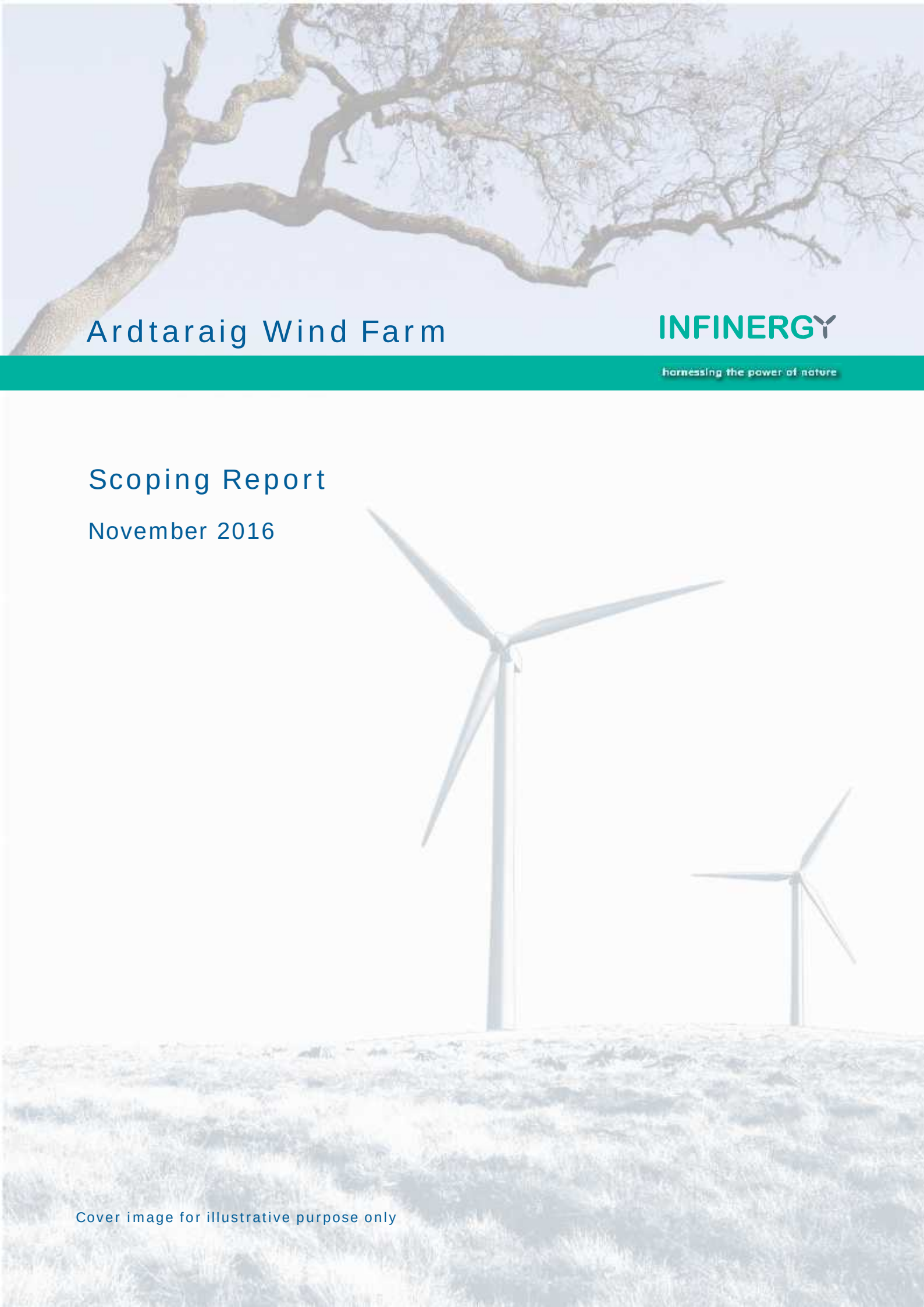
Ardtaraig Wind Farm

INFINERGY

harnessing the power of nature

Scoping Report

November 2016



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1. INTRODUCTION

1.1. Infinergy Limited (hereafter referred to as the 'Applicant') proposes to submit an application for consent to the Argyll and Bute Council ('A&BC'). The application will be for the erection of 10 wind turbines and associated infrastructure at the Ardtaraig Estate, west of Dunoon. The proposal will be known as the Ardtaraig Wind Farm (hereafter referred to as the 'proposed development'). The general site location is centred on OS Grid reference NS038843 and is illustrated on Figure 1.1 below.

