (i.e. turbines have been presented in the greatest number and tallest envisaged height) and therefore the proposal as identified now will have the greatest environmental impacts and benefits, and generally any amendments to the design will decrease the likelihood of a significant effect.

Should any changes occur that are likely to have a significant effect on the receptor these will be included within the EIAR. If the changes are not likely to have a significant effect, these will first be discussed with the relevant consultees, to ensure that they too are in agreement with Vattenfall's understanding before excluding them from the EIAR.

In the following sections the subject areas to be covered in the Scoping Report and EIAR 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

# Chapter 7 Landscape and Visual Impact Assessment

Quantans Hill Wind Farm



## 7. Landscape and Visual Impact Assessment

### 7.1. Introduction

EIAR will include a comprehensive but focussed Landscape and Visual Impact Assessment (LVIA) of the likely significant effects of the proposed development on the landscape resource and visual amenity. These assessments will be undertaken by Chartered Landscape Architects.

### 7.2. Landscape Policy and Guidance

The LVIA would be prepared in accordance with the *Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)* (Landscape Institute and the Institute of Environmental Assessment (2013) and *Landscape Character Assessment, Guidance for England and Scotland*, (The Countryside Agency and Scottish Natural Heritage (SNH) (2002 Edition).

In addition to the above, the LVIA will take account of the following guidance documents:

- Topic Paper 6: *Techniques and Criteria for Judging Capacity and Sensitivity* (Scottish Natural Heritage and the Countryside Agency 2004);
- *Landscape Institute GLVIA3 Statement of Clarification 1/13 (2013)*;
- *Siting and Designing Windfarms in the Landscape*, Version 3a, (SNH, May 2014);
- *Visual Representation of Windfarms*, Version 2.2, (SNH, Feb 2017);
- *Visual Representation of Development Proposals* Technical Guidance Note 06/19 (Landscape Institute, 07/2019);
- *Residential Visual Amenity Assessment (RVAA)*, Technical Guidance Note 2/19 (Landscape Institute, 2019); and
- *Assessing the Cumulative Impact of Onshore Developments* (SNH, March 2012).

The assessment would also take into consideration relevant national and local landscape planning policy and other such material that may be published during the preparation of the LVIA.

### 7.3. Methodology

A methodology including detailed criteria for assessing landscape and visual effects will be included as an appendix document to the main LVIA EIAR Chapter. Below is a summary of the intended methodology that has been used for initial assessments to determine the landscape and visual baseline.

#### 7.3.1. Study Area

A Zone of Theoretical Visibility (ZTV) map has been produced to illustrate the potential extent of visibility of the proposed development at tip height (see Figure 4). The ZTV assumes a bare earth surface, i.e. no trees or buildings etc. that might otherwise obscure the view of the turbines, as well as excellent conditions for visibility and therefore is a 'greatest extent' illustration. The ZTV has been produced with an extent of 45km based on SNH guidance for ZTV production in relation to turbines of greater than 150m in height. Following further evaluation of potential effects within this 45km area, it is anticipated that a study area of lesser extent can be focussed on for assessing the potential significance of landscape and visual effects of the proposed development.

#### 7.3.2. Impacts and effects

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

- Impacts are defined as the predicted change to the landscape and visual baseline as a result of the construction and operation of the proposed scheme; and
- Effects are the consequence of those impacts on landscape resources or visual receptors.

It is a requirement of the EIA Regulations to state whether effects are positive, neutral, or adverse. However, as a precautionary approach, effects on landscape character and views will be considered in the LVIA to be adverse, but it should be noted that not all people would experience effects on landscape character, views and visual amenity as adverse, as people's perception of wind turbines varies between negative and positive attitudes. In addition, turbine visibility from a particular location or receptor does not necessarily mean that there will be a significant adverse effect. Rather, it is dependent on the level (or significance) of that effect or change.

### 7.3.3. Landscape and visual effects

In accordance with GLVIA3 the assessment of Landscape effects and visual effects are considered separately.

Landscape effects are defined as the potential changes as a result of the proposal on the physical landscape resource, including landscape features, which may give rise to changes in its character, or constituent parts of its character. This in turn may affect the perceived value ascribed to the landscape. Landscape resources evaluated include whole Landscape Character Types (LCTs), individual elements and features and perceptual aspects and those areas designated for their scenic or landscape qualities at a national, regional or local policy level.

Visual effects consider potential changes as a result of the proposal on population or people. It considers changes to available views as a result of changes to the landscape and people's responses to these changes, otherwise referred to as visual amenity. Changes in views consider the appearance and prominence of the development from key viewpoint locations, settlements, routes and recreational areas. Viewers from such areas are collectively known as visual receptors. Visual effects include issues of intrusion (turbines encroach in the view) or obstruction (turbines intercept or block a view) and whether important opportunities to enjoy views may be improved or reduced as a result of the proposal.

The two principal criteria for determining the significance of both landscape and visual effects are:

- The nature of the location or receptor (sensitivity); and
- The nature of an effect (magnitude).

#### 7.3.3.1. Landscape effects

As guided by GLVIA3, the nature of the landscape receptors (sensitivity) will be assessed in terms of the susceptibility of the receptor to the proposed change and the value of the receptor and will be expressed in terms of High, Medium or Low sensitivity. The nature of the effect (magnitude) on each landscape receptor will be assessed in terms of the size and scale, geographical extent, duration and reversibility of that effect and will be expressed in terms of Substantial, Moderate, Slight and Negligible.

#### 7.3.3.2. Visual Effects

As guided by the GLVIA3, the nature of the visual receptors (sensitivity) will be assessed in terms of the susceptibility of the receptor or viewer (not the view) to the proposed change in views and visual amenity and

the value attached to particular views. This will be expressed in terms of High, Medium, or Low. The nature of the effect (magnitude) on each visual receptor will be assessed in terms of the size and scale, geographical extent, duration, and reversibility of that effect and will be expressed in terms of Substantial, Moderate, Slight, and Negligible.

#### 7.3.3.3. Significance of Landscape and Visual Effects

For both landscape and visual effects, an overall judgement is made on the nature of the receptor and the likely change resulting from the proposed development. This judgement is based on evaluations of the individual aspects of value, susceptibility, size and scale, geographical extent, duration, and reversibility. Table 7.1 illustrates the four main levels of landscape and visual effects that will be used in this LVIA; Major, Moderate, Minor and Negligible. Three intermediate combinations are also used for determining landscape and visual effects; Major/moderate, Moderate/minor and Minor/negligible. The table is not a prescriptive tool and the evaluation of potential effects makes allowance for the use of professional judgement and experience.

Landscape Institute advice, contained in GLVIA3 statement of clarification 1/13 (June 2013), states that following the determination of magnitude and sensitivity, *'the assessor should then establish (and it is for the assessor to decide and explain) the degree or level of change that is considered to be significant'*. In accordance with this advice, the LVIA will establish at what level in the assessor's opinion, *'significant'* effects arise, as referred to in the EIA Regulations.

Those effects considered to be Major and Major/moderate effects by virtue of the more sensitive receptors and the greater magnitude of effects, are considered to be Significant Landscape or Visual Effects. Moderate, Moderate/minor, Minor, Minor/negligible and Negligible effects are considered to be Not Significant Landscape or Visual Effects. However, whilst assessments are based on factual and objective data where possible, they involve qualitative considerations, and are therefore essentially and inevitably a matter of professional judgement undertaken on an individual basis. In some instances, Moderate effects may be judged to be Significant by the assessor and equally some Major/moderate effects may be judged to be Not Significant. In these instances, the level of significance of the effect determined by the assessor will be explained in detail.

Examples of significant landscape effects can arise where changes to important key elements or attributes of a Landscape Character Types occur without necessarily

giving rise to a change in character, or where a new landscape type or sub-type and therefore new character type (at various scales) would result from the introduction of the proposed development.

A significant visual effect is considered to be a change in the view that would markedly change the composition of that view.

**It should be noted that significant effects need not be unacceptable or necessary adverse and in most cases are reversible.**

| Nature of effect (magnitude) | Nature of Receptor (Sensitivity) |          |            |
|------------------------------|----------------------------------|----------|------------|
|                              | High                             | Medium   | Low        |
| Substantial                  | Major                            | Moderate | Minor      |
| Moderate                     |                                  |          |            |
| Slight                       |                                  |          |            |
| Negligible                   |                                  |          | Negligible |

Table 7.1: Levels of Landscape effects and overall significance

**7.3.4. Cumulative Effects**

The Cumulative Landscape and Visual Impact Assessment (CLVIA) will be undertaken in a similar process to the LVIA. The aim of the CLVIA is to identify, predict and evaluate potential key effects arising from the addition of the proposed development to a theoretical landscape baseline which includes cumulative sites currently present in the landscape and that may or may not be present in the landscape in the future. Cumulative sites consist of other wind farm developments only. As with the LVIA, the CLVIA deals with the effects on landscape and visual receptors separately.

The difference between LVIA and CLVIA is the different baseline conditions in terms of other wind farm developments that are assumed to be present in the landscape. The LVIA baseline conditions consider the introduction of the proposed development to a landscape with other operational wind farm developments and those under construction. The CLVIA baseline conditions consider the introduction of the proposed development to a landscape with other wind farm developments at more speculative stages of the planning system, such as:

- consented wind farms which have been granted planning consent but are not yet constructed; and
- submitted valid wind farm applications awaiting determination, including those at appeal.

For clarity, the cumulative assessment separates out these different speculative stages of development by identifying different “cumulative baseline scenarios”.

- The existing scenario of operational wind farms and those under construction is assessed in the LVIA and is referred to as **Scenario 1**. The CLVIA considers the following scenarios;
- **Scenario 2** considers the addition of the proposed development in the context of operational wind farms, those under construction and additionally those developments currently consented. This represents the likely future scenario; and
- **Scenario 3** considers the addition of the proposed development in the context of operational, under construction, consented, undetermined planning applications and wind farm developments currently at appeal i.e. a less certain future scenario.

Scenario 3 represents the most unlikely cumulative baseline as not all planning applications would necessarily be approved. The detailed cumulative assessment will comprise the assessment of the introduction of the proposed scheme into each scenario baseline. Projects which have come forward of relevance at Scoping or pre-application stage would be acknowledged.

In the CLVIA, cumulative effects will be reported as the additional effects of the introduction of the proposed development against different cumulative baseline scenarios. For each receptor, it is clarified as to whether the effect has increased or decreased relative to the LVIA assessment or whether the effects will be the same as in the LVIA assessment.

**7.3.4.1. Types of Cumulative Landscape Effects**

Cumulative landscape effects are defined as effects on either the physical fabric, aesthetic aspects of the landscape, or overall character of the landscape, or any special values attached to it.

Cumulative effects on the physical fabric of the landscape arise when two or more developments affect the landscape components or features such as woodland, dykes or hedgerows.

Cumulative effects on the aesthetic aspects of the landscape arise when two or more developments affect the aesthetic or perceptual components of landscape character including scale, sense of enclosure, diversity, pattern and colour and perceptual or experiential attributes such as naturalness, remoteness, or tranquillity.

Cumulative effects on the landscape character can arise when a new proposal results in a progression from a landscape which contains one development which forms an individual, isolated feature, to a landscape in which two or more developments are evident and may form a significant or dominant characteristic.

#### 7.3.4.2. Types of Cumulative visual effects

Cumulative visual effects are defined as effects that can be caused by combined visibility, which occurs where the observer is able to see two or more developments from one viewpoint or sequential effects which occur when the observer has to move to another viewpoint to see different developments e.g. along linear routes or journeys.

**Combined visibility** can occur as simultaneous visibility, where more than one development is visible in the same angle of view or successive visibility where two or more developments are present in views from the same viewpoint but cannot be seen at the same time as they are not in the same angle of view e.g. the viewer has to turn their head to see the other developments which become visible in succession.

**Sequential visibility** occurs where two or more developments are not present in views from the same viewpoint and cannot, therefore, ever be seen at the same time. The observer has to move to another viewpoint to see the other developments so they will then appear in sequence. Sequential effects are most common along linear routes and journeys. Sequential effects range from frequently sequential when the developments keep appearing regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints, to occasionally sequential, where there may be long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the areas of visibility.

#### 7.3.4.3. Assessing Cumulative Landscape and Visual Effects

Assessing the significance of cumulative effects requires:

- The identification of the landscape and visual receptors;
- The consideration of the nature of the receptors (sensitivity) as identified in the LVIA; and
- The determination of the nature of the effect (magnitude) which would be experienced by each receptor as a result of the addition of the proposed development to each baseline scenario.

The landscape and visual receptors to be considered in the CLVIA will consist of all the LCTs, designated landscapes, sequential routes and static locations such as viewpoints or settlements assessed in the LVIA as having more than negligible effects.

The susceptibility of receptors may be affected by the presence of other wind energy developments. Some viewers may consider that susceptibility is reduced because other wind farms are '*already there*', but for others it may be that sensitivity is increased because more development would be '*too much*'. However, to retain a consistent and objective approach, the susceptibility of receptors used for the cumulative assessment is taken to be the same as that identified in the LVIA. The value of the receptor would also remain the same in the cumulative assessment and therefore the overall sensitivity of the receptor is considered to be the same as will be identified in the LVIA.

As in the LVIA, the nature or magnitude of the cumulative effect on landscape and visual receptors considers the size and scale, geographical extent, duration and reversibility of the change likely to result from the addition of the proposed development to the different baseline scenarios. With particular regard to cumulative visual effects, the following additional factors are also considered in determining the magnitude of cumulative visual change from each visual receptor:

- The number of turbine developments visible;
- The prominence of the developments likely to be seen;
- The amount of available view affected;
- The arrangement of turbine developments e.g. developments seen in one direction or in only part of the view, or seen in all directions;
- The relationship of the scale of the turbine developments including size and number of turbines which may also be expressed as the horizontal and vertical angle occupied by turbines;
- The position of the turbine developments in the view e.g. on the skyline, against the backdrop of land;
- The distances from the viewer and between developments;
- The landscape setting, context and separation (or coalescence) of turbine developments; and
- Potential screening by land cover such as vegetation and local variations in topography.

As in the LVIA, four main levels of cumulative effect will be used in the CLVIA; Major, Moderate, Minor and Negligible. Three intermediate combinations will also be used; Major/moderate, Moderate/minor and Minor/negligible. The evaluation of potential effects



makes allowance for the use of professional judgement and experience.

**7.3.4.4. Significance of cumulative effects**

SNH guidance considers that the concept of a *'threshold of acceptable change'* beyond which turbine developments in a particular area become unacceptable, is a crucial element in identifying significant adverse cumulative effects. In other words, the effect of the present proposal is limited, but when added to the effect of what has already been permitted, or to new proposals which have been submitted for planning permission, it can become over-dominant in planning terms.

There are varying degrees of cumulative landscape effect. These are as follows:

- Multiple wind farms are seen as separate isolated features within the Landscape Character Type, too infrequent and of insufficient significance to be perceived as a characteristic of the area;
- Multiple wind farms are seen as a key characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area;
- Multiple wind farms appear as a dominant characteristic of the area, seeming to define the character type as a *'wind farm landscape'*; and
- Wind farms cross different character types, reducing the distinction between the different types.

The appropriateness of such effects will depend on the value of a landscape, the objectives for change as defined in local capacity studies and scale of that effect, i.e. whether affecting a local character type or occurring at a regional level.

A significant cumulative landscape effect is considered to be a Major or Major/moderate landscape effect likely to be when the combination of the multiple wind farms (following the addition of the proposed development) become a dominant characteristic of the area and/or reduces the distinction between different character types and/or transforms/re-defines local or wider baseline landscape character.

A significant cumulative visual effect is considered to be a Major or Major/moderate visual effect and would result in a view whose composition would be markedly changed.

It should be noted that significant cumulative effects need not be unacceptable or necessarily negative and may be reversible. Each effect is evaluated on its own merit.

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***Do consultees agree with the LVIA and CLVIA methodologies?***

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## 7.4. Landscape Assessment

The assessment of the levels of effect on the landscape resource will be carried out in the detailed LVIA to be contained in the EIA report and will adopt the following general process:

Identify and describe the key landscape characteristics of the development site;

- Describe the LCTs and landscape designations identified in the landscape baseline to represent the wider landscape resource;
- Identify and describe the type of changes which are likely to occur to the development site and wider landscape resource as a result of the construction and operation of the proposed wind farm;
- Describe the extent to which the key characteristics of the development site and the wider landscape resource would be altered in terms of being weakened or strengthened by the introduction of the proposed wind farm; and
- Assess the nature of the effect (magnitude) on the development site and wider landscape resource which are likely to result from the introduction of the proposed wind farm, at construction and operational stages.

## 7.5. Data Informing Visual Assessment

The assessment of the visual effect of the proposed development considers the effect on visual receptors throughout the study area. These visual receptors comprise the visual baseline.

Visual receptors are people who will be affected by changes in views or visual amenity at different places. They are usually grouped by what they are doing at these places, such as residents. They include people living and working in the area, people who view the proposed development sequentially such as people travelling through the area on road, rail or other forms of transport, people visiting promoted tourist attractions and landscapes and people pursuing other recreational activities.

### 7.5.1. Zone of Theoretical Visibility Mapping

Computer generated ZTV mapping has been undertaken to assist in determining the likely extent of visibility of the proposed development within the study area and the likely landscape and visual receptors affected by the proposed development. The ZTV (Figure 4) has been undertaken in accordance with the guidance included within 'Visual Representation of Wind farms Good Practice Guidance' Version 2.2 (SNH, 2017).

### 7.5.2. Viewpoint Locations

A list of viewpoints is provided in Appendix 7.1 for preliminary assessment and further consultation then approval.

The viewpoints selected represent the views experienced towards the proposed development throughout the study area by various groups of people or receptors. Selected viewpoints include representative, specific, and illustrative views from publicly accessible locations, which are defined as:

- **Representative viewpoints:** selected to represent the experience of different types of visual receptors, where larger number of viewpoints cannot all be included individually and where the significant effects are unlikely to differ. For example, certain points may be chosen to represent the views of users of particular public footpaths and bridleways;
- **Specific viewpoints:** chosen because they are key views and sometimes promoted viewpoints within the landscape, including for example scenic viewpoints from roads, specific local visitor attractions, viewpoints in areas that are particularly noteworthy for visual and/or recreational amenity, such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations; and
- **Illustrative viewpoints:** chosen specifically to demonstrate a particular effect or specific issue.