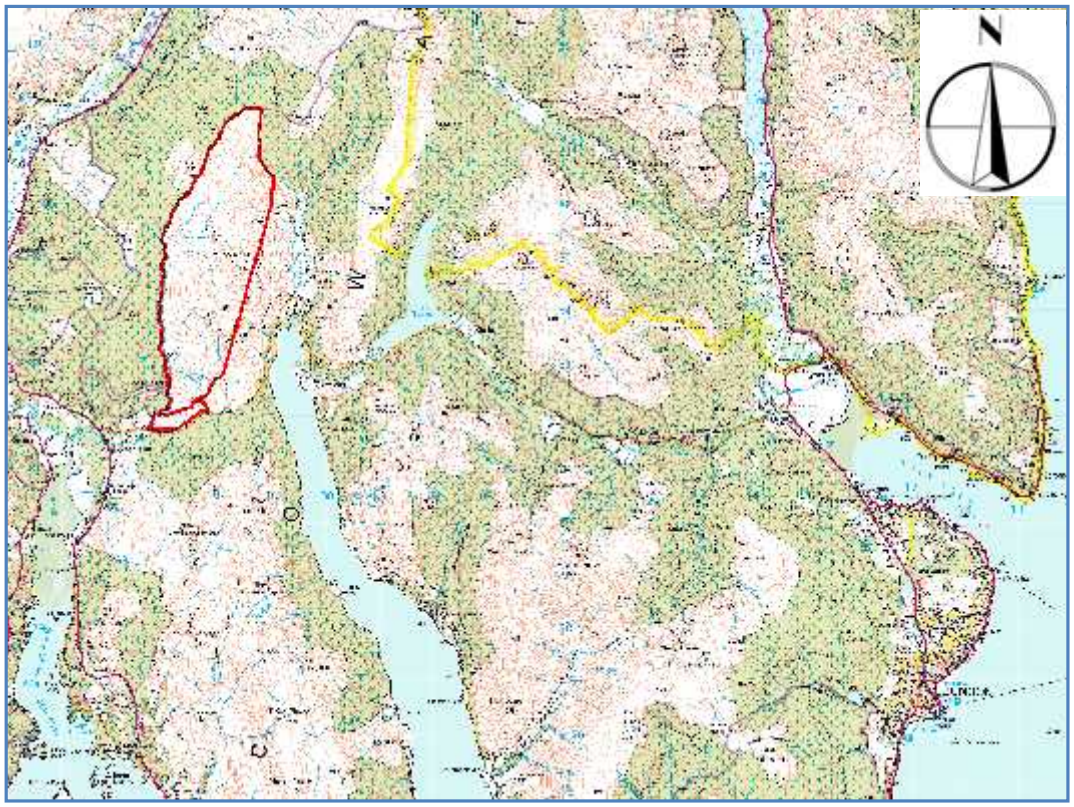


Figure 1.1 – Site Location

1.2. In order to support an application for consent, the proposed development will require an Environmental Impact Assessment (EIA) conducted in line with the requirements of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 as amended (the EIA Regulations). Under the EIA Regulations, the EIA process is undertaken to identify the potentially significant environmental issues which should be considered when assessing the potential effects of a development. An EIA Scoping Opinion may be obtained from the competent authority as to which issues should be considered within the EIA.

1.3. In reaching an EIA Scoping Opinion, the competent authority consults statutory and non-statutory stakeholders for consideration. This document enacts a formal request for a Scoping Opinion under the EIA Regulations, and invites statutory consultees and other stakeholders to provide relevant input or environmental information relating to the proposal, the site and the surrounding area. It also seeks comment and confirmation on the adequacy of environmental data required to support the Environmental Impact Assessment (EIA) and

assessment methods being proposed to inform the final Environmental Statement (ES).

1.4. This report sets out the scope of the EIA for the proposed development. The purpose of this Scoping Report is therefore to:

- Outline the consenting and EIA requirements in relation to the proposed development;
- Outline the development being considered;
- Outline the aspects of the project that could potentially have significant environmental effects;
- Outline the suggested scope of work/methodologies that will be used to assess the significance of any potential impacts during the EIA;
- Outline the proposed statutory and non-statutory organisations to be consulted during the EIA process; and
- Provide a proposed contents list for the ES.

The Applicant

1.5. Infinergy is a renewable energy company which has been developing onshore wind farms throughout the United Kingdom since 2003. Infinergy is a member of the trade organisations Renewable UK and Scottish Renewables. The company has offices in Wimborne (England), Edinburgh and Inverness (Scotland). For more information please visit www.infinergy.co.uk.

Environmental Impact Assessment

1.6. The EIA Regulations require that before consent is granted for particular types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must be subject to an EIA ('Schedule 1' development) and other developments which may require an EIA if they are above certain thresholds or are likely to give rise to significant environmental impacts ('Schedule 2' development).

1.7. The proposed development falls within Schedule 2 (a) of the EIA Regulations as 'the development involves the installation of more than 2 turbines' and 'the hub height of any turbine...exceeds 15 metres'. As such, the proposed development qualifies as an 'EIA development' and the applicant proposes that it is subject to an EIA.

1.8. Environmental Impact Assessment is a systematic process which identifies the potential environmental effects which in turn inform the design of a proposal. The process seeks to avoid, reduce, offset or minimise any adverse effects through mitigation. Effects are evaluated over the whole lifecycle of a development including construction, operation and decommissioning.

1.9. Establishing which aspects of the environment are likely to be significantly affected by a particular development is captured through the EIA scoping process. Scoping identifies those aspects of the environment that need to be considered when determining the potential effects of a development. This recognises that there may be some environmental elements on which a development is unlikely to have significant effect and hence where there is no need for further investigation to be undertaken as part of an EIA. The scope of the EIA for the proposed development is set out in section 4 of this report.

1.10. The EIA methodologies proposed in this scoping report are based on recognised good practice and guidelines specific to each topic area.

1.11. In addition, the EIA Regulations state that cumulative effects should be considered as part of the EIA process. Therefore, it is important to consider the cumulative effects of the proposed development alongside other wind energy developments in the area, including those that are currently operational, consented and in planning.

2. THE SITE AND PROPOSAL

Site Description and Surroundings

2.1. The proposed site (NGR NS038843) lies 14.5km to the west of Dunoon, in Argyll and Bute. Figure 1.1 illustrates the Site Context and Figure 2.1 illustrates the Scoping Boundary and preliminary turbine locations for the proposed development.

2.2. The proposed site extends over approximately 750 hectares of gently sloping open moorland intersected burns at heights varying from 95m-430m AOD. The A886 lies 3km to the west of the site while the B836 lies directly south. The Stronafian Community Forest which is largely a commercial plantation of coniferous woodland is located along the western boundary. While approximately 1km north of the site lies the operational Cruach Mhor Wind Farm.

2.3. The residential properties closest to the site boundary are Hillhouse, approximately 680m to the south east, Craigendive approximately 700m, Stronafian approximately 850m to the south west and Balliemore approximately 990m to the east.

Figure 2.1 Preliminary Turbine Site Layout for Ardtaraig Wind Farm

The Proposal

2.4. Infinergy is proposing to construct and operate a 10 turbine wind farm at the Ardtaraig Estate. For the purposes of this Scoping Report, it is assumed that each turbine will have a generation capacity of 3.0 MW, giving a total installed capacity of up to 30 MW.

2.5. Figure 2.1 illustrates the proposed turbine layout; while Appendix A provides a grid reference for each turbine location.

2.6. The main components of the proposed development are:

- Ten wind turbines (maximum blade tip height of 136.5m) with associated turbine foundations and hardstandings;
- An onsite network of underground cables linking the turbines to a grid connection;

- A series of onsite access tracks connecting each of the turbine locations;
- An onsite substation and control/maintenance building;
- Temporary works including a construction compound;
- A permanent anemometer mast to measure wind speed and wind direction; and
- On-site borrow pit/s.

2.7. The ES will include a detailed description of all the wind farm components.

2.8. It is recognised that throughout the EIA process, the number and/or layout of the turbines may change due to emerging technical and environmental constraints.

Access

2.9. Site access will be required for the delivery of turbine components, construction materials and plant, and for general construction and maintenance traffic. A new vehicular access will either be constructed directly from the B836 to the proposed development site or via the existing Stronafian Community Forest access track. The abnormal load route for the delivery of turbine components is anticipated to run from King George V Port in Glasgow, approximatly 120km to the south-east using the road network.

2.10. Once the optimal route for abnormal loads has been identified a full swept path analysis will be carried out from port to site to determine whether any upgrades will be required to accommodate the delivery of the turbine components.

Grid Connection

2.11. The proposed development will be connected into the local distribution network at 33kV. The applicant has a signed Grid Connection Agreement with the local distribution network operator. The grid connection for the proposed development will be via an on-site control building which will then be connected to the electrical distribution network through underground and overhead cables.