In accordance with recently revised guidance, 'Visual Representation of Windfarms' Version 2.2, (SNH Feb 2017), *'the aim is to choose a range of viewpoints from where there are likely to be significant effects and those that are representative of views within the study area...It is preferable not to include too many viewpoints as this can distract attention from the key significant effects...We therefore encourage all applicants and consultees to further scrutinise the list of viewpoints selected and reduce these where possible.'* (SNH, 2017 paras. 76 & 85).

Computer generated wire-frame visualisations of the proposed development will then be produced for each selected viewpoint to determine the potential view and

suitability for EIA. It is suggested that 25 viewpoints would be an appropriate quantity for the proposed development.

Following a list of final viewpoints being agreed with DGC and SNH, photomontage images will then be produced for the EIA. The photography and visualisation images produced in the EIAR will accord with the guidance included in 'Visual Representation of wind farms' Version 2.2 (SNH, 2017).

#### 7.5.2.1. Aviation Lighting

The proposal for turbines up to 250m to blade tip may require further description and illustration of potential effects of aviation lighting. At time of writing the Civil Aviation Authority (CAA) requires visible red aviation warning lighting at up to 2000 candela for any structure at and greater than 150m in height. For the proposed turbines, a 2000 candela light may be positioned on the nacelle and 32 candela lights on the tower of each turbine. Currently the CAA guidance for lighting onshore wind turbines allows for the lighting intensity to be reduced to 10% in good visibility conditions and, furthermore, that the lighting be omni-directional and therefore dim in intensity outside of a 0° - 3° viewing angle. This results in the light being most visible and seen at its greatest intensity when viewed at eye level such as someone in a low-flying aircraft or atop a similar height hill but will become increasingly dim outside this range, for example for someone standing on the ground looking up. The current guidance is that the lighting would be static and only be operating during hours of darkness. The above methods mitigate the potential effects of the lighting. Vattenfall is aware of proposals accepted by the CAA for other development to install aviation lights on a limited number of turbines to limit visual effects (e.g. the perimeter turbines).

As a precautionary measure, it is proposed a description of any lighting proposals visible from each selected viewpoint will be included in the viewpoint assessment. A limited number of viewpoints may be illustrated in additional photomontages using photographs taken at dusk. These will be agreed during further consultation regarding viewpoints.

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**Consultees are asked to provide comment on, and review the suggested viewpoint locations detailed in Appendix 7.1, of which some could be considered for night time use. It is suggested that a total of 25 viewpoints maximum are taken forward to EIA.**

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### 7.5.3. Residential Receptors

#### 7.5.3.1. Settlements

Receptors within settlements are assumed to be high sensitivity receptors as the majority of receptors from these areas would be residents. Settlements are generally inward-looking with intervening built structures mostly intercepting views any further than settlement boundaries. This premise has led to the approach for the initial assessment, to only consider those settlements within a study area of 20km from the proposed development that are identified in the Development Plan for DGC. Additional smaller settlements/hamlets within a 5km radius of the proposed development will also be considered in the initial assessment.

#### 7.5.3.2. Residential Visual Amenity Assessment (RVAA)

The Residential Visual Amenity Assessment (RVAA) will consist of a detailed study of the visibility from individual properties within a 2km radius of the outer turbine of the proposed development. In the absence of published guidance on the distance from the proposed development that should be adopted for a detailed study of visual amenity from residential properties, a 2km study area is considered appropriate.

This assessment will focus on the effect on the visual component of residential amenity only and does not consider other components such as noise, dust, shadow flicker etc. The assessments of these effects will be contained in other sections of the EIAR.

For properties considered to experience a high or moderate magnitude of visual change, this assessment will evaluate the potential effects on the visual component of residential amenity or 'living conditions'. The visibility of existing and under construction wind farms considered as Scenario 1 cumulative developments will be taken into account as part of the existing visual baseline.

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***Do consultees have comment on the acceptability of the proposed RVAA study area of 2km and the general methodology outlined above?***

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#### 7.5.4. Sequential Receptors

Sequential impacts occur when an observer moves through a landscape along a linear route. This can lead to a series of viewpoints and experiences which may include other developments in addition to the proposed development.

An initial list of routes to be assessed includes the Southern Upland Way (SUW), the A713, B729, and the

B700. Core Paths to a radius of 5km from the proposed development will also be included. The aim of the initial assessment will be to ascertain which sequential routes have the potential to experience significant visual effects including significant cumulative sequential effects.

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***Do consultees agree with the approach to the sequential assessment?***

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## 7.6. Data Informing Cumulative Assessment

### 7.6.1. Cumulative Baseline

As detailed above, the difference between LVIA and CLVIA is the different baseline conditions in terms of other wind farm developments. This cumulative baseline is divided into different scenarios that reflect which groups of wind farm developments are assumed to be present in the landscape.

Quantans Hill wind farm's closest neighbouring development is the proposed Shepherds Rig wind farm. This application was made in December 2018 under Section 36 of the Electricity Act 1989, for a wind farm development to the east of Quantans Hill wind farm in an area of privately owned commercial forestry between Craigengillan Hill and Marscalloch Hill.

Further from Quantans Hill wind farm the operational Brockloch Rig I, Brockloch Rig Wind, Afton, Benbrack, Enoch Hill, Hare Hill, Pencloe, South Kyle, Windy Rig Wind Farms are likely to be the primary developments against which cumulative effects will be most relevant. Cumulative assessment of other projects such as Eucharhead and Brockloch Rig III will be dependent on their progress through the planning system.

These most relevant wind farm developments comprise the cumulative baseline (or Cumulative Study Area). As stated in the SNH guidance 'Assessing the Cumulative Effects of Onshore Wind Energy Developments,' (SNH, 2012) 'the key principle for all cumulative impact assessments is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process'. (para 33 SNH 2012).

The cumulative baseline identifies those developments it is considered require further cumulative assessment in the detailed CLVIA. These include all operational, consented and valid planning applications within an approximate 10km radius from the proposed development. Turbines below 50m are only considered

within a 5km radius and are scoped out of the LVIA beyond this distance. Potential sequential cumulative visual effects have been identified relating to the Southern Upland Way (SUW) long distance walking route and potential successive cumulative visibility occurs from points along the Southern Upland Way.

Beyond 30km is considered too distant to present significant cumulative combined and cumulative sequential effects with the proposed development. Such developments are requested to be scoped out of the cumulative baseline.

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***Do consultees agree with the cumulative baseline?***

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It should be noted that the cumulative baseline represents the ‘*maximum development scenario*’. It considers the effects of the proposed development in addition to other developments that do not yet exist in the current landscape, but which may exist in the future. This results in a high level of uncertainty in the cumulative baseline as not all of the other undetermined proposals will necessarily gain planning approval.

Owing to this uncertainty with regard to the maximum development scenario, the cumulative baseline is split into different scenarios with a decreasing likelihood of becoming operational.

The continually evolving nature of the cumulative baseline requires a reasonable end date beyond which any further changes to the baseline would not need to be considered in the CLVIA. It is suggested a ‘*cut-off*’ date of three months prior to the submission of the LVIA and CLVIA be a reasonable timeframe.

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***Do consultees agree to an end date of three months prior to the submission of the LVIA and CLVIA after which point any additional sites will not be assessed with the application?***

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**7.6.2. Cumulative Assessment**

The landscape and visual receptors to be considered in the CLVIA will also consist of relevant Landscape Character Types, designated landscapes, sequential routes and static locations such as viewpoints and settlements.

In the CLVIA, cumulative effects will be reported as the additional effects of the introduction of the proposed development to the different baseline scenarios, over and above the effects identified in the LVIA. For each receptor, it is clarified as to whether the effect has increased or decreased relative to the LVIA assessment

or whether the effects will be the same as in the LVIA assessment.

Cumulative wind farms will be shown in the viewpoint visualisations in accordance with SNH good practice guidance (2017). In addition, a ZTV to blade tip height of each wind farm proposal identified in the cumulative baseline will be prepared and then combined with the ZTV of the proposed scheme to create ‘paired ZTVs’ which illustrate the areas of mutual visibility, i.e. where the proposed scheme and other proposals are both visible from. ZTVs showing the combined visibility of each cumulative baseline scenario will also be prepared to illustrate the total visibility for each scenario.

## 7.7. Proposed Mitigation

By their nature landscape and visual effects require early consideration of mitigation which is embedded in the design of the proposed development, which has been specifically designed to avoid or to minimise the occurrence of adverse environmental impacts. All effects identified in the final detailed assessment will therefore be ‘residual effects’.

# Chapter 8 Ornithology

## Quantans Hill Wind Farm

## 8. Ornithology

### 8.1. Introduction

This chapter of the Scoping Report describes the proposed approach to the assessment of the potential effects from the proposed Quantans Hill wind farm (the 'Proposed Development') on bird populations and their supporting habitats. It includes a summary of the baseline surveys completed to date and the proposed EIA scope and assessment methods.

A chapter of the EIA Report will be devoted to the assessment of the impacts on key ornithological receptors. The chapter will be supported by a number of Technical Appendices, which will provide the full detail of the data used to inform the assessment.

The potential effects on ornithological receptors arising from a proposed development can be summarised as follows:

- Disturbance and/or displacement from supporting habitats during construction works;
- Loss / degradation of habitats through construction works, permanent structures and access tracks;
- Displacement from and disturbance to foraging, nesting and roosting habitat from the operating wind farm, including consideration of potential barrier effects;
- Mortality from collision with turbine blades; but also
- Net biodiversity gain and habitat improvement associated with a wind farm site's Habitat Management Plan

There is also the potential for the above to act cumulatively with the effects of other existing and proposed developments within the wider area. Potentially significant cumulative effects will be fully considered within the assessment following methods set out in current guidance.

### 8.2. Key Ornithological Receptors

- Particular focus will be given to the assessment of impacts on certain key bird species whose populations are of conservation concern (in a regional, national or international context), that are subject to specific legal protection, and that are considered to be particularly vulnerable to impacts from wind farm development. These include:
- Bird species of conservation concern listed on Annex I of European Council Directive 2009/147/EC on the Conservation of Wild Birds, in particular those that may be associated with populations of species that are qualifying interests of Special Protection Areas in the wider area;
- Bird species listed in Schedule 1 to the Wildlife and Countryside Act 1981 (as amended); and
- Bird species of national or regional conservation concern, not included within the above categories, but that are present within the study area in nationally or regionally important numbers and are considered to be relatively sensitive to the potential impacts of the proposed development.

Table 8.1 provides a provisional list of species to be considered in detail within the assessment (i.e. as key ornithological receptors), based on the results of the surveys carried out in 2018 and 2019. These species have been selected based on the conservation status / relative rarity of their populations, potential sensitivity to the impacts of onshore wind farm development, the suitability of habitats within the study area and their breeding / wintering ranges (i.e. the likelihood of the species being present in the study area). Also included in this table is a summary of the current conservation status, nature conservation policy and legal designations for each species.

| Common Name      | Scientific Name           | Species Designations   |
|------------------|---------------------------|--|
| Whooper swan     | <i>Cygnus cygnus</i>      | Ann. I, Sch. 1 <sup>ii</sup> , UK Amber List <sup>iii</sup> , SBL <sup>v</sup> |
| Greylag goose    | <i>Anser anser</i>        | UK Amber List <sup>iii</sup>   |
| Black grouse     | <i>Lyrurus tetrix</i>     | UK Red List <sup>iii</sup> , UK BAP <sup>iv</sup> , SBL <sup>v</sup>           |
| Osprey           | <i>Pandion haliaetus</i>  | Ann. I, Sch. 1 <sup>ii</sup> , UK Amber List <sup>iii</sup> , SBL <sup>v</sup> |
| Goshawk          | <i>Accipiter gentilis</i> | Sch. 1 <sup>ii</sup>   |
| Hen harrier      | <i>Circus cyaneus</i>     | Ann. I, Sch. 1 <sup>ii</sup> , UK Red List <sup>iii</sup> , SBL <sup>v</sup>   |
| Red kite         | <i>Milvus milvus</i>      | Ann. I, Sch. 1 <sup>ii</sup> , SBL <sup>v</sup>                                |
| Lapwing          | <i>Vanellus vanellus</i>  | UK Red List <sup>iii</sup> , UK BAP <sup>iv</sup> , SBL <sup>v</sup>           |
| Curlew           | <i>Numenius arquata</i>   | UK Red List <sup>iii</sup> , UK BAP <sup>iv</sup> , SBL <sup>v</sup>           |
| Barn owl         | <i>Tyto alba</i>          | Sch. 1 <sup>ii</sup> , SBL <sup>v</sup>  |
| Short-eared owl  | <i>Asio flammeus</i>      | Ann. I, UK Amber List <sup>iii</sup> , SBL <sup>v</sup>                        |
| Merlin           | <i>Falco columbarius</i>  | Ann. I, Sch. 1 <sup>ii</sup> , UK Red List <sup>iii</sup> , SBL <sup>v</sup>   |
| Peregrine falcon | <i>Falco peregrinus</i>   | Ann. I, Sch. 1 <sup>ii</sup> , SBL <sup>v</sup>                                |

Table 8.1: Potential EIA Receptor Species and their Designations

i. Species listed on Annex I of the EC Birds Directive (Directive 2009/147/EC on the conservation of wild birds - the codified version). These species are the subject of special conservation measures concerning their habitat, in order to ensure their survival and reproduction within their area of distribution.

ii. Species listed on Schedule 1 to the Wildlife and Countryside Act 1981 (as amended). All wild birds their nests eggs and dependant young are protected under the Wildlife and Countryside Act. Schedule 1 species receive additional legal protection under the Act.

iii. Birds of Conservation Concern (BoCC) in the UK (Eaton et al. 2015). The population status of birds regularly found in the UK is reviewed every five years to provide an up-to-date assessment of conservation priorities. Quantitative criteria are used to assess the population status of each species and to place it on the Red, Amber or Green list. These are global conservation status, recent decline, historical decline, European conservation status, rare breeders, localised species and international importance.

iv. Priority species in the 2007 UK Biodiversity Action Plan (UK). Local Biodiversity Action Plan species are given in the Dumfries and Galloway LBAP (April 2009). The UK BAP was superseded by the UK Post-2010 Biodiversity Framework (JNCC 2012).

v. Species included on the Scottish Biodiversity List (Scott Wilson 2005), which is part of the Scottish Biodiversity Strategy (published by the Scottish Government in May 2004).

In addition to the species receptors listed in Table 8.1, all relevant statutory designated sites and their cited qualifying interests, such as Sites of Special Scientific Interest (SSSIs) and Special Protection Areas (SPAs) will be considered in the assessment. An overview of statutory designated sites within 20km of the Site is provided in Table 8.2.

## 8.3. Baseline Conditions

### 8.3.1. Introduction

The following provides a summary of the baseline conditions relevant to the ornithological assessment. The description of the study area is informed by the results of survey work completed between April 2018 and August 2019.

Ornithological baseline surveys of the proposed Quantans Hill wind farm site were completed between April 2018 and August 2019 (inclusive). The surveys that have been carried to date are as follows:

- Flight Activity Surveys (April 2018 to August 2019);
- Moorland wader and songbird surveys (April to July 2018 and 2019);
- Breeding raptor surveys (April to August 2018 and April to September 2019);
- Black grouse lek survey (April and May 2018 and 2019); and
- Wintering waterfowl surveys (e.g. waterbody and grazing counts) (October 2018 to May 2019).

Further, targeted surveys for black grouse, breeding peregrine falcon and associated flight activity is proposed for March to August 2020 to provide additional data to inform the wind farm design and EIA processes. The spring 2020 survey period has been affected by restrictions during the COVID-19 outbreak. However, it has been possible, with appropriate measures in place to prevent the spread of the disease (i.e. in full compliance with all relevant Scottish Government regulations and guidance), to complete survey work during March and in June/July. This restriction will be fully recognised and addressed in the EIAR. However, the survey constraints during 2020 are not considered to be critical, in terms of the suitability of the baseline data to inform the EIA, given the existing breeding bird data from 2018 and 2019 and the records available from other sources.

The data collected during 2018/19, along with information from other sources (including powerline and wind farm EIA projects in the wider area) are considered to provide a suitably detailed baseline from which to assess the sensitivity of the proposed development area and to inform the design and EIA of the proposed development.

### 8.3.2. Designated Sites

Statutory sites, designated fully or in part for their ornithological interest within c. 20km of the proposed development are listed in Table 8.2 along with a summary of their cited interest.

| Name                               | Designation   | Distance from Site | Summary of Species Interest / Condition  |
|------------------------------------|---|--------------------|--|
| Loch Ken and River Dee Marshes     | SPA / Ramsar Site (including Kenmure Holms and River Dee (Parton to Crossmichael SSSI)) | 15km South         | This SPA is an internationally important site for wintering Greenland white-fronted goose and greylag goose. Important breeding populations of common tern, kingfisher, wigeon, teal, mallard, shoveler, tufted duck, goosander, water rail, coot, oystercatcher, lapwing, redshank, curlew and black-headed gull. The following species of wintering wildfowl are notable: whooper swan; bean goose; wigeon; teal; pintail; goldeneye; smew; and goosander. |
| Muirkirk and North Lowther Uplands | SPA (various SSSIs)   | 17.5km north west  | This SPA supports populations of European importance: hen harrier; short-eared owl; merlin; peregrine falcon and, golden plover.   |

Table 8.2: Statutory Designated Sites with Ornithological Interest

**8.3.2.1. SPA Connectivity**

The SNH document “Assessing Connectivity with Special Protection Areas (SPAs)” (2016) provides guidance on determining if there are likely to be adverse effects on bird populations ranging outside of the SPAs as a result of a proposed development. Included in the document are details of the typical foraging ranges for breeding and wintering populations of species that form the qualifying interests of SPAs.

The reported core ranging distances for all of the qualifying species for Muirkirk and North Lowther Uplands SPA are much shorter than the 17.5km separation distance from the SPA to the proposed development. There is no ecological connectivity to the SPA qualifying interests and the proposed development would not undermine the conservation objectives of the SPA. There is considered to be no Likely Significant Effect from the proposed development, alone or in combination with other plans or projects. Therefore it is proposed that formal consideration of any potential effects on the Muirkirk and North Lowther SPA will be scoped out of the assessment.