Construction Period

2.12. The construction period for the proposed development is expected to be 6 to 9 months depending on weather conditions and ecological considerations.

2.13. The construction process will consist of the following principal activities:

- Construction of temporary construction compound;
- Import of construction materials;

- Construction/upgrade of on-site access tracks interlinking the turbine locations and the control building, incorporating relevant works to maintain site hydrology and manage surface water run-off;
- Construction of turbine foundations;
- Construction of control building;
- Excavation of trenches and cable laying adjacent to on-site access tracks;
- Connection of electrical distribution and signal cables;
- Movement onto site and erection of wind turbines;
- Commissioning of site equipment; and
- Site Restoration.

2.14. Many of these operations will be carried out concurrently, although predominately in the order identified, which will minimise the overall length of the construction programme. Site restoration will be programmed and carried out to allow restoration of disturbed areas as early as possible and in a progressive manner.

Site Restoration

2.15. The main site restoration activity will occur principally alongside access tracks, hardstandings and turbine foundations. Most excavated material will be stored alongside these locations, being used to dress back working areas to facilitate re-vegetation or agricultural use. Where vegetation exists this will be scraped off and stored separately prior to re-use as the top layer of any restored areas. This approach will maximise the potential for natural re-vegetation from the existing onsite seed bank.

2.16. Vegetation and soils will be stored and reinstated in accordance with best practice.

Maintenance and Servicing

2.17. Routine maintenance and servicing of turbines is carried out twice a year, with a main service at 12 month intervals and a minor service at 6 months. Teams of two people with a 4x4 vehicle would carry out the servicing, which takes on average one day for each turbine.

Decommissioning

2.18. The proposed development will be designed to have an operational life of 25 years. At the end of this time, it is envisaged that the site will be decommissioned and the turbines dismantled and removed. Any alternative to this action would require a new planning approval.

3. POLICY CONTEXT

Introduction

3.1. This Section of the Scoping Request sets out a high-level overview of the relevant national and local planning policies that will inform the EIA process for the proposed development.

National Planning Context

3.2. The National Planning Framework 3 (NPF3) and the Scottish Planning Policy (SPP) set out the national planning context for the proposed development. In addition, national planning advice is outlined in a number of documents including the Planning Advice Notes (PANs).

National Planning Framework 3 (2014)

3.3. Scotland's third National Planning Framework (NPF3) was published by the Scottish Government on 23 June 2014. NPF3 is a long-term strategy for Scotland and is the spatial expression of the Government's Economic Strategy and plans for development and investment in infrastructure. Together, NPF3 and Scottish Planning Policy 2014 (referred to below) applied at the strategic and local levels, are intended to help the planning system deliver the Government's vision and outcomes for Scotland and to contribute to the Government's central objective: sustainable development.

3.4. NPF3 sets out the Government's "vision" for Scotland which is referred to as inter alia:-

- A successful, sustainable place – "we have a growing low carbon economy which provides opportunities…"
- A low carbon place - "we have seized the opportunities arising from our ambition to be a world leader in low carbon generation, both onshore and offshore…"
- A natural resilient place - "natural and cultural assets are respected; they are improving in condition and represent a sustainable economic, environmental and social resource for the nation…"

A Low Carbon Place

3.5. Chapter 3 of NPF3 address 'A Low Carbon Place'. As noted below, this is also a "subject policy" in the Scottish Planning Policy. Paragraph 3.1 explains that planning will play key role in delivering on the commitments set out in 'Low Carbon Scotland': The Scottish Government's Proposals and Policies'. It adds:

> "the priorities identified in this spatial strategy set a clear direction of travel which is consistent with our world leading climate legalisation".

3.6. The introduction to Chapter 3 states that the Government's ambition "is to achieve at least an 80% reduction of greenhouse gas emissions by 2050".

3.7. The introductory section acknowledges that at present, the energy sector accounts for a significant share of the country's greenhouse gas emissions and that a planned approach to development has ensured that onshore wind development has widely avoided internationally and nationally protected areas.

3.8. Paragraph 3.7 states that whilst there is strong public support for wind energy as part of the renewable energy mix, opinions about onshore wind in particular locations can vary. It adds that the technology is also "…recognised as an opportunity to improve the long-term resilience of rural communities".

3.9. Overall, NPF3 supports the development of wind farms in locations where the technology can operate efficiently and environmental and cumulative impacts can be addressed satisfactorily.

Scottish Planning Policy (2014)

3.10. The Scottish Planning Policy (SPP) was published on 23rd June 2014. The purpose of the SPP is to set out national planning policies which reflect Scottish Government Ministers' priorities for the operation of the planning system and for the development and use of land. The SPP is a statement of Scottish Government policy on how nationally important land use planning matters should be addressed.

3.11. Paragraph (iii) states that as a statement of Ministers' priorities, the content of the SPP is a material consideration that carries significant weight, although it is for the decision maker to determine the appropriate weight to be afforded to it in each case.

Relationship of SPP to National Outcomes

3.12. SPP contains two Principal Policies: 'sustainability' and 'place making'. Sustainability is addressed at Page 9. The SPP states:

> "the Scottish Government's central purpose is to focus Government and public services on creating a more successful country with opportunities for all of Scotland to flourish through increasing sustainable economic growth".

3.13. Paragraph 25 adds that the Scottish Government's commitment to the concept of sustainable development is reflected in its purpose.

3.14. Paragraph 27 cross references the Government's Economic Strategy which it states "… that sustainable economic growth is the key to unlocking Scotland's potential…. and to achieving a low carbon economy…" It also makes reference to the need to maintain a high quality environment and to pass on "a sustainable legacy for future generations". Importantly, 'sustainability' as set out under the Principal Policies of the SPP "….introduces a presumption in favour of development that contributes to sustainable development..".

SPP Subject Policies – A Low Carbon Place

3.15. SPP addresses 'A Low Carbon Place' as a 'subject policy' on page 36 and refers to 'delivering electricity'. Paragraph 152 refers to the NPF3 context and states that NPF3 is clear that planning must facilitate the transition to a low carbon economy and help to deliver the aims of the Scottish Government. It is stated that Scotland has significant renewable energy resources, both onshore and offshore.

3.16. Paragraph 153 notes that terrestrial planning "facilitates" development of renewable energy technologies, and guides new infrastructure to appropriate locations. It adds that "sufficient supply of low carbon and low cost generation of electricity from renewable energy sources are vital to reducing greenhouse gas emissions.." It explains that renewable energy also presents a significant opportunity for associated development, investment and growth of the related supply chain.

3.17. In terms of 'Policy Principles', Paragraph 154 states that the planning system should:

- Support the transformational change to a low carbon economy, consistent with national objectives and targets, including deriving:
  - 30% of overall energy demand from renewable sources by 2020; and
  - the equivalent of 100% of electricity demand from renewable sources by 2020.
- Support the development of a diverse range of electricity generation from renewable technologies – including the expansion of renewable energy generation capacity;
- Guide development to appropriate locations and advise on the issues that will be taken into account when specific proposals are being assessed; and
- Refers to "key documents". Those of relevance include:
  - The Electricity Generation Policy Statement;
  - The 2020 Routemap for Renewable Energy in Scotland; and
  - Low Carbon Scotland: Meeting Our Emissions Reductions Targets 2013 – 2027.

<u>Onshore Wind</u>

3.18. Onshore wind is specifically addressed at Paragraphs 161 of SPP. Detailed guidance is provided for Planning Authorities with regard to the preparation of spatial frameworks for onshore wind development, and it makes it clear that proposals for onshore wind development should continue to be determined whilst spatial frameworks and local policies are being prepared and updated. It makes it clear at Paragraph 166, that moratoria on onshore wind development are not appropriate.

3.19. In terms of spatial framework guidance, a "community separation for consideration of visual impact" is set out as an area not exceeding 2 km around cities, towns and villages identified on the local development plan with an identified settlement envelope or edge.

3.20. As with the previous SPP, this separation distance seeks to guide the preparation of spatial frameworks and is not a requirement for a 'set back' to settlements for wind farms in terms of development management.

Development Management for Energy Infrastructure Developments

3.21. In terms of development management, Paragraph 169 of SPP sets out that "proposals for energy infrastructure should always take account of spatial frameworks for wind farms and that considerations will vary relative to the scale of proposals and area characteristics but are likely to include a number of matters..". These are set out as follows:

- net economic impacts, including local and community socio economic benefits such as employment, associated business and supply chain opportunities;
- the scale of contribution to renewable energy generation targets;
- effects on greenhouse gas emissions;
- cumulative impacts – planning authorities should be clear about the likely cumulative impacts arising from all of the considerations below;
- impacts on communities and individual dwellings, including visual impact, residential amenity and noise and shadow flicker;
- landscape and visual impacts including effects on wild land;
- effects on the natural heritage, including birds;
- impacts on carbon rich soils using the carbon calculator;
- public access, including impact on long distance cycling and walking routes and scenic routes identified in the NPF;
- impacts on the historic environments, including scheduled monuments, listed buildings and their settings;
- impacts on tourism and recreation;
- impacts on aviation and defence interests and seismological recording;
- impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised.
- impacts on road traffic;
- impacts on adjacent trunk roads;
- effects on hydrology, the water environment and flood risk;
- the need for conditions relating to the decommissioning of developments, including ancillary infrastructure and site restoration; and
- the need for a robust planning obligation to ensure that operators achieve site restoration.