The distance from the proposed development to Loch Ken and River Dee Marshes SPA is within the reported ranging distance for wintering greylag goose (estimated

to be up to 15-20km from their roosts) but not for Greenland white-fronted goose (core range of 5-8km).

The available data indicates that the proposed development area, and associated buffer zones, do not regularly support appreciable numbers of roosting or feeding migratory Icelandic greylag geese that are part of the Ken and River Dee Marshes SPA population. This is consistent with a study of the feeding distribution of the SPA population (Mitchel 2012<sup>3</sup>). The proposed development is located in an area occasionally used by whooper swan, particularly during migration. The potential effects of the proposed development on the Loch Ken and River Dee Marshes SPA / Ramsar qualifying interests will be fully considered within the assessment.

**8.3.3. Baseline Surveys**

**8.3.3.1. Introduction**

The primary land use within the site is sheep and cattle grazing, across large tracts of unenclosed moorland, marshy and semi-improved grassland and improved pasture fields at lower elevations. There are several small mixed woodland plantations scattered across the site. The eastern edge of the site borders an extensive area of commercial conifer plantation. The site is intersected by a number of minor watercourses, many of which originate within the site, and flow into the Water of Deugh to the west and south.

Baseline ornithological surveys were completed between April 2018 and August 2019 (inclusive) to systematically record and assess the use of all habitats within the study area by breeding and non-breeding birds, with a particular focus on species that are potentially sensitive to wind farm development and are also of conservation concern (i.e. species listed on Annex I of the EC Birds Directive, Schedule 1 of the Wildlife and Countryside Act 1981, species on the UK Red List of birds of conservation concern). All surveys have been undertaken by suitably experienced ornithological surveyors trained in the detailed field and recording methods of each of the surveys undertaken.

**8.3.3.2. Summary of Completed Surveys**

The survey areas referred to within this report are illustrated on Figure 5 and are based on the proposed development boundary. The current site boundary differs in some locations in comparison to the boundary defined at the time the 2018-19 surveys were completed (see Section 8.9.1 for further discussion of this issue).

<sup>3</sup> Mitchell, C. (2012). Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge. 108pp.



The various survey areas were defined as follows:

- 'site area' refers to the area enclosed by the proposed wind farm site boundary;
- 'core survey area' refers to the site area plus an additional 500m wide strip;
- 'black grouse survey area' refers to the site area plus an additional minimum 1.5km wide strip; and
- 'raptor survey area' refers to the site area, plus an additional strip up to 2km wide, depending on the focal species and the presence of contiguous suitable habitat outside of the core survey area.

A suite of ornithological surveys were completed across the study area to inform the design and planning of the proposed development. All surveys follow methods set out in current SNH guidance (*Recommended bird survey methods to inform impact assessment of onshore wind farms*, March 2017). In summary, the following surveys were completed:

- Winter, spring, summer and autumn Flight Activity Surveys, from five strategically located vantage points (see Figure 6), to systematically quantify the use of the site by target species (i.e. species of conservation concern and susceptibility to adverse effects from wind farm development);
- Breeding Bird Surveys: a range of surveys completed to determine the presence and approximate location of breeding territories/sites within the core and wider survey areas, including the following:
  - Moorland and woodland breeding bird surveys of the core survey area in April to July of 2018 and 2019;
  - Breeding raptor surveys, focusing on species listed on Schedule 1 of the Wildlife & Countryside Act 1981, within suitable habitats in the raptor survey area in the Spring/Summer of 2018 and 2019; and
  - Black grouse reconnaissance and lek surveys in spring of 2018 and 2019 within the black grouse survey area.
- Winter waterfowl surveys to assess the use of the core survey area by passage and wintering swans and geese, particularly the carse land along the Water of Deugh. These surveys were carried out from October 2018 to May 2019

### 8.3.3.3. Flight Activity Surveys

Flight activity surveys were carried out in order to systematically sample, record and quantify the use of the airspace over the survey area by certain key species. Surveyors recorded the proportion of time that these key species spent flying at different elevations relative to the

potential turbine blade swept height. The data will be used to identify constraints, such as regularly used flight corridors and areas of concentrated flight activity, which may be taken into consideration in the wind farm design process in order to reduce impacts. The flight activity data will also be used in the assessment of displacement effects and will be input into a standard model of bird collision risk to help inform the assessment of collision mortality impacts on receptor populations.

Flight activity data was collected during timed watches from strategically located Vantage Points (VPs). For this study, a total of five VPs were selected, in order to ensure good visual coverage of the proposed development area and an approximate 500m wide buffer zone. Where possible, the VPs were selected to be outside of the areas where wind turbines might be proposed, in order to minimise observer effort.

The height above ground level of target and secondary species observed in flight was assessed by the observer to be within one of several height bands so that an estimate could be made of flight activity within the zone where turbine blades would be operating. Table 8.3 details the location of each of the VPs selected for the flight activity survey (see Figure 6).

| VP Ref. | Location             | Easting | Northing |
|---------|----------------------|---------|----------|
| VP1     | Willieanna           | 257724  | 595687   |
| VP2     | Craig of Knockgray   | 257099  | 594223   |
| VP3     | Marbrack             | 259199  | 593813   |
| VP4     | The Glenkens (north) | 261334  | 595000   |
| VP5     | The Glenkens (south) | 261334  | 595000   |

Table 8.3: Vantage Point Locations

A minimum of 72 hours of observation were completed at each VP per year (an average of six hours a month), with the surveys spread evenly throughout the survey period. Additional survey effort was made during October-November 2018 and March-May 2019, to coincide with peak passage periods for wildfowl. Table 8.4 provides a summary of the observation effort at each VP per month for the full survey period.

| Year | Month | Vantage Point Reference |    |    |     |     |
|------|-------|-------------------------|----|----|-----|-----|
|      |       | Q1                      | Q2 | Q3 | Q4N | Q4S |
| 2018 | Apr.  | 6                       | 6  | 6  | 3   | 3   |
|      | May   | 12                      | 9  | 9  | 12  | 12  |
|      | Jun.  | 6                       | 9  | 9  | 9   | 9   |
|      | Jul.  | 6                       | 6  | 6  | 6   | 6   |
|      | Aug.  | 6                       | 6  | 6  | 6   | 6   |
|      | Sep.  | 9                       | 9  | 6  | 9   | 9   |
|      | Oct.  | 12                      | 16 | 15 | 9   | 9   |

|                    |      |            |            |            |            |            |
|--------------------|------|------------|------------|------------|------------|------------|
|                    | Nov. | 16         | 12         | 12         | 12         | 12         |
|                    | Dec. | 6          | 6          | 9          | 12         | 12         |
| <b>2018 Total</b>  |      | <b>79</b>  | <b>79</b>  | <b>78</b>  | <b>78</b>  | <b>78</b>  |
| 2019               | Jan. | 6          | 6          | 6          | 6          | 6          |
|                    | Feb. | 6          | 6          | 6          | 6          | 6          |
|                    | Mar. | 9          | 9          | 9          | 9          | 9          |
|                    | Apr. | 12         | 12         | 18         | 12         | 12         |
|                    | May  | 15         | 9          | 9          | 9          | 9          |
|                    | Jun. | 9          | 15         | 9          | 15         | 15         |
|                    | Jul. | 6          | 9          | 9          | 9          | 9          |
|                    | Aug. | 9          | 6          | 6          | 6          | 6          |
| <b>2019 Total</b>  |      | <b>72</b>  | <b>72</b>  | <b>72</b>  | <b>72</b>  | <b>72</b>  |
| <b>Grand Total</b> |      | <b>151</b> | <b>151</b> | <b>150</b> | <b>150</b> | <b>150</b> |

Table 8.4: Monthly Hours of Observation at Each Vantage Point (April 2018 to August 2019)

VP watches were carried out between sunrise and sunset, with watches timed to achieve an even spread throughout the hours of daylight, by a single observer in conditions of good visibility, avoiding periods of very strong wind speeds when bird flight activity is suppressed.

### 8.3.4. Summary Survey Results

#### 8.3.4.1. Breeding Birds

The surveys completed in 2018 and 2019 confirmed the use of the site by various bird species of conservation concern and susceptibility to the impacts of onshore wind farm development, including raptors such as red kite and peregrine falcon and waders such as curlew.

The surveys confirmed peregrine falcon breeding to the south of the site and a relatively small number of wader territories. There were no records of any raptors of conservation concern breeding within the survey area, with the exception of common kestrel (UK Amber list species).

During spring 2018 there were two male black grouse lekking in the survey area, towards the southern end of the site, to the south of Quantans Hill. There were two other sightings of black grouse during the flight activity surveys in 2018, one of which was of a male in the same location as the lek site. A female was also recorded in May 2018, flushed from the ground within the same area. Surveys in spring 2019 found no evidence of black grouse lekking anywhere within the survey area. One black grouse was recorded in flight during April.

Table 8.5 summarises the results of the breeding bird surveys for 2018 and 2019, with respect to breeding waders.

| Species      | No. Apparent Territories |      |
|--------------|--------------------------|------|
|              | 2018                     | 2019 |
| Curlew       | 2                        | 3    |
| Common snipe | 2                        | 2    |

Table 8.5: Summarised Results of the Breeding Bird Surveys (Waders only)

Curlew breeding territories were recorded in areas of blanket bog at the base of Craig of Knockgray and to the north-west of Furmiston Craig.

Other species, of national conservation concern, recorded as breeding within the survey area included the following:

- Cuckoo (*Cuculus canorus*), territorial males were recorded in the core survey area, within the coniferous plantation and various smaller woodland blocks.
- Skylark (*Alauda arvensis*) were recorded in all open grassland habitats within the core survey area.
- Spotted flycatcher (*Muscicapa striata*), several territories were recorded, associated with small woodland blocks.
- Whinchat (*Saxicola rubetra*) breeding activity was mainly concentrated towards the eastern side of the survey area, towards the base of Knockwhinn hill.

#### 8.3.4.2. Passage / Wintering Birds

Geese were recorded infrequently during the survey, mostly along the Water of Deugh. There were no records of geese roosting or grazing any of the fields within the core survey area.

There was a peak count of 25 greylag geese recorded in February 2019 grazing on carseland along the Water of Deugh. Low numbers (<5) were infrequently recorded during the flight activity surveys.

In March 2018 two skeins of pink-footed geese (one of 15 birds and one of 70) were recorded passing over the site, partly at collision risk height, during the flight activity surveys.

No whooper swans were recorded using the site or surrounding area during the passage / wintering wildfowl surveys. In October 2018, 27 whooper swans were seen flying southeast over North Liggat during the flight activity surveys. In March 2019, 28 were recorded in flight, heading southwest then west over the site.

There was no evidence of the presence of any communal raptor roost sites within the survey area (e.g. red kite or hen harrier).

Dotterel (*Charadrius morinellus*) were recorded on the summit of Cairnsmore of Carsphairn, on the north-eastern edge of the site, in spring of both 2018 and 2019. A single bird in May 2018 and a group of five in May 2019. These sightings were birds on passage, most likely on migration to breeding grounds in the Grampians and Scandinavia. There was no evidence of any breeding occurring in either year, despite the presence of potentially suitable habitat. Dotterel is a species of high conservation concern (UK Red List) due to large population falls and range contractions in recent decades.

**8.3.4.3. Flight Activity**

Table 8.6 provides an overview of the results of the 2018-19 flight activity surveys. The percentage of birds in flight that were entirely or partly at potential collision risk height are also shown in the table (NB this includes flights recorded between 20 to 250m above ground level and does not reflect actual collision risk which would be modelled during the EIA based on the wind farm layout and the key design parameters of the proposed wind turbine).

| Species           | Total no. Flights (no. birds) | % Birds at CRH |
|-------------------|-------------------------------|----------------|
| Whooper swan      | 2 (55)                        | 50.9           |
| Pink-footed goose | 2 (85)                        | 17.7           |
| Greylag goose     | 4 (11)                        | 81.8           |
| Black grouse      | 2 (2)                         | 50.0           |
| Golden eagle      | 1 (1)                         | 100.0          |
| Red kite          | 95 (108)                      | 93.5           |
| Goshawk           | 1 (1)                         | 100.0          |
| Osprey            | 3 (3)                         | 33.3           |
| Curlew            | 11 (15)                       | 66.7           |
| Common snipe      | 8 (11)                        | 54.6           |
| Common gull       | 3 (14)                        | 92.9           |
| Common kestrel    | 60 (63)                       | 90.5           |
| Merlin            | 4 (4)                         | 25.0           |
| Peregrine falcon  | 4 (5)                         | 60.0           |

Table 8.6: Number of Flights by Target and Secondary Species and the Percentage of Flights at Collision Risk Height (CRH)

In November 2018 an adult golden eagle (probable female) flew southwest across site, mostly below collision risk height, from the direction of Green Hill.

There was no evidence of breeding by red kite within the survey area in 2018 or 2019. However, this was the most frequently recorded target species during the flight activity surveys. Most of this activity related to hunting birds, with a high proportion of flight time within the potential collision risk height band. Flight activity was recorded across most of the survey area, with

concentrations in the area of Craig of Knockgray and at the southeast corner of the survey area.

The potential effects on this species from wind turbine collision risk will be a key focus for the assessment. Options to reduce the risk through wind farm design and habitat management are being carefully considered by Vattenfall.

**8.4. Relevant Embedded Mitigation and Design Principles**

The proposed development will incorporate a number of embedded mitigation measures to achieve the design objectives and avoid, prevent or minimise likely significant adverse environmental effects. At this early stage in the design process, this includes the following relevant design principles which will be incorporated into the final design of the proposed development:

- Key ornithological constraints have been mapped, based on the existing baseline data collected in 2018/19. This information will be used to inform the development of the detailed wind farm layout to help reduce potential impacts on sensitive ornithological receptors; for example, important flight corridors / activity areas, breeding sites of Schedule 1 bird species and important areas for breeding curlew will be identified as a wind farm design constraint with appropriate set-back zones.
- All watercourses and waterbodies will have a minimum 50m wide protection buffer that will be avoided for wind turbine (and other structure) placement. The access track layout will be optimised to ensure the minimum number of necessary watercourse crossings.
- A suitably qualified and experienced Ecological Clerk of Works (ECoW) will be appointed in advance of works commencing on the site. The ECoW will oversee the implementation of the suite of measures proposed to avoid or minimise potential impacts from the construction phase on sensitive habitats and species. The ECoW will have the authority to halt works on site and help ensure that the environmental commitments made within the EIA report are properly implemented.
- A Construction Environmental Management Plan (CEMP) will be developed in advance of works commencing on the site. The CEMP will detail all measures, protocols, method statements and monitoring that will be implemented to protect the environment during the works. For example, implementation of best practice measures to protect

aquatic habitats from siltation and chemical pollution during construction.

- A site restoration plan will be prepared in outline which will set out the proposed site restoration measures following construction.
- Pre-construction surveys for breeding birds will be completed to ensure that current baseline information is available and that proposed works that have the potential to disturb such species, or destroy important habitats or nests sites and proceed lawfully with respect to the legislation protecting the relevant species (e.g. ground-nesting birds, Schedule 1 raptor species).
- A Habitat Management Plan (HMP) will be provided in outline within the EIA report, and will be developed in detail prior to works commencing on the site. The HMP will include measures to alter and improve the quality of upland habitats within/adjacent to the site in order to help offset impacts arising from the construction works and operation of the proposed wind farm (e.g. discouragement of red kite flight activity near to the proposed wind turbines, improvement of habitats away from the wind turbine areas for red kite and black grouse).
- A plan to monitor breeding birds prior to and following wind farm construction and to monitor bird collision rates during wind farm operation will be provided in the EIA report and will follow current best practice methods.

## 8.5. Potential Effects Proposed to be Scoped Out of Further Assessment

Having regard to the characteristics of the site and the proposed development, key baseline characteristics and proposed embedded mitigation measures, at this stage it is considered that the potential effects listed below have no potential to be significant and can therefore be scoped out of requiring further assessment.

### 8.5.1. Construction and Decommissioning

Effects on common breeding bird species will not be formally assessed, although measures to help ensure that active nest sites of all breeding birds are protected, as legally required, will be set out in the EIA Report.

### 8.5.2. Operation

Potential effects on any SPAs with the exception of the Loch Ken River Dee Marshes SPA will be scoped out of the assessment as the proposed development is situated outside of the potential connectivity distances, as defined in the SNH guidance, for all of the relevant species.

The potential effects on birds arising from the connection of the proposed development to the national grid will not be assessed within the EIA report. Such effects (e.g. collision risk with overhead powerlines) will be considered within the planning and assessment process for the grid connection.

## 8.6. Scope of the Assessment

Having regard to the characteristics of the site and the proposed development, key baseline characteristics and proposed embedded mitigation measures, at this stage it is considered that the following effects on the relevant key receptors are likely to or have some potential to be significant and therefore require further consideration through the EIA process:

### 8.6.1. Construction and Decommissioning

Likely, adverse effects during construction, which will be considered in detail in the EIA, are as follows:

- Disturbance and displacement to key receptors (breeding and non-breeding) caused by the presence of construction workers, noise, vibration and artificial lighting during construction;
- Loss of degradation of important supporting habitats for key receptors during construction; and
- The potential for cumulative construction related effects with other proposed developments.

### 8.6.2. Operation

Likely, adverse effects during the operational phase, and which will be considered in detail the EIA, are as follows:

- Mortality from collision with wind turbines and tower for the key receptor species (including consideration of proposed aviation warning lighting and this potential for this to increase bird collision risk);
- Operational displacement from / disturbance to important habitats supporting key receptor populations (e.g. displacement from foraging, nesting, roosting habitats due to the presence of the wind farm including consideration of potential 'barrier effects'); and
- The potential for cumulative operational effects with other existing and proposed developments.

## 8.7. Assessment Methodology

An assessment of the likely significant effects and impacts associated with the proposed development will

be carried out in accordance with relevant and applicable legislation, policies and technical standards.

The ornithological assessment will be supported by a number of Technical Appendices, which will provide further detail on the baseline survey results and background to some aspects of the assessment. Data from the baseline surveys, along with information from other sources (e.g. local Raptor Study Group, Royal Society for the Protection of Birds, British Trust for Ornithology, Scottish Ornithologists' Club) will be used to inform the evaluations of the relative importance of the proposed development site for key receptor species.