3.22. Paragraph 170 states that areas identified with wind farms should be suitable for use in perpetuity. It further adds that consents maybe time limited, but nevertheless "wind farms should be sited and designed to ensure impacts are minimised and to protect an acceptable level of amenity for adjacent communities..".

3.23. In terms of the various considerations set out above, SPP also contains detailed policies on a number of the topics referred to: for example cultural heritage and the historic environment, natural heritage and landscape designations.

National Policy Conclusions

3.24. Support for renewable energy development at an appropriate scale and location is provided within both the NPF 3 and SPP. The proposed development at the Ardtaraig Estate is entirely consistent with both the NPF 3 and the SPP and would further the sustainable development and low carbon objectives set out in both documents.

Local Development Plan

3.25. The Argyll and Bute Local Development Plan' (2015) is the applicable development plan agents which the proposed development will be assessed. Policy LDP 6 – 'Supporting the Sustainable growth of Renewables' is the principal policy within the plan, with which to assess the proposed development. Policy LDP 6 is based on multiple criteria and contains policy tests specifically for the assessment of renewable energy development, reflecting policy matters of relevance set out elsewhere in the plan.

4. SCOPE AND FORMAT OF ENVIRONMENTAL IMPACT ASSESSMENT

Structure of the Environmental Statement

4.1. The structure of the ES will follow the requirements of the EIA Regulations 2011 and other relevant good practice guidance. The ES will describe the EIA process and its findings and will include the following documents:

- Non-Technical Summary
- Environmental Statement Volume 1: Written Statement
- Environmental Statement Volume 2: Figures
- Environmental Statement Volume 3: Appendices

4.2. The ES Written Statement structure is likely to be as follows, subject to any changes to the scope identified through the consultation process:

- Chapter 1 outlines the proposed development and the structure of the ES.
- Chapter 2 describes the EIA process undertaken for the proposed development, including this Scoping exercise and its outcomes.
- Chapter 3 provides a detailed description of the proposed development and includes an overview of the construction methodology.
- Chapter 4 Climate change policy, carbon payback and peat management.
- Chapters 5 - 15 provide the EIA, i.e. the assessment of impacts on the various environmental parameters.
    - Chapter 5: Socio-Economics, Recreation and Land Use
    - Chapter 6: Traffic and Access
    - Chapter 7: Noise and Vibration
    - Chapter 8: Landscape and Visual Impact Assessment
    - Chapter 9: Cultural Heritage
    - Chapter 10: Ecology
    - Chapter 11: Ornithology
    - Chapter 12: Hydrology, Hydrogeology and Geology
    - Chapter 13: Shadow Flicker
    - Chapter 14: Infrastructure
    - Chapter 15: Forestry

Description of Development

4.3. A detailed description of the scheme to be assessed by the EIA will be described in Chapter 3 'Description of the Proposed Development'. This chapter will form the basis of the assessment of effects and will describe the following phases of the project:

- Construction – works, activities and processes that would be required to build the wind farm;
- Operation – the developed wind farm upon completion and its use; and
- Decommissioning – works and processes that would be required to undertake the removal of the wind farm and the means to which the land will be restored to its former condition.

4.4. Where mitigation measures have been developed and adopted as part of the project through the iterative EIA process, details of these measures will be set out within this chapter.

General Approach to Assessments

4.5. Where possible, each chapter of the ES will adopt a consistent format, comprising:

- Methodology and Assessment Criteria, including any applicable Legislation, Policy and Guidance;
- Description of Baseline Conditions, based on desk study or survey work undertaken where relevant;
- Impact Assessment, which identifies the impacts and assesses their significance;
- Cumulative Assessment, which identifies any cumulative impacts and assesses their significance;
- Mitigation, whereby any necessary mitigation and monitoring measures are identified; and
- Residual Effects, providing an assessment of impact significance once mitigation has been incorporated.