A confidential annex will also be produced which will provide details of the locations of breeding sites of bird species at risk of human persecution (e.g. nest locations of species listed on Schedule 1 to the Wildlife & Countryside Act). These details will not be included in the publicly available EIA documents. The confidential annex will follow current best practice guidance (SNH 2016) and will only be issued to SNH.

### 8.7.1. Relevant Legislation, Guidance and Technical Standards

The assessment of the likely significant effects will be undertaken in accordance with relevant and applicable legislation, policies and technical standards. In addition to relevant legislation and policy considerations, the assessment will be undertaken in accordance with subject specific legislation and best practice guidance including the following:

#### 8.7.1.1. Legislation

- The Convention for the Conservation of European Wildlife and Natural Habitat (The Bern Convention) 1979;
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- Council Directive 2009/147/EC on the conservation of wild birds (codified version of the 'Birds Directive');
- The Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland);
- Wildlife and Countryside Act 1981 (as amended in Scotland);
- Nature Conservation (Scotland) Act 2004 (as amended); and
- The Wildlife and Natural Environment (WANE) (Scotland) Act 2011.

#### 8.7.1.2. Biodiversity Policy Context

Relevant biodiversity policies were originally based on the UK Biodiversity Action Plan (UKBAP) which listed 65 Priority Habitats and 1150 Priority Species, and created

action plans for these priority habitats and species. The UKBAP formally ended in 2010 and was replaced by the UK Post-2010 Biodiversity Framework published in 2012. The UK Post-2010 Biodiversity Framework sets out the priorities for UK-level work to support the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020 as well as its five strategic goals.

The '2020 Challenge for Scotland's Biodiversity: A Strategy for the Conservation and Enhancement of Biodiversity in Scotland' launched in 2013 provides the overview of Scottish biodiversity policies set within the UK framework (Scottish Government 2012). The 2020 Challenge publication is a supplement to the Scottish Biodiversity Strategy (SBS) published in 2004.

The SBS emphasises the need to take account of how ecosystems work, particularly across landscapes. It states that both the broad and local scales need to be considered, that the capacity of ecosystems to respond to impacts is not infinite and that resilience is to be built into ecosystems using an adaptive, integrated approach at the scale of river catchments.

The UK BAP list of priority habitats and species remain integral to the SBS and the Scottish Biodiversity List which is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland.

Originally under the UK BAP, and now under the SBS, local authorities have a responsibility to produce their own list of priority habitats and species and associated actions for conservation. These are called Local Biodiversity Action Plans (LBAP). The LBAP applicable to this site is the Dumfries and Galloway Biodiversity Action Plan (2009). The species and habitats identified as a focus for conservation action in the LBAP will be taken into consideration, where relevant, in the assessments.

#### 8.7.2. Relevant Technical Standards

The following guidance will be referred to and followed as appropriate for the ornithological assessment:

- Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland;
- SNH (2018). Environmental Impact Assessment Handbook. A Handbook on Environmental Impact Assessment: Guidance for Competent Authorities, Consultation Bodies, and others involved in the Environmental Impact Assessment Process in Scotland. 5th Edition;

- SNH Guidance on the Habitats Regulation Appraisal process (available online);
- Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas (SNH, February 2018);
- Natural Heritage Zones Bird Population Estimates. SWBSG Commissioned Report Number: 1504 (BTO, 2015);
- Guidance on Assessing Connectivity with Special Protection Areas (SNH, June 2016);
- EU Guidance on wind energy development in accordance with the EU nature legislation (Publications Office of the European Union 2011);
- Calculating a theoretical collision risk assuming no avoiding action (SNH, 2000; Band, 2007);
- Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model (SNH, 2018);
- Assessing the cumulative impacts of onshore wind farms on birds (SNH, August 2018);
- A Review of Disturbance Distances in Selected Bird Species (SNH, 2007);
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information (SNH, September 2016); and
- Dealing with construction and birds (SNH, March 2016).

Additional reference materials and guidance which is relevant to the ornithology assessment is referred to within the summary of assessment methods provided below. Consideration will also be given to the potential implications of the proposals for all relevant national and local nature conservation policies and for key species highlighted for conservation action in relevant national and local biodiversity action plans.

### 8.7.3. Consultations

The assessment will be carried out based on relevant requirements and guidance contained in an EIA Scoping Opinion to be adopted by the Scottish Ministers in response to this EIA Scoping Report. To maximise the value of this EIA scoping process, in accordance with the EIA Regulations, all relevant consultees are requested to consider:

- The proposed scope of assessment as outlined in Section 8.6;
- The assessment methodology as outlined in this section; and,
- The key questions and design considerations set out in Section 8.10.

If required, additional consultation will be undertaken with relevant consultees to clarify aspects of the assessment methodology (e.g. any survey requirements) and address topic-specific issues.

### 8.7.4. Approach to the Assessment of Effect Level and Significance

The following section sets out the proposed approach to determining the level and significance of likely effects.

The assessment will follow a standard, systematic approach which will be informed by the best available scientific evidence and experienced professional judgement. Where there are uncertainties, reasonable greatest extent assumptions are made to minimise the risk of effects being under-estimated. The assessment methods follow guidance produced by SNH and the Chartered Institute of Ecology and Environmental Management (CIEEM), as detailed above.

#### 8.7.4.1. Defining Receptor Sensitivity

The importance of each receptor (also referred to as 'receptor sensitivity') can involve a wide range of factors (e.g. habitat naturalness, extent, quality, populations that are of conservation importance at various geographical scales, or at the edge of their natural range). In practice, conservation status and rarity are often the most important criteria to consider. Therefore, ecological receptor sensitivity is usually defined by rarity at different geographical scales (e.g. local, regional, national, international). This is also useful in placing the receptor in the context of natural heritage designations which tend to be selected and ranked according to the rarity of the qualifying species or habitats at different geographical scales, e.g. habitats or species that are rare at a global or European level are usually covered by European legislation and protected within designated sites defined by the European legislation, namely Special Protection Areas (SPAs).

Although there are a range of factors to be considered, the evaluation of importance in relation to bird population size is primarily based on the estimated proportion of a population that a site supports. Where 1% of the population, for a given geographical scale, is regularly present within the site, then it is considered to be important for that species at that spatial scale. For example, where more than 1% of the national population of a species is regularly present, the site would be considered to be of national importance. The 1% criterion for importance is well established and can be applied at the regional, sub-regional or local scales, providing there is sufficiently accurate information available on population sizes within these geographical units. Where there is uncertainty about the accuracy of the available information a precautionary approach has been adopted to minimise the risk of under-valuing any receptor.

Breeding population estimates, based on Natural Heritage Zone (NHZ) boundaries which divide Scotland into a number of distinct biogeographical areas, have been published for some key bird species (Wilson *et al.* 2015). The proposed development is located within the 'Western Southern Uplands & Inner Solway' NHZ. Population estimates for the NHZ will be used in this assessment where available to assist in informing judgements on the sensitivity of the populations using the site and their supporting habitats.

Definitions of ornithological receptor sensitivity are outlined in Table 8.7 below.

| Receptor Sensitivity  | Example Criteria / Definitions   |
|---|--|
| International   | Populations of bird species that form part of the cited interest of an internationally protected site or candidate site (e.g. a Special Protection Area, or Ramsar site).<br><br>Bird species listed on Annex I of the EC Birds Directive if regularly present in qualifying numbers / proportions of the national or international populations.   |
| National (i.e. at the Scottish or UK level)                 | Habitats or species that form part of the cited interest of a nationally important designated site (e.g. a Site of Special Scientific Interest or a National Nature Reserve).<br><br>Regularly occurring, but rare bird species (for example, less than 300 breeding pairs in the UK) and/or a species present in nationally important numbers (for example, more than 1% of the UK population).<br>A site that provides critical supporting habitat for any regularly occurring bird population of national importance. |
| Regional (e.g. Western Southern Uplands & Inner Solway NHZ) | Any regularly occurring population of a nationally important bird species which is threatened or rare in the region (for example, more than 1% of the regional population or NHZ population where reliable estimates are available). Regionally important habitats critical to supporting such populations.<br><br>In the local authority area context, Local Nature Reserves where bird populations / assemblages are a key component.  |
| Local (High)  | Regularly occurring population of bird species and their supporting habitats which are considered to be of conservation importance at a sub-regional / supra-local spatial scale.<br><br>Sites with an identified ornithological interest meeting the criteria for local authority area designation (e.g. Site of Importance for Nature Conservation).   |
| Local (Medium)  | A population of a species or assemblage of species, and their supporting habitats, of sub-regional importance, which are not considered sufficiently notable to qualify for protection under a local authority designation, but which are considered important at a moderately local spatial scale (e.g. approx. radius of 15-20km).   |
| Local (Low)   | A population of a species or assemblage of species which are not considered to qualify for local authority non-statutory designation, but which are considered important in the context of the   |

| Receptor Sensitivity | Example Criteria / Definitions  |
|----------------------|---|
|                      | immediate surrounding area (e.g. approx. radius of <10km).  |
| Negligible           | A commonplace species / population of little or no conservation importance at a local scale. Habitats of negligible value to any bird population. |

Table 8.7: Defining Receptor Sensitivity

### 8.7.4.2. Effect Characterisation

The overall character of an effect is a function of a wide range of variables acting on the receptor which include the following:

- Direction - whether the effect benefits (positive) or harms (negative) the receptor;
- Extent - the area affected or potentially affected by a particular impact (e.g. distance over which artificial lighting may affect bat behaviour);
- Magnitude - the amount of a habitat or population affected (quantified, where possible, as the proportion of the receptor lost or affected);
- Complexity - relating to whether an effect is direct or indirect, proximal or distal, immediate or delayed;
- Reversibility - can the effect be reversed, within a reasonable timescale and with reasonable expectation of recovery, or is it permanent and irreversible;
- Frequency - is the effect acting constantly or intermittently (e.g. occasional noise disturbance in comparison to a longer-term change to the existing baseline levels of disturbance);
- Timing - is the effect occurring during a more or less sensitive period for the receptor (e.g. relative to the bird breeding season);
- Duration - the length of time that the effect is acting on the receptor, this may be longer than the associated impact is occurring for and may be short, medium, long-term or permanent (indicative periods for these categories are given in Table 8.8 below, in relation to faunal receptors duration may also be defined relative to the lifecycle of the species); and
- Confidence - certain/near certain (95% or greater chance of occurring), probably (50-95%), unlikely (5-49%) or extremely unlikely (<5%).

The overall effect, considering all of the above factors, for each receptor is categorised for each phase of the Proposed Development (i.e. the construction phase, the operational phase and the decommissioning phase). To help illustrate this, summary descriptions of the various effect levels (primarily considering effect magnitude and duration) are provided in Table 8.8 below.

| Effect Level         | Description of the resultant effect on the ornithological receptor   |
|----------------------|--|
| Total/Near Total     | Would cause the loss of a major proportion or whole feature/population, or cause sufficient damage to a feature to immediately affect its viability.   |
| High                 | Major effects on the feature/population, which would have a sufficient effect to alter the nature of the feature in the short-long term and affect its long-term viability. For example, more than 20% habitat loss or damage. |
| Medium               | Effects that are detectable in short and long-term, but which should not alter the long-term viability of the feature/ population. For example, between 10 - 20% habitat loss or damage.                                       |
| Low                  | Minor effects, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature/population. For example, less than 10% habitat loss or damage.  |
| Negligible           | Minimal change on a very small scale.  |
| Duration definitions | Long-term (5 - 25 years or longer, and refers to wind farm operation).<br>Short-term (<5 years, and refers to construction or decommissioning).  |

Table 8.8: Defining Effect Level

**8.7.4.3. Effect Significance**

Significance is a measure of the importance that should be given to an effect in relation to the consideration of appropriate mitigation and the overall environmental impact of the proposals and the planning process. Effects can be significant at a wide range of geographical scales (i.e. from the local level to effects that are of international importance for the receptor under consideration), but which result in important consequences for the functioning and/or conservation status of the receptor. In general terms, significance is determined through the interaction between receptor sensitivity and the categorised effect level (i.e. taking into account effect extent, duration, reversibility etc.).

Effect significance is reported in categories, from None to Major, through Negligible, Minor and Moderate. For the purposes of the assessments, effects are considered significant (i.e. 'significant' in terms of the relevant EIA Regulations and of key importance in terms of planning consent decision-making) if they are reported as Moderate or above.

The process of determining the significance of an effect can be illustrated by a simple matrix which shows the interaction between receptor sensitivity and the magnitude of effect as illustrated in Table 8.9 below. In practice, the determination of significance involves the careful application of informed professional judgment and consideration of a range of parameters, as outlined above. If the likely effect is assessed as being moderate or above, the effect on the receptor is judged to be 'significant'.

| Receptor Sensitivity | Effect Level       |                  |                 |                  |            |
|----------------------|--------------------|------------------|-----------------|------------------|------------|
|                      | Total / near total | High             | Medium          | Low              | Negligible |
| International        | Major              | Major            | Major           | Major-Moderate   | Negligible |
| National             | Major              | Major            | Major-Moderate  | Moderate         |            |
| Regional             | Major              | Major - Moderate | Moderate        | Moderate - Minor |            |
| Local (High)         | Major-Moderate     | Moderate         | Moderate -Minor | Minor            |            |
| Local (Medium)       | Moderate           | Moderate - Minor | Minor           | Minor            |            |
| Local (Low)          | Moderate - Minor   | Minor            | Minor           | Minor            |            |
| Negligible           | Negligible         |                  |                 |                  |            |

Table 8.9: Determining the Significance of Effect on Ornithological Receptors

**8.7.5. Collision Risk Assessment**

Wind turbine collision risk for key species has been estimated following a method developed by Band *et al.* (2007). In summary, the process involves three stages:

- Stage one is the estimation of the number of transits through the proposed rotor swept volume per year based on observed flight activity data and parameters of the wind farm and wind turbine design.
- Stage two involves the estimation of the predicted proportion of transits through the rotor swept volume that would result in a collision between the bird and a wind turbine blade. All predicted collisions are assumed to be fatal. This provides an estimate of the number of fatalities per year for the wind farm but assumes that no bird takes avoiding action to prevent a collision.
- Finally an assumed rate for collision avoidance is applied to the estimate.

This method is more suitable for some species than others. For example, small and/or fast flying birds such as merlin, golden plover and most songbirds are difficult to detect beyond a distance of a few hundreds of metres and therefore it is rarely possible to generate reliable estimates of flight activity. In the case of these species collision risk is probably best determined through informed reasoning rather than quantitative modelling.

In order to provide a biologically realistic estimate of collision risk it is necessary to assume that birds take action to avoid collision. However, reliable empirical data on which to base estimates for avoidance are often lacking and therefore the collision rates derived from assumed avoidance values should be considered as cautious estimates.



In the assessment, estimates of collision risk/mortality will be calculated for key receptors where there was sufficient data to carry out the analysis. Species that are not included in the collision risk analysis are either not of conservation concern or are at low collision risk due to their flight behaviour, and/or are species which are infrequently present within the study area.

Various adjustments to the collision risk estimates will be made to account for the turbine blade parameters relative to the height bands which were used to record observations of target and secondary species in flight.

The potential collision risk is calculated for each species based on a number of assumptions. For example, it is assumed that there is no influence on collision risk from weather conditions. In the case of diurnal raptors, as visual hunters, the risk of increased collision rates due to poor visibility is lessened by the likely reduction in flight activity during such periods, as hunting efficiency is greatly reduced. Flight speeds and biometrics will be conservatively estimated and will follow current SNH guidance.

#### **8.7.6. Statement of Significance**

At the end of the assessment a statement of residual effect levels and associated significance will be provided. This is a summary of the complete assessment for each receptor, taking into consideration any proposed mitigation measures, and reports the significance of the residual effects in compliance with the EIA Regulations.

#### **8.7.7. Cumulative Impact Assessment**

The potential for cumulative impacts on ornithological receptors arising from other wind farm proposals within the Western Southern Uplands & Inner Solway NHZ will be assessed following the approach set out in current SNH guidance. This part of the assessment will focus on those sensitive receptors where there is at least the potential for biologically important cumulative effects to occur (i.e. effects that have the potential to act additively and materially affect annual survival or productivity rates at the relevant population level). The assessment will include consideration of operational projects; projects under construction; consented projects which are not yet under construction; and projects for which planning applications have been submitted and for which ornithological impact assessment information is available.

## **8.8. Identification of Further Mitigation and Enhancement Measures**

Where likely or potentially significant adverse effects are identified through the assessment, the design will be reviewed to consider if further mitigation can reasonably be embedded into the proposed development. Alternatively, further mitigation may be proposed in order to reduce effect severity. Such mitigation may include alternative construction methods, the timing of works and effective habitat restoration, enhancement and creation. In some cases, mitigation measures may also be specified where effects are not considered to be significant as part of a best practice approach to development. Following consideration of the proposed mitigation then the residual effect and significance is reported in the assessment.

## **8.9. Risks, Limitation and Uncertainties**

### **8.9.1. Survey constraints**

There are considered to be no significant constraints or gaps in the baseline data that will be used to inform the assessment.

The site boundary illustrated in Figures 5 & 6 differ in some locations in comparison to the boundary defined at the time the 2018-19 surveys were completed. There is a part of the current site, the lower Furmiston area, which lies just outside the 2018-19 core survey area (see Figure 5). However, all of the proposed wind turbine locations are located well within the 2018-19 core survey area (at least 500m). Assuming that access to site will be made on the west of the site, this will also be the case for the proposed access tracks, borrow pits, construction compounds etc. Therefore, this is not considered to be an important constraint as there will be sufficient extent of baseline data to inform the EIA of the proposed development.

### **8.9.2. Assessment Limitations**

Ecological impact assessments are always subject to some degree of uncertainty as to the potential scope, scale, duration and magnitude of effects and the range and sensitivity of receptors affected. Such factors can be accounted for by assuming a reasonable 'greatest extent scenario' in relation to the potential effects of construction works, taking into consideration prior experience and what can reasonably be expected of a

prudent construction contractor given the nature of the proposed development.

Limitations with respect to bird collision risk modelling methods are well known (Band *et al.* 2007). As discussed above, the method is limited by the current understanding of how bird flight activity and behaviour is affected by wind farms in the long-term and in proximity to individual wind turbines. However, this method includes parameters that can be adjusted to some extent to account for species-specific differences in morphology and flight behaviour and incorporates variables for individual turbine design, wind farm layout and operational regime. A further advantage of the Band Model, which has become widely adopted in wind farm EIA, is that it enables comparison of collision risk between proposals, which also helps to inform cumulative assessment.

## 8.10. Key Questions

A collaborative design process is being adopted and comments are therefore sought at this stage from consultees regarding both the proposed scope of assessment and the optimum design of the proposed development within the maximum development parameters. Specifically, in responding to this EIA Scoping Report, consultees are asked to consider the following key questions:

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***Is the proposed scope and extent of the available and proposed baseline data considered to be sufficient to inform a reliable assessment of the potential effects of the proposed development?***

***Do the consultees agree with the list of key potential receptors for the EIA and with the receptors / issues to be scoped out of the assessment?***

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## Chapter 9 Ecology

### Quantans Hill Wind Farm



## 9. Ecology

### 9.1. Introduction

The intention of this section of the Scoping Report is to provide the competent authority and its advisers with sufficient information (where it currently exists) on the likely impacts of the proposed development on important ecological features, ornithological features will be covered by a third-party in the subsequent section. This will allow for an EIAR that focusses on features which could be significantly affected, or for which the predicted effects are currently unknown. Baseline survey work on the proposed development to inform the EIA is still to commence, therefore this Scoping Report is based on desk study information on the species and habitats most likely to be present and potentially impacted by this development.

A screening process will be undertaken alongside the EIA to determine whether the predicted impacts of the proposed development will result in a “Likely Significant Effect”. The screening process will allow the competent authority to determine whether an Appropriate Assessment (AA) will be required.

#### 9.1.1. Desk Study

A desk-based study will include ecological data for the last five years from within 10km (bat data) or 5km (other ecology data) of the proposed development boundary from local environmental records centres (South West Scotland Environmental Information Centre (SWSEIC) and Glasgow Museums Biological Records Centre (GMBRC)) and EIA Chapters for other developments where available.

Results will be included in the desk-study section of the EIAR Chapter and any implications for the survey programme highlighted for discussion with SNH.

#### 9.1.2. Habitat Surveys

It is proposed that surveyors will work to a minimum polygon size of 10m<sup>2</sup>, areas of habitat smaller than this will be recorded as target notes or mosaics - whichever is most appropriate. Where mosaics are recorded, target notes will include a description which will indicate mean habitat patch sizes and integration. Survey work will include:

- Extended Phase 1 and NVC surveys;
- Undertaking habitat loss calculations for the ecology EIAR Chapter;

- Identifying and mapping sensitive areas to avoid e.g. potential Ground Water Dependant Terrestrial Ecosystems (GWDTE) and priority habitats; and
- Identifying less sensitive habitats potentially suitable for development to inform the project design.

Phase 1 and NVC surveys were previously carried out in the southern part of the currently proposed development area (in 2010 and 2013 respectively) in connection with the original Quantans Hill wind farm application. If there have been no significant changes in land management practices, then the existing data could still be applicable and surveys in 2020 would therefore focus on covering the area not already surveyed and ground-truthing the existing data. The site walkover still needs to be repeated to cover the current (larger) extent of the proposed site.

#### 9.1.3. Extended Phase 1 habitat survey

A walkover habitat survey will be undertaken, and habitats present mapped digitally in the field and assigned a Phase 1 habitat code. Target notes will be taken for any other notable observations e.g. signs of protected species or presence of suitable habitat for protected species such as red squirrels and herpetiles, habitat patches that are considered to be botanically rich, and protected or invasive plant species.

#### 9.1.4. National Vegetation Classification survey

National Vegetation Classification (NVC) surveys will be undertaken after Extended Phase 1 habitat surveys have been completed, the results of which will be used to target survey areas to be covered by NVC surveys. The areas to be covered by NVC surveys will be those identified during Phase 1 habitat surveys as potential GWDTEs. GWDTE are protected under the Water Framework Directive. Before the surveys commence, we will seek to have the survey approach agreed by relevant stakeholders and consultees.

NVC habitat polygons will be mapped digitally in the field and identified to sub-community level. As far as practical, the surveyor will avoid recording mosaics that are a mix of potential GWDTE and non-GWDTE habitats, this will aid more accurate mapping of potential GWDTE habitats. Data will be suitable for a hydro-geological GWDTE assessment.

Vegetation surveys are likely to be conducted during the peak/end of the growing season when most plant species are easily detectable (May-August).

## 9.2. Terrestrial Ecology Surveys

### 9.2.1. Otter and water vole survey

We anticipate that a survey targeting otter and water vole (mid-May to end June), will be required. These surveys would be completed in all suitable habitat within 250m of proposed infrastructure and will be carried out by two surveyors due to the high health and safety risks posed by working in close proximity to water.

As water vole are a mobile species a single visit can be insufficient to confirm presence/absence, it is therefore possible that a second water vole survey may be required if suitable habitat is present and the results of the initial survey are inconclusive. Alternatively, assessment of impact on water vole could be carried out on a precautionary basis without a second survey.<sup>4</sup> The requirement for further survey would be discussed and agreed with SNH during consultation, based on initial results of survey work and desk study data.

### 9.2.2. Badger, red squirrel, and pine marten survey

The development area will be surveyed for badger where all signs of presence shall be recorded and mapped. Additionally, during the badger survey, any forested areas that lie within the development area shall be surveyed for signs of squirrel and pine marten presence. It is expected that the surveys will be carried out in late summer (July to September).

## 9.3. Bat surveys

### 9.3.1. Bat roost surveys

Farm buildings and mature trees within the site may provide suitable locations for roosting or hibernating bats and these areas will require roost assessment surveys to determine their suitability and any evidence of occupation. Should evidence of bat roosts be recorded, emergence and re-entry surveys will be undertaken to count the species and number of bats involved.

### 9.3.2. Ground level bat detectors

New guidance (SNH, 2019)<sup>5</sup> has been produced as to the baseline surveys required for bats on a proposed wind farm site. The main requirement will be the deployment of automated full spectrum static detectors. The guidance recommends that bat detectors are sited as close as possible to the location of proposed turbines.

<sup>4</sup> Dean M., Strachan R., Gow D., and Andrews R. 2016. The water vole mitigation handbook (The mammal society mitigation guidance series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

The spring 2020 survey period has been affected by restrictions during the COVID-19 outbreak. However, it will be possible, with appropriate measures in place to prevent the spread of the disease (i.e. in full compliance with all relevant Scottish Government regulations and guidance), to carry out bat activity surveys during June to September. It is intended that 30 nights of bat activity monitoring will be completed for each sampling point. This will be divided into three survey bouts, of at least 10 nights, spread across the June to September period. The restriction during the spring 2020 survey period will be fully recognised and addressed in the EIAR. In this case, the June-September bat activity data, in combination with data from other sources, is likely to be sufficient to inform the EIA process and any mitigation measures to avoid / reduce the risk to bat populations from the proposed development.

Following the new SNH guidance, deployment of static bat detectors at height is not currently required unless there are site-specific reasons for it.

Weather data including wind speed, temperature and rainfall are important for the interpretation of bat activity data and should be recorded nightly.

Bat calls identified in the detectors deployed will be analysed using Kaleidoscope Pro Software. Manual quality assurance will be conducted on a 10% sample of the recorded bat calls.

Current guidance indicates that bat activity levels should be assessed using the online tool Ecobat which compares data entered by the user with bat survey information from similar areas at the same time of year and in similar weather conditions. This requires that the bat data are submitted to Ecobat and form part of the data repository that it uses to make bat activity assessments.

## 9.4. Fish Surveys

The previous Quantans Hill EIA identified possible adverse effects to brown trout with minor effects to salmon populations further downstream from the development associated with potential pollution incidents during construction. Mitigation proposed included a post-consent fish population monitoring plan including

<sup>5</sup> SNH. 2019. Bats and onshore wind turbines: survey, assessment and mitigation. Scottish Natural Heritage, Inverness.

electrofishing surveys to be implemented over a period of at least three years.

Given existing knowledge of the fish population within the local catchments, and considering the use of best-practice mitigation measures which would be employed in the design of watercourse crossings and to protect watercourses during construction and operation, it is not considered that baseline fish surveys will be required. In light of this we would seek to scope out the requirement for baseline fish surveys.

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***Do consultees agree with the scope of survey proposed?***

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## 9.5. EIA Assessment

Based on a review of the ecological data available, an assessment of the effects associated with construction, operation, and decommissioning of the project will be undertaken including habitat loss and gain calculations associated with the development.

The assessment will follow CIEEM and other relevant guidelines, and effects will be assessed as being either not significant (for predicted negligible or low impacts) or significant (for predicted moderate or high impacts). Whilst it is intended that much of the non-significant elements can be scoped-out it is important to note that the potential effects can include the following:

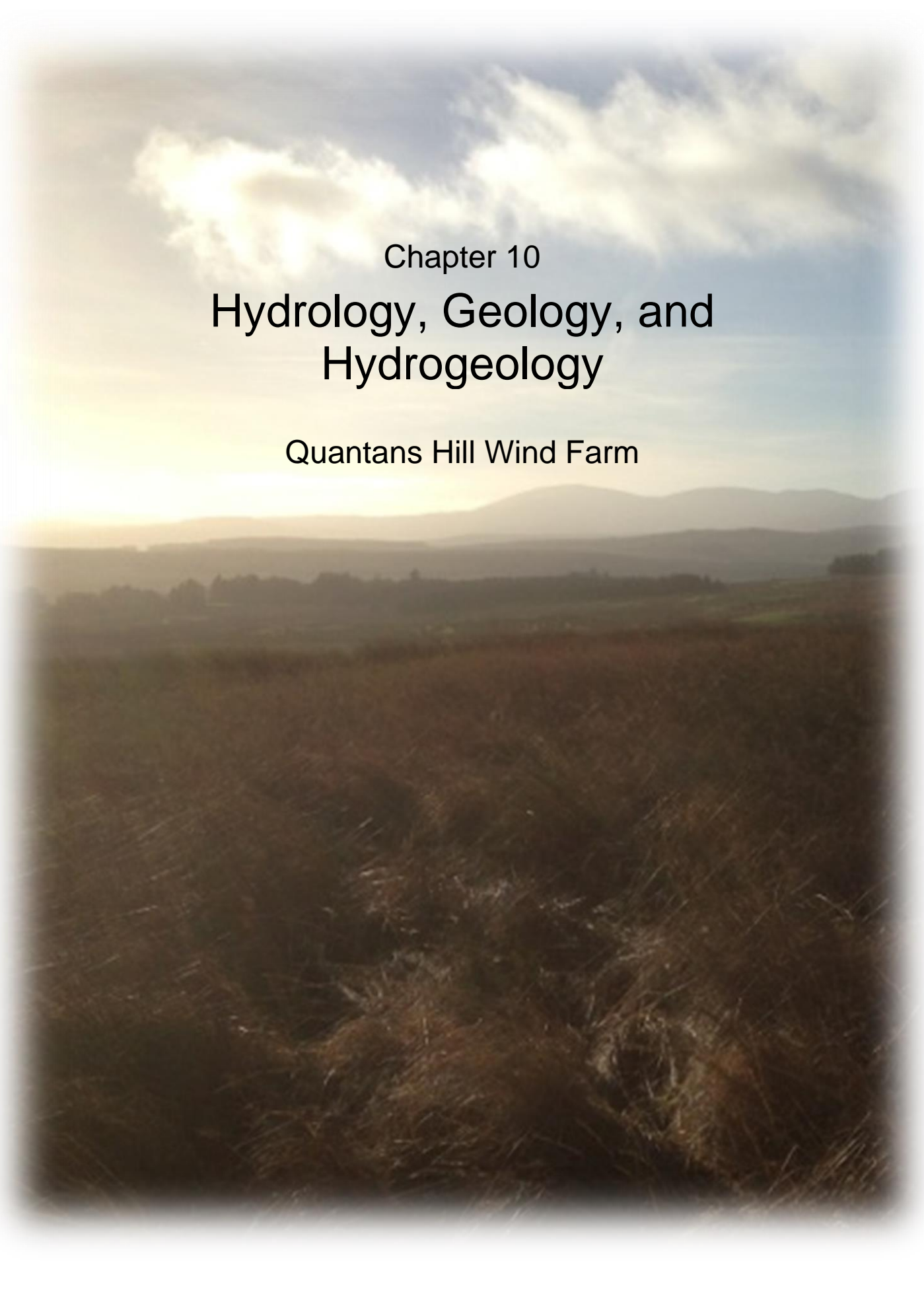
- Disturbance and/or displacement of protected species; and
- Damage, destruction or pollution of protected species habitats/other resources.

Any proposed mitigation measures will be developed in conjunction with industry best-practice standards. In keeping with the principle of proportionate EIA, only summary data and methodologies will be included within Chapters. Other detailed methods and data will be provided in technical appendices or on request as considered appropriate.

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***Does SNH agree with this approach?***

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Chapter 10  
Hydrology, Geology, and  
Hydrogeology

Quantans Hill Wind Farm

# 10. Hydrology, Geology and, Hydrogeology

## 10.1. Introduction

As part of the EIAR, a Hydrological, Geological, and Hydrogeological Impact Assessment will be undertaken on those receptors that are likely to experience a significant impact from the construction, operation, and decommissioning of the proposed development.

## 10.2. Embedded Mitigation and Layout Iterations

The design of the proposed development to date has avoided known impacts on hydrological receptors as far as possible through embedded mitigation. Throughout the remainder of the EIAR process and following further survey work and feedback from the consultation process, it may be that the layout presented here in the Scoping Report further develops. Should the 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 any changes that are likely to have a significant impact on the receptor occur 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 and before excluding them from the EIAR.

Section 8 contains further general information about embedded mitigation.

### 10.2.1. Mitigation by Design

A series of buffer distances have been adopted to help reduce effects of the proposed development on the hydrological environment. As the design process evolves, a 50m buffer will be ensured for all identified natural hydrological features. Infrastructure will be located outwith this buffer except where access necessitates.

Watercourse crossings associated with the new access track required as part of the proposed development will be minimised as far as practicable.

### 10.2.2. Good Practice Mitigation

Mitigation will follow the well-established principles of industry good practice so as to prevent or minimise effects on the surface and groundwater environment. The following good practice principles will be included as part of the embedded mitigation:

- Drainage – all runoff derived from works associated with the proposed development will not be allowed to directly enter the natural drainage network. All runoff will be adequately treated via a suitably designed drainage scheme with appropriate sediment and pollution management measures. The proposed development is situated in an upland hydrological area and it is imperative that the drainage infrastructure is designed to accommodate storm flows based on a 1-in-200 year event + climate change to help maintain the existing hydrological regime.
- Storage – all soil/peat stockpiles as well as equipment, materials and chemicals will be stored well away from any watercourses. Chemical, fuel, and oil stores will be sited on impervious bases with a secured bund. No fuels, chemicals, or oils would be stored in the catchment of the Benloch Burn owing to its status as a Drinking Water Protected Area (DWPA).
- Vehicles and refuelling – standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. Where practicable, refuelling of vehicles and machinery will be carried out in designated areas, on an impermeable surface, and well away from any watercourse.
- Maintenance – only emergency maintenance to construction plant will be carried out within the Planning Application Boundary, in designated areas, on an impermeable surface well away from any watercourse or drainage, unless vehicles have broken down necessitating maintenance at the point of breakdown, where special precautions will be taken.
- Welfare facilities – on-site welfare facilities will be adequately designed and maintained to ensure all sewage is disposed of appropriately. This may take the form of a soakaway or tankering and off-site disposal depending on the suitability of the site for a soakaway and only with prior agreement with SEPA.
- Cement and concrete – fresh concrete and cement are alkaline and corrosive and can be lethal to aquatic life. The use of wet concrete in and around watercourses will be avoided and elsewhere carefully controlled.
- Monitoring Plan – all activities undertaken as part of the proposed development will be monitored



throughout the construction phase. Such monitoring will be to ensure environmental compliance.

- Contingency plans – plans will ensure that emergency equipment is available on site i.e. spill kits and absorbent materials, advice on action to be taken and who should be informed in the event of a pollution incident.
- Training – All relevant staff personnel will be trained in both normal operating and emergency procedures and will be made aware of highly sensitive areas on site.

Further details on specific mitigation requirements will be provided as part of the EIAR. This is likely to include the preparation of a site specific Construction Environmental Management Plan (CEMP) as well as associated appendices, including but not limited to, a peat slide risk assessment, a peat management plan, a watercourse crossing assessment and hydrological monitoring plan. Under the Water Environment (Miscellaneous) (Scotland) Regulations 2017, amendments were made to the Controlled Activities Regulations (CAR) and the proposed development will require a construction site licence for water management across the entirety of the wind farm site prior to any construction works taking place, including enabling works. No work will be able to commence on site until a Pollution Prevention Plan (PPP) has been prepared and agreed with Scottish Environment Protection Agency (SEPA).

## 10.3. Legislation and Guidance

### 10.3.1. International Legislation and Policy

The assessment takes into account the requirements of the Water Framework Directive (2000/60/EC) (WFD). The WFD aims to protect and enhance the quality of surface freshwater (including lakes, rivers, and streams), groundwater, groundwater dependent terrestrial ecosystems (GWDTE), estuaries, and coastal waters. The key objectives of the WFD relevant to this assessment are:

- To prevent deterioration and enhance aquatic ecosystems; and
- To establish a framework of protection of surface freshwater and groundwater.

The WFD resulted in The Water Environment and Water Services (Scotland) Act 2003, which gave Scottish Ministers powers to introduce regulatory controls over water activities in order to protect, improve and promote sustainable use of Scotland's water environment. These regulatory controls, in the form of The Water Environment (Controlled Activities) (Scotland)

Regulations 2011 (as amended) or CAR, made it an offence to undertake the following activities without a CAR authorisation:

- Discharges to all wetlands, surface waters and groundwaters;
- Disposal to land;
- Abstractions from all wetlands, surface waters and groundwaters;
- Impoundments (dams and weirs) of rivers, lochs, wetlands; and
- Engineering works in inland waters and wetlands.