Methodology and Assessment Criteria

4.6. The general assessment methodology for each topic is set out in the Section 5 below, and will be described within the individual topic chapter of the ES. Each environmental topic will be considered by a specialist in that area and subsequent sections define the scope of the assessment in more detail.

4.7. The methods of predicting the nature and magnitude of any potential impacts vary according to the subject area. Quantitative methods of assessment can predict values that can be compared against published thresholds and indicative criteria in Government guidance and standards. However, it is not always possible to ascribe values to the environmental assessments and thus qualitative assessments are used. Such assessments rely on professional judgement and previous experience.

Description of Baseline Conditions

4.8. The baseline of the site and its environment form the basis of the assessment for the EIA, enabling the likely significant effects to be identified and assessed through comparison with the baseline. Each ES topic chapter will include a

description of the environmental conditions of the current site and study area. The study area will vary according to the topic under consideration. For example, an assessment of effect on noise would be limited to the site and immediate surroundings whereas effects on the landscape character could potentially be much wider.

Impact Assessment

4.9. The EIA Regulations require the identification of the likely significant environmental effects of the project. The process by which significant effects are identified are dependent on a number of factors such as sensitivity of receptor, magnitude, duration and nature and how this relates to any adopted environmental quality standards. Significant effects are predicted where important resources, or numerous or sensitive receptors, could be subject to impacts of considerable magnitude. Effects are unlikely to be significant where low value or non-sensitive resources, or a small number of receptors, are subject to minor impacts.

Receptors and Sensitivity

4.10. Receptors are defined as the physical resource or user group that would be affected. The baseline study will identify potential environmental receptors for each topic. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity of a receptor will vary depending on numerous factors, for example, frequency or duration or use or importance at an international, national, regional, local or site level.

4.11. Where planning permission has been granted for other developments, but not yet constructed, receptors associated with these developments would be included within the baseline description and assessed.

Description of Effects

4.12. Effects are defined as the physical changes to the environment attributable to the project. For each topic the likely environmental effects will be identified and taken into account, including their magnitude of change in the environment by comparison to the existing baseline of no development, as well as a baseline of the extant consented scheme.

4.13. Subject to the topic specific methodologies, effects will be defined as either positive or adverse and direct or indirect. The assessment will also define whether these effects will occur during the construction/decommissioning stage and therefore temporary, or during the operation stage and therefore described as permanent (albeit the planning permission will only be sought for a 25 year operational period and therefore all ‘permanent’ effects would actually be a long-term temporary basis).

Significance of Effects

4.14. The significance of the effect is therefore concluded based on the above factors. Significance is not directly linked to magnitude of change, consideration has to be given to the following criteria:

- Extent and Magnitude;

- Duration (short term and long term);
- Reversibility and irreversibility;
- Performance against environmental quality standards; and
- Sensitivity of receptor.

4.15. Levels of significance that will be used in the assessment include:

- Major;
- Major-Moderate;
- Moderate;
- Moderate-Minor;
- Minor; and
- Neutral.

4.16. These significance levels will be defined within the methodology of each topic chapter of the ES. In all cases, judgement made as to significance will be that of the author of the relevant chapter with reference to appropriate standards/guidelines where relevant.

Cumulative Assessment

4.17. The cumulative effects of the proposed revised scheme will be considered in conjunction with other wind farms and developments that are either within the planning system but not yet determined, or that have been consented but not yet constructed.

4.18. The study area and the types of development included within the cumulative assessment will vary depending on the topic chapter and the nature of the receptors.

Mitigation

4.19. The EIA regulations provide that an ES must contain a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

4.20. As the EIA process leads to an iterative design process, many mitigation measures will have been adopted as part of the design/layout of the proposed development. These will be discussed within the 'Description of Proposed Development' chapter and will therefore be included as integral to the development and assessed as such within the Impact Assessment.

4.21. Additional mitigation measures required to address any identified significant effects will be clearly detailed within each environmental topic chapter.

Residual Effects

4.22. Ultimately, the EIA process reported within the ES will identify the 'residual' effects that are left after all mitigation and control measures are taken into account.

5. KEY ENVIRONMENTAL ASSESSMENTS

5.1. This section describes the baseline conditions, the potential impacts of the Ardtaraig Wind Farm and the proposed assessment methodologies for the completion of an EIA with respect to key environmental parameters.

Socio-Economics, Tourism and Recreation

Introduction

5.2. The socio-economic assessment will consider the potential positive economic impacts associated with the development and operation of the Proposed Development as well as considering whether here could be any adverse impacts on other sectors, particularly tourism.