### 10.3.2. National & Regional Legislation and Policy

The assessment takes into account the following legislation and policy:

- The Water Environment and Water Services (Scotland) Act 2003;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- Flood Risk Management (Scotland) Act 2009;
- The Water Supply (Water Quality) (Scotland) Regulations 2001;
- Private Water Supplies (Scotland) Regulations 2006;
- Part IIa of the Environment Protection Act 1990;
- Waste Management Licensing Regulations 1994;
- Pollution Prevention and Control Regulations (Scotland 2000); and
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.
- Scottish Planning Policy (2014);
- Land Use Planning System (LUPS) Guidance Note 4: Planning Guidance on Onshore Windfarm Developments;
- LUPS Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems; and
- SEPA Policies:
  - No. 19 Groundwater Protection Policy for Scotland;
  - No. 22 Flood Risk Assessment Strategy;
  - No. 41 Development at Risk of Flooding: Advice and Consultation;
  - No. 54 Land Protection Policy; and
  - No. 61 Control of Priority & Dangerous Substances & Specific Pollutants in the Water Environment.

### 10.3.3. Other Guidance and Best Practice

Table 12.1 lists other key guidance and best practice documentation relevant to assessment.

| TOPIC  | SOURCE OF INFORMATION  |
|--|--|
| Scottish Government Planning Advice Notes (PAN's)  | PAN 50: Controlling the Environmental Effects of Surface Mineral Workings.<br>PAN 51 Planning, Environmental Protection and Regulation.<br>PAN 1/2013 Environmental Impact Assessment.<br>PAN 61 Planning and Sustainable Urban Drainage Systems.<br>PAN 79 Water and Drainage.  |
| SEPA Guidance for Pollution Prevention (GPP's) and Pollution Prevention Guidelines (PPG's) | PPG1 General Guide to the Prevention of Water Pollution.<br>GPP2: Above Ground Oil Storage Tanks.<br>GPP4 Treatment and Disposal of Wastewater Where there is no Connection to the Public Foul Sewer.<br>GPP5: Works and maintenance in or near water.<br>PPG6 Working at Construction and Demolition Sites.<br>PPG 7: Safe Storage - The Safe Operation of Refuelling Facilities;<br>GPP 8: Safe Storage and Disposal of Used Oils<br>GPP 13: Vehicle Washing and Cleaning;<br>GPP 21: Pollution Incident Response Planning;<br>GPP 22: Dealing with Spills; and<br>GPP 26 Safe Storage - Drums and Intermediate Bulk Containers. |
| SEPA Position Statements (Published)   | WAT-PS-06-02 Culverting of Watercourses<br>WAT-PS-07-02 Bank Protection<br>WAT SG- 78 Sediment Management Authorisation  |
| Construction Industry Research and Information Association (CIRIA)                         | CIRIA C692 Environmental Good Practice on Site (third edition)<br>CIRIA C753 The SuDS Manual<br>CIRIA C532 Control of Water Pollution from Construction Sites<br>CIRIA C648 Control of Water Pollution from Linear Construction Projects<br>CIRIA C689 Culvert Design and Operation Guide  |

Table 10.1: Guidance and Best Practice

|                  |  |
|------------------|--|
| Other Guidelines | Scottish Renewables Joint Publication, (2019) Good Practice During Wind Farm Construction Version 4<br>FCE, SNH, (2010), Floating Roads on Peat<br>Scottish Renewables, Joint Publication (2012), Development of Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste<br>SEPA, The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), A Practical Guide, Version 8.4, October 2019<br>River Crossings and Migratory Fish: Design Guidance, A Consultation Paper, The Scottish Executive<br>WAT-SG-23: SEPA (2008), Engineering in the Water Environment, Good Practice Guide - Bank Protection Rivers and Lochs, First Edition<br>WAT-SG-25: SEPA (2010), Engineering in the Water Environment, Good Practice Guide, River Crossings, Second Edition<br>WAT-SG-26: SEPA (2010), Engineering in the Water Environment, Good Practice Guide, Sediment Management, First Edition<br>WAT-SG-31: SEPA, (2006) Special Requirements for Civil Engineering Contracts for the Prevention of Pollution, Version 2 |
|------------------|--|

Table 10.1: Guidance and Best Practice

## 10.4. Desk Based Studies

The following sections summarises the work that has been undertaken to inform the details presented in this Scoping Report.

### 10.4.1. Surface Water Hydrology

The general position of the proposed development means that the site is situated on the localised Water of Deugh hydrological networks and is part of the main Water of Ken and River Dee catchments. There are six main burns which supply these networks situated in and around the proposed development area (Benloch Burn, Knockgray Burn, Furmiston Lane, Rothay Burn, Marbrack Burn and Polshagg Burn).

These catchments along with the additional detail taken from the Flood Estimation Handbook (FEH) web service are summarised below.

| Catchment Name | Downstream Network Name | AREA /km <sup>2</sup> | ALTBAR /m AOD | BFI HOST | SAAR mm yr <sup>-1</sup> | SPR (%) |
|----------------|-------------------------|-----------------------|---------------|----------|--------------------------|---------|
| Benlock Burn   | Water of Deugh          | 4.16                  | 457           | 0.353    | 1808                     | 50.6    |
| Polhay Burn    | Water of Deugh          | 2.13                  | 322           | 0.348    | 1680                     | 50.8    |
| Marbrack Burn  | Water of Deugh          | 5.81                  | 349           | 0.321    | 1759                     | 53.0    |

Table 10.2: Summary of catchments within the proposed development. Source: FEH Web Service. ALTBAR – Average Altitude in the catchment, BFI HOST – Base Flow Index (0 [low] to 1[high]), SAAR – Standard Annual Average Rainfall, SPR – Standard Percentage Runoff.

The catchments situated in and around the proposed development are typical of the type of upland watersheds within Southern Uplands, being high in altitude (349 – 457m AOD) with a correspondingly high average rainfall volume (1680 – 1808mm yr<sup>-1</sup>).

The BFI is a measure of the proportion of a catchment's long-term runoff that derives from stored sources, with the BFI ranging from 0.10 in relatively impermeable clay catchments to 0.99 in highly permeable catchments. The BFI for the site catchments indicates that around a third of the catchments long-term runoff is derived from stored sources. The SPR values represent the percentage of rainfall that is likely to contribute to runoff. The SPR for the site catchments indicates that around a half of the rainfall during an event contributes to runoff. This demonstrates that the site is on moderately impermeable catchments.

#### 10.4.1.1. River Dee Catchments

The main Quantans Hill catchments of Benlock Burn, Polhay Burn and Marbrack Burn drain southwards down the Water of Deugh and through Kendoon Loch becoming the Water of Ken. The Water of Ken flows through Carsfad Loch and Earlistoun Loch before entering Loch Ken and into the River Dee.

The Benloch Burn, located to the west of the proposed development is designated as a Drinking Water Protection Area. This has a catchment area of 4.16km<sup>2</sup>, and is designated as a result of an abstraction for Carsphairn Water Treatment Works (WTW) situated at NX 57943 94991.

#### 10.4.1.2. Quantans Hill Catchments

The Quantans Hill catchments drain south down the River Dee discharging into the Solway Firth. Within the proposed development, the watercourses which supply this network are divided into a number of smaller

catchments discharging into the Water of Deugh. To the south of the proposed development are the Knockgray Burn (0.62km<sup>2</sup>), Furmiston Lane (1.37km<sup>2</sup>) and an unnamed catchment located between these two burns (0.54km<sup>2</sup>) directly south of the confluence of the Polhay and Marbrack Burns, that drains into the Water of Deugh at 259422 591925. The Poldores Burn (3.02km<sup>2</sup>) encroaches on the north eastern perimeter but is up catchment from the proposed development and drains east away from the site into the Poliferie Burn, discharging into the Water of Ken.

#### 10.4.2. Water Quality

Several watercourses within the vicinity of the proposed development have been classified under SEPA's River Basin Management Plans (RBMP) (SEPA 2011). The RBMP are one of the requirements of the Water Framework Directive (WFD) (2000/60/EC) and are the plans designed for protecting and improving the water environment. The details of the watercourses within the proposed development that are classified under the RBMP classification scheme are provided below.

| Designation               | Site name      | Qualifying features | Distance to site boundary |
|---------------------------|----------------|---------------------|---------------------------|
| Poor ecological potential | Water of Deugh | Heavily modified    | 0m                        |
| Bad ecological potential  | Water of Ken   | Heavily modified    | 3km                       |
| Poor ecological potential | Poliferie Burn | N/A                 | 1.5km                     |

Table 10.3: RBMP classification of watercourses in the vicinity of the proposed development

#### 10.4.3. Designated Areas

There is one designated Site of Special Scientific Interest (SSSI) within 5km (Cleugh) and a further two SSSI's within 7km of the proposed development's site boundary (Loch Doon and Merrick Kells).

There are no other designated sites within 10km of the site.

#### 10.4.4. Flood Risk

The Flood Risk Management (Scotland) Act 2009 sets in place a statutory framework for delivering a sustainable and risk-based approach to managing flooding.

Flood information provided by SEPA indicates that within the proposed development area there is a risk from flooding in the Water of Deugh, Marbrack Burn and Benloch Burn catchments (less than 1:10 chance of flooding each year). This risk is mainly associated with

fluvial flooding and appears to be most significant on areas of level ground in the riparian zones and in the base of the corries.

A flood risk assessment will be undertaken as part of the planning application. The assessment will be carried out in accordance with Scottish Planning Policy (SPP). The document states that *“Planning authorities must take the probability of flooding from all sources – (coastal, fluvial (watercourse), pluvial (surface water), groundwater, sewers and blocked culverts) and the risks involved into account when preparing development plans and determining planning applications.”*

**10.4.5. Soils and Peat**

Peat is a soft to very soft, highly compressible, highly porous organic material that can consist of up to 90 – 95% water, with 5 – 10% solid material. Unmodified peat consists of two layers; a surface acrotelm which is usually 10cm – 30cm thick, highly permeable and receptive to rainfall. Decomposition of organic matter within the acrotelm occurs aerobically and rapidly. The acrotelm generally has a high proportion of fibrous material and often forms a crust in dry conditions.

A second layer, or catotelm, lies beneath the acrotelm and forms a stable colloidal substance which is generally impermeable. As a result, the catotelm usually remains saturated with little groundwater flow. Peat is thixotropic, meaning that the viscosity of the material decreases when stress is applied. The thixotropic nature of peat may be considered less important where the peat has been modified through artificial drainage or natural erosion and is drier but will be significant when the peat body is saturated.

The distribution of soils across the site is dependent upon land use, geology, topography and hydrological regime of the area. Information on the site soils has been provided by the James Hutton Institute, specifically from its online Soil Information for Scottish Soils (SIFSS) portal.

| Soil Association | Parent Material   | Component Soils   |
|------------------|---|---|
| ETTRICK          | Drifts derived from Lower Paleozoic greywackes and shales | Peaty gleyed podzols with peaty gleys and dystrophic peat |
| ORGANIC SOILS    | Organic deposits  | Dystrophic blanket peat                                   |

Table 10.5: Summary of Soil Types

The above soils information indicates that peat is present in the area occupied by the proposed development. Site survey work would be needed to confirm the presence and depth of peat on site. The completion of such works will support the completion of the EIAR and associated technical appendices including a peat management plan and peat side risk assessment.

**10.4.6. Bedrock Geology**

According to the 1:50,000 scale British Geological Survey (BGS) Bedrock Geology Sheet, the site is predominantly underlain by a Portpatrick Formation Wacke and Siltstone Turbidite succession, conformably overlying the Hartfell Shale Formation. The central to north-western sections are underlain by a shallow layer of Quartzose Wacke and Conglomerate Turbidite unit (0-500 m) and the western to north-western part of the proposed development is dominated by deeper sequence of Sandstone and Siltstone from the Kirkcolm Formation, which is likely to be ~4500m in vertical thickness.

There are no apparent registered geologically derived Sites of Special Scientific Importance within the site boundary or with a 500m buffer.

**10.4.7. Superficial Geology**

According to the 1:50,000 scale BGS Superficial Drift Sheet the solid bedrock is likely to be overlain by an assemblage or post glacial quaternary deposits comprising of sands, gravels, clays and areas of peat. It appears that most of these deposits are mapped to be within the confines of the valley bottoms and sides with no deposits mapped to be on the hill tops themselves. It is anticipated the general succession of facies is likely to be a layer of peat underlain by alluvial sediments such as sands and gravels, then glacially derived sands and gravels which may also have a clay matrix.

**10.5. Hydrogeology**

According to the 1:625,000 scale BGS Hydrogeology Sheet the site is underlain by a low productivity aquifer with limited resource potential. This is on account of both the Queensberry Formation and the Gala Unit 4 bedrock being well cemented and highly indurated, being consequently very low in permeability. Notwithstanding, the aquifer underlying most of the site, Upper Clyde, is classified by SEPA as being in ‘Poor’ condition on account of the historic mining and quarrying of materials in the area. The adjacent Annerdale aquifer is classed as being in ‘good’ condition. The Annerdale bedrock aquifer is also classified as a Drinking Water Protection Zone.

Given the low porosity of the underlying bedrock, it is possible that groundwater may exist within the

weathered zone in fractures, or in superficial sands and gravel deposits. The volume of water corresponding to the aquifer transmissivity will be a primary function of the effective porosity derived from the content of clays and silts. Since most of these deposits are mapped to be around watercourses it is likely these locations may well support perched aquifers, supplying baseflow to some of the catchments. These may also support species and be considered as groundwater dependant terrestrial ecosystems (GWDTE), which again will require further assessment during the completion of the EIAR.

# Chapter 11

## Population and Human Health

### Quantans Hill Wind Farm

# 11. Population and Human Health

A requirement of the EIA Regulations is to consider potential effects upon population and human health. These have typically been assessed in the past but under different headings and are now brought together under the same umbrella. Issues considered under this topic include:

- Noise;
- Shadow flicker;
- Ice throw;
- Lightning;
- Private water supplies; and
- Socio-economics

## 11.1. Noise

As part of the EIA, a noise assessment will be undertaken by a suitably experienced and qualified noise consultant.

Noise and vibration will occur during the construction, operation, and de-commissioning of the proposed development. The extent to which this is significant depends on the noise sources, in each case, and the distance of each of the noise sources to noise sensitive receptors.

Noise sensitive receptors in this case are considered to be residential properties, those identified at this stage are noted on Figure 3 (Site Constraints). During the construction and de-commissioning phases, the effects can be divided into noise and vibration from on-site activities and from construction traffic accessing the site. During operation, noise is generated by the turbines as they rotate with noise output depending on wind speed. Vehicle movements during operation (for maintenance for example) can be considered insignificant in terms of noise impact due to the relatively small number of movements of primarily smaller vehicles. For on-site construction noise and operational noise at different wind speeds, the levels received at residential properties will depend on wind direction.

The site location is rural and remote and residential properties around the site are likely to be free of any noise of human origin except for road noise from the A713 and B729 as well as occasional air traffic and operation of forestry and farm machinery. Any road noise as well as noise relating to forestry is more likely to be significant for properties to the south and west of the proposed development. Such other noise as there is, is likely to be from animals and birds and from wind around trees and foliage, depending on wind speed.

### 11.1.1. Planning Policy and Guidance on Noise Issues

The principal planning guidance on noise is contained in Planning Advice Note (PAN) 1/2011, Planning and Noise, which contains advice on assessment of noise from new sources as well as the effects of noise on new residential development. For construction noise it refers to the Control of Pollution Act and the Pollution and Prevention Control Act 1999 for relevant installations. The accompanying Technical Advice Note, Assessment of Noise, lists BS 5228, Noise and Vibration Control on Construction and Open Sites as being applicable for Environmental Impact Assessment (EIA) and planning purposes. In respect of operational noise from wind farms, PAN 1/2011 refers to 'web based planning advice' on renewables technologies which in turn refers to ETSU-R-97, The Assessment and Rating of Noise from Wind Farms (ETSU-R-97), as the appropriate method for assessment of operational noise. Additional guidance on assessment of operational noise is contained in the UK Institute of Acoustics (IOA) document Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (GPG) which has been endorsed by the Cabinet Secretary for Finance, Employment and Sustainable Growth of the Scottish Government.

### 11.1.2. Assessment Methodology

#### 11.1.2.1. Construction Noise

Construction noise is temporary and an assessment of the potential noise associated with construction of the original Quantans Hill wind farm indicated that noise associated with such activity would be limited to acceptable levels. It is considered that potential construction noise effects are not significant and can be scoped out.

---

#### ***Can consultees agree for construction noise to be scoped out of EIA?***

---

#### 11.1.2.2. Operational Noise

Operational noise will be assessed according to the requirements of ETSU-R-97 as clarified and refined by the UK IOA GPG. The ETSU-R-97 methodology sets noise limits for the day and night-time periods by carrying out measurements of baseline/background noise and wind speed and deriving 'prevailing' background noise levels from the results, with limits set at 5dB above this subject to lower limiting values which are different for day and night periods or where properties are deemed to be 'financially involved' with the development. Background noise monitoring was undertaken at 10 residential properties in the vicinity of the site in 2012 as part of the EIA for the original Quantans Hill wind farm. It is proposed to re-analyse that previous baseline data for informing a fresh operational noise assessment.

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***Can consultees agree that baseline noise monitoring does not need repeated? If there are additional locations considered necessary for recording, please specify.***

---

## 11.2. Shadow Flicker

It is proposed that shadow flicker can be scoped out if the final layout for proposed turbines are further than 10 rotor diameters from potential receptors. If this situation cannot be avoided, shadow flicker will be calculated using WindFarmer software for a single given turbine layout and set turbine dimensions. Shadow flicker will be calculated assuming:

- There are clear skies every day of the year;
- The turbines are always rotating;
- The sun can be represented as a single point;
- The blades of the turbines are always perpendicular to the direction of the line of sight from the specified location to the sun.

---

***Do consultees agree with the proposed scope for shadow flicker?***

---

## 11.3. Ice Throw

Ice throw is the process of ice falling or being launched from the blades of a turbine. As imbedded mitigation, the turbines will have sensors on them to detect the build-up of ice and automatically prevent the turbines spinning when ice has developed on them, thus preventing the ice being thrown. Scottish Government's Onshore Wind Farm Advice Sheet states that danger to human or animal life from falling parts or ice is rare. Ice throw will not be assessed in the EIA.

## 11.4. Lightning

As stated in Scottish Government's Onshore Wind Farm Advice Sheet, the danger to human or animal life from lightning strike via a turbine is rare since lightning is directed down the turbine to the earth; the turbine itself being earthed. Maintenance of the turbines would not be undertaken during high lightning risk weather conditions. Lightning will not be assessed in the EIA.

## 11.5. Water Supply

The Hydrology chapter of the EIAR will present the relevant hydrological assessment. It will inform a brief assessment upon human health in the Population and Human Health chapter of the EIAR.

### 11.5.1. Private Water Supplies

The EIA for the original Quantans Hill wind farm identified 84 registered private water supplies (PWS) within 5km of the site and none within. Increased sediment erosion as a result of wind farm construction and decommissioning can have significant impacts on the quality, quantity and continuity of water supply to the properties. Dumfries and Galloway Council is requested to provide a fresh list of PWS to allow a gap analysis of the potential effects on PWS by the proposed development. Potential effects will be assessed in the EIAR and appropriate mitigation would be proposed.

### 11.5.2. Public Water Supplies

The EIA for the original Quantans Hill wind farm identified one public water supply; the Scottish Water Carsphairn Water Supply. The EIA predicted there would be no significant adverse effects upon this asset. The applicant would consult with Scottish Water during the EIA process to ensure this asset remains safeguarded.

## 11.6. Socio-Economic Assessment

### 11.6.1. Introduction

Consideration of sustainable economic development has become a cornerstone of government policy and a key driver of the planning system in recent years. The underlying socio-economic wellbeing of an area is also itself a driver in terms of population change. The EIA will therefore include a socio-economic assessment to ensure the balance between economic, social and environmental effects can be properly assessed.

A report issued by BiGGAR Economics in 2016 concludes that there is no relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at local authority level nor in the areas immediately surrounding wind farm development. The EIA for the original Quantans Hill wind farm did not report any significant effects upon tourism and it is intended to scope out any specific assessment of tourism from the EIA.



### 11.6.2. Methodology

Instead we propose that the socio-economic assessment would be based upon 3 economic boundaries (local, regional and national economy) will include the following:

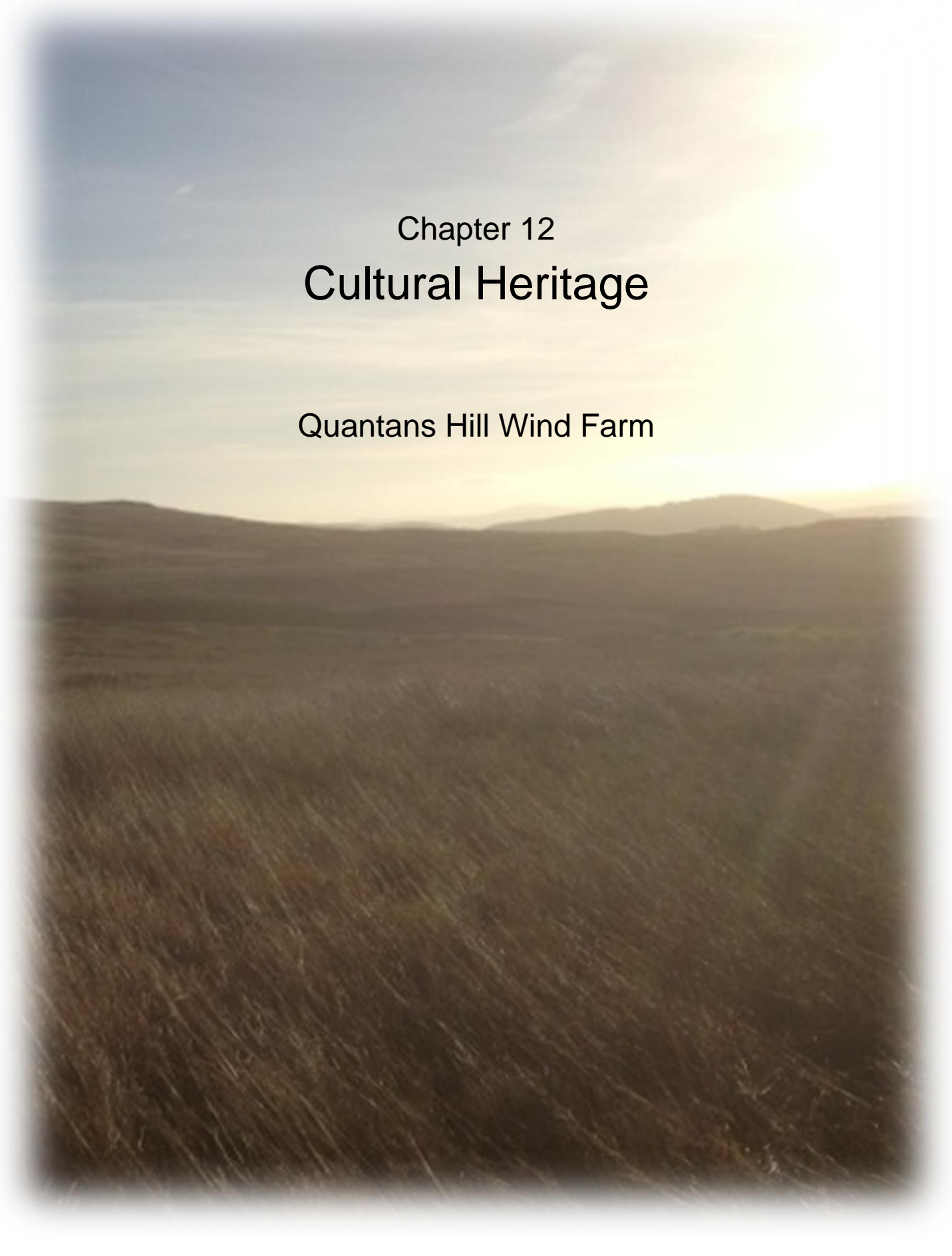
- assess the existing economic environment using official data on population, industrial structure, unemployment and economic activity levels, income and earnings;
- assess the potential economic effects during the development and construction phase of the project including direct employment, supplier effects and income effects;
- assess the potential economic effects during the operation of the wind farm including direct employment, supplier effects and income effects;
- assess the economic affects arising from infrastructure improvements, payment of business rates, and potential community benefits; and
- consider and report on mitigation and management measures which could be employed to minimise any negative impacts and maximise potential positive impacts.

### 11.6.3. Analysis

As part of the proposed socio-economic assessment, the social and economic effects associated with the proposed development will be identified. Information potentially contained in this section may include the following:

- Direct and supply chain impacts;
- The total amounts predicted to be spent in terms of construction and operation;
- Predicted numbers of jobs supported in the operational phase;
- Predicted spending on accommodation & local businesses – details of accommodation stayed in by construction workers;
- Environmental benefits - electricity generated annually (MWh);
- Case studies of particular businesses – details of Scottish based Tier 1 suppliers; and
- Investment in transport infrastructure – details of any investments that have been made.

This analysis will help inform the prediction of the likely social and economic effects associated with the proposed development.



Chapter 12  
Cultural Heritage

Quantans Hill Wind Farm

## 12. Cultural Heritage

### 12.1. Introduction

As part of the EIA, a Cultural Heritage Assessment will be undertaken by a suitable qualified consultant. The assessment will be conducted with reference to the relevant statutory and planning frameworks for cultural heritage. Legislation includes:

- The Ancient Monuments and Archaeological Areas Act 1979;
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997;
- The Town and Country Planning (General Development Procedure) (Scotland) Order 1992; and,
- The Electricity Act 1989 (Schedule 9).

The primary planning policy and guidance comprises: Historic Environment Scotland Policy Statement (HESPS), Scottish Planning Policy (SPP) and PAN 2/2011 at the national level; and the Dumfries and Galloway Council Development Plan at the local level.

The Environmental Statement for the original Quantans Wind Farm found no designated cultural heritage assets are located within the Inner Study Area (within the site boundary). A total of 15 cultural heritage assets were found to be located within the Inner Study Area. Six of these assets were recorded in the Dumfries and Galloway Historic Environment Record (HER), with an additional nine assets have been recorded through the examination of maps or during the walkover survey. These consisted of clearance cairns, dykes, mounds, sheep folds and other examples of features and enclosures.

There were eight scheduled monuments located within the Middle Study Area (the middle study area being 5km from the original Quantans site boundary). These include five prehistoric sites, comprising three prehistoric burial cairns, a standing stone and stone circle and a hill fort. There are two scheduled cross slabs dating back to the medieval period. The early industrial remains of the lead mines and smelter at Woodhead are also scheduled.

The outer study area was based on the Zone of Theoretical Visibility (ZTV), as defined in Section 6 of the original Quantans Wind Farm ES Landscape and Visual Impact Assessment, within which cultural heritage assets were highlighted.

Here cultural heritage assets highlighted specifically by consultees or identified as being at risk of significant effects upon setting were considered.

### 12.2. Scope of Works

When preparing an Environmental Impact Assessment Report (EIAR) chapter which will address the potential cultural heritage impacts resulting from the proposed development the scope of work is proposed to include:

- Desk-based research which will draw upon information held by Historic Environment Scotland (HES), the National Library of Scotland (NLS) and the Dumfries and Galloway Historic Environment Record (HER).
- Carrying out a detailed walkover survey of the site where previously not surveyed, undertaken by two archaeological surveyors.
- Undertaking site visits to assess the potential for impacts upon the settings of both designated heritage assets and nationally important non-designated assets.
- Undertaking pre-application consultation with HES and The Dumfries and Galloway Council Archaeology Service (DGCAS). The scope of these consultations would include identifying required visualisations and discussing mitigation options.

The proposed development lies within an area of known archaeological remains dating from the prehistoric period to the Second World War, including six Scheduled Monuments which lie within 2.5km; Craigengillan Cairn (SM2238); Stroanfreggan Craig Fort (SM1095), Cairn Avel (SM1006), the Braidenoch Hill Cross Slabs (SM1105), the Holm of Daltallochan, Stone Circle and Standing Stone (SM1029) and Cross Slab (SM1106). A selection of non-designated assets, a number of which are considered by DGCAS to be nationally important, are also located within the vicinity of the site and will require consideration.

### 12.3. Proposed Methodology

Archaeological assessment will comply with both national and local planning policy and guidance as well as the professional standards of the Chartered Institute for Archaeologists.

#### 12.3.1. Baseline Methodology

A desk-based assessment would be undertaken in order to identify any previously unrecorded remains through

map regression and examination of vertical aerial photographs held by the National Collection of Aerial Photographs as well as readily available online satellite digital imagery (Google Earth, ESRI mapping).

A walkover survey will be undertaken by archaeologists walking in transects across new areas of the site where previously not surveyed. The aim of the survey will be to assess the significance and extent of remains identified through desk-based assessment and to identify any hitherto unrecorded remains that might be present within the proposed development footprint.

The extent of previously known or newly recorded heritage assets encountered during the survey will be recorded on site using a handheld GPS/iGIS or ArcGIS Collector as appropriate. Photographs will be taken of any such assets identified, and sketch plans will be produced if appropriate. A written description of the assets including information about their extent, significance and character will also be completed.

The Setting Assessment will include identification of all designated heritage assets within 5km of the site boundary and Nationally Important designated assets (as recorded by HES) within 10km of the site boundary. Site visits will be undertaken to assets which would potentially be impacted (as per the sites identified and ZTV mapping supplied by the client). Dumfries and Galloway Council locally designated Archaeological Sensitive Areas will also be considered. Any non-designated assets, such as those which DGCAS consider to be non-statutory assets of national importance, which require assessment or any designated assets beyond 10km, that require assessment will be agreed via scoping or in consultation with HES and DGCAS.

The setting assessment will be undertaken with reference to Historic Environment Scotland's setting guidance (2016) and will aim to establish the current setting of the identified heritage assets, how that setting contributes to the understanding, appreciation and experience of those assets and how the proposed development could impact upon this.

The following information sources will be consulted:

- The Dumfries and Galloway Historic Environment Record (Dumfries and Galloway Council)
- The National Record of the Historic Environment (Historic Environment Scotland (HES))
- Designated asset downloads (HES)
- The National Collection of Aerial Photography (HES)

- The National Library of Scotland (for historic mapping, including superseded Ordnance Survey editions).
- Available LiDAR data

The cultural heritage assessment will also draw upon the results of previous work on the site, by other consultants as well as work on other proposed sites situated nearby.

### 12.3.2. Assessment Methodology

In undertaking the impact assessment the following assessment method to establish the sensitivity of heritage receptors, the magnitude of impact and the significance of effect.

- Cultural Heritage Value – the method of classifying cultural heritage value will be guided by the classification criteria used nationally by Historic Environment Scotland in designating Scheduled Monuments, Listed Buildings and Inventory sites. This will involve consideration of the asset's cultural heritage value and will include consideration of factors such as their type, age, rarity, group value, site context, historical associations (i.e. with well-known persons or historical events), quality, character and style of construction and condition.

- Magnitude of Impact - the classification of the magnitude of impact on cultural heritage assets will be rigorous and based on consistent criteria. This will take account of such factors as the physical scale and type of disturbance to them and whether features or evidence would be lost that is fundamental to their historic character and integrity.

- Level of Effect – the method for rating the level of effect on each cultural heritage asset will be based on a matrix that is a function of the cultural heritage value and/or relative sensitivity to changes to setting and magnitude of impact for each site. Classifications of significance of impact follow EIA regulations and generally include None, Neutral, Negligible, Minor, Minor-Moderate, Moderate, Moderate-Major, and Major.

A cumulative impact assessment will be included in the assessment.

## 12.4. Key Planning Policy and Guidance

Legislation concerning the protection and conservation of cultural heritage assets includes:

- Ancient Monuments and Archaeological Areas Act<sup>6</sup>;
- Town and Country Planning (Scotland) Act, as amended in the Planning (Listed Buildings and Conservation Areas) (Scotland) Act and as modified by the Historic Environment (Amendment) (Scotland) Act,<sup>7</sup> and
- Historic Environment Scotland Act 2014.<sup>8</sup>

Relevant planning policy and guidance concerning cultural heritage matters includes:

- The National Planning Framework for Scotland (NPF3);<sup>9</sup>
- Scottish Planning Policy (SPP);<sup>10</sup>
- Historic Environment Policy for Scotland (HEPS);<sup>11</sup>
- Planning Advice Note 2/2011 (PAN 2);<sup>12</sup>
- Chartered Institute for Archaeologists (CIfA) Standards and Guidance for commissioning work and providing consultancy advice on archaeology and the historic environment;<sup>13</sup> and Standards and Guidance for historic environment desk-based assessment;<sup>14</sup>
- The Dumfries and Galloway Local Plan 2 (LDP2);<sup>15</sup> and
- Change in the Historic Environment: Setting.<sup>16</sup>

## 12.5. Mitigation

As previously mentioned the undertaking of pre-application consultation with HES and The Dumfries and Galloway Council Archaeology Service (DGCAS) will work to identify required visualisations and discuss mitigation options. Work will also be undertaken to identify any direct or setting effects that could potentially

result from the proposed development and developing a proposed mitigation strategy as required.

The proposed development will seek to avoid direct impacts upon any known heritage assets during construction through careful siting of infrastructure and, where appropriate, fencing off known heritage assets. The finalised turbine array and access track layout will be informed by the results of the archaeological walkover survey and wherever possible direct impacts upon heritage assets will be avoided or minimised during the iterative design process. This could include rerouting and micro-siting so as to avoid direct impacts upon identified archaeological assets.

Where impacts cannot be entirely avoided, or where the potential for previously unrecorded buried remains cannot be excluded then a programme of archaeological work is likely to be required and the proposed archaeology and cultural heritage chapter include a detailed mitigation strategy developed in consultation with the Council Archaeologist at Dumfries and Galloway Council and, if their input is required, Historic Environment Scotland. The overall objective would be to develop appropriate design responses or mitigation measures required to avoid, minimise or offset significant effects.

Full assessment of the potential for indirect impacts will only be undertaken in cases where ZTV analysis suggests either that the proposed development could be visible from the asset or that it could appear in key views which include the asset. It is not possible to assess indirect impacts in detail prior to the finalising of the design of the proposed development and the preparation of the ZTV. It would be advised that all assets within the ZTV are subject to site visits, to better inform the assessment of the indirect impact of the proposed development.

<sup>6</sup> UK Government, 1979

<sup>7</sup> UK Government, 1997

<sup>8</sup> Scottish Government, 2014

<sup>9</sup> Scottish Government, 2014

<sup>10</sup> Scottish Government, 2014

<sup>11</sup> Historic Environment Scotland (HES). (2019a). Historic Environment Policy for Scotland (HESP). [https://www.historicenvironment.scot/advice-Chartered-Institute-for-Archaeologists-\(CIfA\)-\(2014\).-Available-at-https://www.archaeologists.net/codes/cifa-\(03/02/2020\)-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/\(03/02/2020\)](https://www.historicenvironment.scot/advice-Chartered-Institute-for-Archaeologists-(CIfA)-(2014).-Available-at-https://www.archaeologists.net/codes/cifa-(03/02/2020)-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/(03/02/2020))

<sup>12</sup> Scottish Government, 2011

<sup>13</sup> Chartered Institute for Archaeologists (CIfA) (2014). Available at: [https://www.archaeologists.net/codes/cifa-\(03/02/2020\)](https://www.archaeologists.net/codes/cifa-(03/02/2020))

<sup>14</sup> Chartered Institute for Archaeologists (CIfA) (2017). Available at: [https://www.archaeologists.net/codes/cifa-\(03/02/2020\)](https://www.archaeologists.net/codes/cifa-(03/02/2020))

<sup>15</sup> Dumfries and Galloway (2019) Local Development Plan 2. Available at: [https://www.dumgal.gov.uk/ldp2-\(03/02/2020\)](https://www.dumgal.gov.uk/ldp2-(03/02/2020))

<sup>16</sup> Historic Environment. [https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549-\(03/02/2020\)](https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549-(03/02/2020))



Chapter 13  
Traffic and Transport

Quantans Hill Wind Farm

## 13. Traffic and Transport

### 13.1. Objective

The objective of the Traffic and Transport Assessment is to assess the impact associated with Quantans Hill wind farm on the public road network, including physical constraints, through an Access Route Assessment; impact on existing traffic levels through a Traffic Impact Assessment (TIA), and management of construction phase traffic through a preliminary Traffic Management Plan (TMP).

The proposed access route for the Quantans Hill wind farm development, as identified previously and used for other wind farm developments in the area, would be via the A713. It is expected that the A713 would be reached via the A77(M), with the port of entry being either Ayr or Kind George V docks in Glasgow. This route is the same abnormal load route to site as proposed in the neighbouring Shepherds Rig application. The difference being that the Quantans Hill wind farm proposal does not require use of the B729 for as great a distance from leaving the A713.

### 13.2. Access Route Assessment Scope

Assessments for inclusion within the planning submission will be undertaken to determine suitable routes for abnormal load access and general HGV construction traffic. These assessments will include the following:

- Abnormal load access assessment from potential ports of entry to the site access point, to determine potential constraints along entirety of proposed access route. This will include:
  - Identification of port options;
  - Identification of abnormal access route;
  - Swept Path Analysis to determine extent of constraints identified;
  - Consultation with the local roads authority to establish weight restrictions on identified structures.
- Identification of construction material sources (e.g. quarries) and possible routes to site for HGVs, for use in the Traffic Impact Assessment.

### 13.3. Traffic Impact Assessment Scope

An assessment of the traffic impact will be undertaken for the proposed scheme using the relevant project specific information. The methodology for the assessment would comply with all latest guidance, as relevant, including the Guidelines for the Environmental Assessment of Road Traffic (IEMA 1993) and Transport Scotland Guidance on Transport Assessment.

The methodology used for the assessment will be as follows:

- The geographic extent of the study will be confirmed in consultation with the relevant roads and highways authorities and will generally consist of the local road network where sensitive receptors are evident.
- Baseline traffic data will be used to measure the impact on existing traffic levels, considering the increase in HGVs and LGVs during construction and operation for the proposed scheme which will be derived from detailed project information and professional judgement. Acquisition of traffic count data will be done either by use of the Department for Transport Traffic Count Database, consultation with the local roads authority or commissioning of traffic counts depending on the level of existing information available.
- The assessment of traffic against baseline data will determine the likely impact of project traffic against the criteria set out in IEA Guidance Note 1 and Transport Scotland guidance. If any traffic impact criteria is exceeded, the assessment will recommend suitable mitigation measures. The assessment would consider:
  - Delay effects on other road users (by consideration of percentage changes in traffic composition and volume),
  - Road infrastructure (dilapidation)
  - Safety effects on other road users and adjacent properties, and
  - Safety effects on pedestrians and cyclists (e.g. on routes passing through towns).

The study would consider effects during construction, operation and decommissioning.

## 13.4. Preliminary Traffic Management Plan

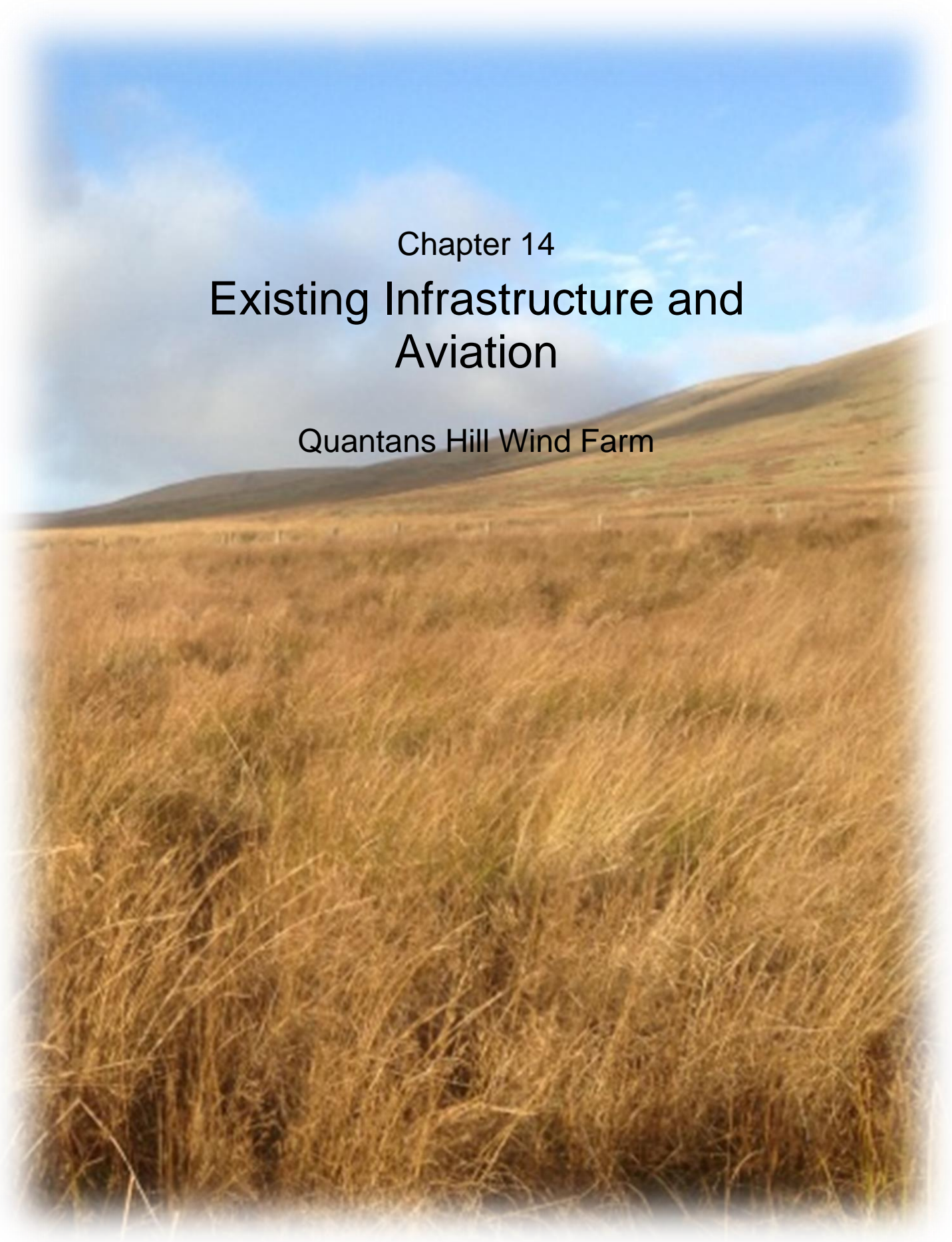
As part of the Traffic and Transport assessment, and in line with any pre-application requirements, a Preliminary Traffic Management Plan will be produced for inclusion in the application. The Traffic Management Plan will generally outline the detail of the works and the associated traffic. It will include aspects such as the standard industry mitigation measures considered for impacts associated with the works, and typical traffic management measures employed for control of traffic on the public road to ensure there are no safety issues or impediments on the public highway.

## 13.5. Traffic and Transport Chapter

A Traffic and Transport EIAR chapter will be produced as part of the EIA and include the following information:

- Traffic Impact Assessment;
- Access Route Report including Swept Path Analysis;
- Preliminary Traffic Management Plan .





Chapter 14  
Existing Infrastructure and  
Aviation

Quantans Hill Wind Farm

## 14. Existing Infrastructure and Aviation

This section of the EIAR will assess the potential impact on any existing infrastructure in the vicinity of the proposed development. The approach to the assessment will be to consult with statutory undertakers and other relevant organisations to ascertain if the proposed development will have an impact on their services and if so, what mitigation if any will be necessary. In this respect, the EIA will consider:

- Civil aviation.
- Military interests including aviation.
- Water, gas and power.
- Existing footpaths including Public Rights of Way and Southern Upland Way.
- Microwave fixed links.
- Telecoms.

### 14.1. Public access

The locations of all footpaths will be considered during the iterative design process. Scoping responses from the local planning authorities and ScotWays will be considered during the final design work to ensure balance between wind optimisation and potential effects on access are addressed. There is a Public Right of Way that traverses the site but does not appear to physically exist on site. Nonetheless, a safe passage across the site will be maintained.

### 14.2. Defence interests

The Ministry of Defence (MoD)/Defence Infrastructure Organisation (DIO) had no objection to the original application for Quantans Hill wind farm. However, that application was for 19 turbines at 130 metres to blade tip. The applicant is engaging with the MoD over the proposed development.

### 14.3. Civil aviation

Both Glasgow Prestwick Airport and NATS stated they would have no objection to the original Quantans Hill wind farm application. However, it is appreciated that stance may change with the proposed development and its increase in size. The applicant is in consultation with NATS.

### 14.4. Telecoms and radiocommunications

Our records indicate a micropath crosses the site although this appears to be at the southwestern end of the site well clear of any potential turbines. Stakeholders responded to the original Quantans Hill with no objection on telecoms grounds. An update to this position will be indicated in the Scoping Opinion. A relevant assessment will be included in the EIAR.

Fixed microwave and scanning telemetry link radio facilities with the potential to be affected by the proposed development will be identified through consultation with Ofcom.

Determination of the impact of the proposed wind turbine on any potentially affected telecommunications facilities will be conducted principally through consultation with the operators of the facilities.

### 14.5. Utilities

Potential utilities including gas and electricity will be investigated and assessed during the EIA with the final layout designed to avoid potential direct effects

Chapter 15  
Synergistic Effects and Summary  
of Mitigation and Residual Effects

Quantans Hill Wind Farm

## 15. Synergistic Effects and Summary of Mitigation and Residual Effects

A concluding chapter will present the key findings from each EIAR chapter and any required mitigation. In line with the EIA Regulations (2017) it will then assess the potential synergistic effects that may occur in combination. This will include an assessment of potential effects on human health caused by the proposed development and will be covered by assessments provided throughout chapters in the EIAR (e.g. Noise, Access, Traffic and Transport, Shadow Flicker, Residential Amenity).

The chapter will identify all mitigation, including the mitigation by design that will be undertaken to reduce any adverse effects and summarise the residual effects regarding all of the proposed work in relation to the construction, operation and decommissioning of the proposed development.

# Chapter 16

## EIAR Accompanying Documents

### Quantans Hill Wind Farm

## 16. EIAR Accompanying Documents

### 16.1. Non-Technical Summary (NTS)

The NTS details the main components of the proposed development and summarises the main findings of the environmental studies carried out to build and operate the proposed development. It is designed to be an easily readable document that will communicate the main elements of the EIA to any interested party without the need for the reader to have specialist background knowledge. It will also contain maps that show the extent and geographical location of the development.

### 16.2. Planning, Design & Access Statement (PDAS)

A PDAS may be produced and would seek to highlight the design principles and concepts behind the proposed development. It would detail how the developer has applied these principles to the proposed development in tandem with input from consultation activities and would review how successful the proposed development has been in realising the design strategy.

The PDAS will also provide a commentary of the EIA findings and assess the proposed development accounting for residual effects (both positive and negative) against national policy and legislation, the Development Plan and other material planning considerations relevant to the proposed development.

### 16.3. Pre-Application Consultation (PAC) Report

Although not a statutory requirement for applications submitted under Section 36 of the Electricity Act 1989, the applicant intends to submit a PAC Report to accompany the application.

It is proposed that the legislation and best practice guidance in relation to public consultation for Major Developments will be broadly followed as contained in PAN 3/2010 - Community Engagement - Planning with People.

The PAC report would:

- outline the scope of the consultation programme including when and who has been consulted;
- confirm how the consultation programme meets the best practice standards;
- set out how the applicant has responded to the comments made, including whether and the extent to which the proposals have changed as a result of PAC;
- 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 response from such events;
- demonstrate that steps were taken to explain the nature of PAC i.e. that it does not replace the application process whereby representations can be made to the planning authority; and
- make an assessment of the success of the Pre-application Consultation activities.

Chapter 17  
Responding to this Scoping  
Report

Quantans Hill Wind Farm



## 17. Responding to this Scoping Report

Consultee responses to this report should be directed to the Energy Consents Unit which will form a Scoping Opinion. The ECU can be contacted via email:

[Econsents\\_Admin@gov.scot](mailto:Econsents_Admin@gov.scot)

The Applicant will welcome such responses to inform the scope of EIA to be undertaken for the proposed development and further consultation to be undertaken with each consultee as the EIA progresses.

- Do consultees agree with the scope of survey proposed (Ecology)?
- Can SNH agree with this approach (Ecology as outlined at the end of chapter 9)?
- Can consultees agree for construction noise to be scoped out of EIA?
- Can consultees agree that baseline noise monitoring does not need repeated? If there are additional locations considered necessary for recording, please specify
- Do consultees agree with the proposed scope for shadow flicker?

### 17.1. Consultation Questions

Summary of consultation questions as proposed throughout this Scoping Report. Please see previous chapters where relevant for further context.

- Do consultees have any comments in relation to public consultation?
- Do consultees have any comments in relation to the approach to the Environmental Impact Assessment?
- Do consultees have any comments in relation to the proposed chapters to be included in the EIAR?
- Do consultees agree with the LVIA and CLVIA methodologies?
- Do consultees have comment on the acceptability of the proposed RVAA study area of 2km and the general methodology outlined above?
- Do consultees agree with the approach to the sequential assessment (LVIA)?
- Do consultees agree with the cumulative baseline (LVIA)?
- Do consultees agree to an end date of three months prior to the submission of the LVIA and CLVIA after which point any additional sites will not be assessed with the application?
- Is the proposed scope and extent of the available and proposed baseline data considered to be sufficient to inform a reliable assessment of the potential effects of the proposed development?
- Do the consultees agree with the list of key potential receptors for the EIA and with the receptors / issues to be scoped out of the assessment?



# Appendices

## Quantans Hill Wind Farm



# Appendix 1

## Figure List

- Figure 1 – Site Layout and Location (1218656B)
- Figure 2 – Regional Context (1218660B)
- Figure 3 – Site Constraints (1218657B)
- Figure 4 – ZTV to Tip Height (1218658B)
- Figure 5 – Othnothological Survey Areas (1219506A)
- Figure 6 – Vantage Point Locations and Viewsheds (1219508A)

# Appendix 7.1

**Table A7.1: Viewpoint Locations**

| VP No. | Location   | Easting | Northing | Receptor   |                 | Visualisation Type |              |
|--------|--|---------|----------|--|-----------------|--------------------|--------------|
|        |  |         |          | Landscape Character Type (LCT) / Landscape Designation       | Visual Receptor | Wireline           | Photomontage |
| 1      | Carsphairn War Memorial                          | 256863  | 593088   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Visitors        | •                  | •            |
| 2      | Carsphairn Community Garden                      | 256293  | 593223   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Visitors        | •                  | •            |
| 3      | Cairnsmore of Carsphairn                         | 259619  | 597613   | Southern Uplands – Dumfries & Galloway<br>Galloway Hills RSA | Walkers         | •                  | •            |
| 4      | Beninner   | 260413  | 596549   | Southern Uplands – Dumfries & Galloway<br>Galloway Hills RSA | Walkers         | •                  |              |
| 5      | Alhang   | 264228  | 601021   | Southern Uplands with Forest – Dumfries & Galloway           | Walkers         | •                  |              |
| 6      | Benbrack   | 268025  | 597029   | Southern Uplands with Forest                                 | Walkers         | •                  | •            |
| 7      | Southern Upland Way, north-east of Stroanfreggan | 264836  | 592777   | Southern Uplands with Forest                                 | Walkers         | •                  | •            |
| 8      | B729 south-east of Carsphairn                    | 259465  | 591935   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Road users      | •                  |              |
| 9      | Minor road between A713 and B729                 | 260405  | 590759   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Road users      | •                  |              |
| 10     | Cairn Avel                                       | 255943  | 592456   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Walkers         | •                  | •            |
| 11     | Corserine  | 250356  | 587173   | Rugged Uplands – Dumfries & Galloway<br>Galloway Hills RSA   | Walkers         | •                  | •            |
| 12     | Meikle Millyea                                   | 251842  | 582897   | Rugged Uplands – Dumfries & Galloway<br>Galloway Hills RSA   | Walkers         | •                  | •            |
| 13     | Dundeugh   | 260977  | 589734   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Walkers         | •                  |              |
| 14     | Stroanfreggan Cairn                              | 264010  | 591408   | Narrow Wooded River Valley – Dumfries & Galloway             | Walkers         | •                  | •            |
| 15     | B7000 south of High Bridge of Ken                | 261847  | 589303   | Upper Dale – Dumfries & Galloway                             | Road users      | •                  |              |
| 16     | Black Hill                                       | 268849  | 598725   | Southern Uplands with Forest                                 | Walkers         | •                  |              |
| 17     | A762 north of New Galloway                       | 263093  | 578938   | Flooded Valley<br>Galloway Hills RSA                         | Road users      | •                  |              |

| VP No. | Location                          | Easting | Northing | Receptor   |                 | Visualisation Type |              |
|--------|-----------------------------------|---------|----------|--|-----------------|--------------------|--------------|
|        |                                   |         |          | Landscape Character Type (LCT) / Landscape Designation       | Visual Receptor | Wireline           | Photomontage |
| 18     | A713 south of Carsphairn          | 257975  | 591434   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Road users      | •                  |              |
| 19     | A713 north of Carsphairn          | 255442  | 594671   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Road users      | •                  |              |
| 20     | Black Shoulder                    | 259235  | 596735   | Southern Uplands – Dumfries & Galloway<br>Galloway Hills RSA | Walkers         | •                  | •            |
| 21     | Manquhill Hill                    | 266164  | 594663   | Southern Uplands with Forest                                 | Walkers         | •                  |              |
| 22     | B729 west of Stronefreggan Bridge | 263659  | 591735   | Narrow Wooded River Valley – Dumfries & Galloway             | Road users      | •                  |              |
| 23     | B729 Burnfoot Bridge              | 259053  | 592278   | Upper Dale – Dumfries & Galloway<br>Galloway Hills RSA       | Road users      | •                  |              |
| 24     | Culmark Hill                      | 264447  | 589673   | Foothills with Forest – Dumfries & Galloway                  | Walkers         | •                  | •            |
| 25     | Coran of Portmark                 | 250933  | 593667   | Rugged Uplands – Dumfries & Galloway<br>Galloway Hills RSA   | Walkers         | •                  | •            |