Policy guidance

5.3. There is no specific guidance or legislation on socio-economic or tourism assessments of wind farm developments. However, the assessment will be undertaken according to established best practice.

Baseline Overview

5.4. The application site is situated approximately1km to the south-west of the village of Auchenbreck. Ardtaraig is approximately 1.7km to the south-east.

5.5. There are no residential properties within the site boundary; the closest residential property is Craigendive approximately 1km away.

Proposed Scope of Assessment

5.6. The assessment will examine, through a desk based assessment:

- Direct effect on employment – the generation of employment opportunities associated with wind farm construction, operation and decommissioning;
- Direct effects on economic activity – effects on business activity within or close to the application site, due to land take and restriction to land use practices, during construction and operation; and
- Indirect effects on economic activity – effects on other business activities in the surrounding area, for example, as a result of construction workers using local bed and breakfast accommodation and shopping locally. The potential for indirect effects in socio-economic terms of businesses, such as, leisure and recreation facilities due to perceptions of visitors to the area, will be considered only where significant effects are identified in the LVIA.

Assessment Methodology

5.7. There is no prescribed methodology or standard guidance of relevance to this assessment. The method adopted will draw on publicly available information and the outcome of consultations to determine the existing socio-economic circumstances. The effects of the revised scheme (I.e. increase in height, and reduction in number of turbines) will also be considered within the context of

the original permitted development. Effects will be assessed using knowledge gained previous wind farm developments and professional judgement.

Traffic and Transport

Policy Context

5.8. The following policy and guidance documents will be used to inform the Transport & Access Chapter:

- Transport Assessment Guidance (Transport Scotland, 2012);
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993);
- SPP (Scottish Government, 2014b); and
- Local Development Plan (Argyll and Bute Council, 2015).

Baseline Overview

5.9. Where existing data is available, traffic count data will be requested from A&BC for the A886 and B836. Where no suitable existing data is available, new Automatic Traffic Count (ATC) surveys will be undertaken for a seven day period on the relevant links to provide classified, directional traffic volume and speed data.

5.10. It is proposed that either the port in Campbeltown or the King George V Port in Glasgow will be the most suitable port of entry based on the site location and the proven capacity of the road network to accommodate the required abnormal load vehicles to support the transportation of the turbine components.

Proposed Scope of Assessment

Construction

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

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

5.12. The main transportation impacts will be associated with the movement of general HGV traffic travelling to and from the site during the construction phase of the development.

5.13. Each turbine is likely to require 11 abnormal loads to deliver the components to site. Based on 10 turbines, this will result in 110 one way abnormal load movements; the components will be delivered on extendable trailers which

will then be retracted to the size of a standard HGV for the return journey. Whilst the abnormal load movements may have a disproportionate effect on the local road network and users of the route, the impact will only be temporary for the duration of the abnormal load deliveries.

5.14. It is considered that the effects of abnormal load traffic generated as a consequence of the proposed development would be negligible and therefore further consideration does not need to be given to the transportation impacts associated with it; however, a detailed swept path analysis (SPA) will be undertaken for the main pinch points to demonstrate that the turbine components can be delivered to site and to identify any temporary highway works which may be necessary.

Operational

5.15. Once operational, it is envisaged that the level of traffic associated with the proposed wind farm would be minimal. Regular monthly or weekly visits would be made to the wind farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles, such as a Land Rover or similar. There may also be the occasional need for an HGV to access the wind farm for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the development is proposed.

Assessment Methodology

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

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

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

5.18. The estimated traffic generation of the proposed wind farm development will be compared with baseline traffic flows, obtained from existing traffic survey data, in order to determine the percentage increase in traffic. Potentially significant environmental effects will then be assessed where the thresholds as defined above (5.9) are exceeded. It is not anticipated that a formal Transport Assessment will be required; these are not generally considered necessary for temporary construction works.

Noise

Introduction and baseline Conditions

5.19. Noise and vibration will occur during the construction, operation and de-commissioning of the proposed wind farm. In each case the extent to which this is significant depends on the noise sources and the distance of each of the noise sources to potential receptors.

5.20. 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.

5.21. For on-site construction noise, and operational noise at different wind speeds, the levels received at residential properties will depend on wind direction. Vibration from on-site construction activities and during operation will not be perceptible at residential properties. Vibration from construction vehicles accessing the site may be perceptible at roadside properties but will be no greater than from other heavy good vehicles and will not be significant.

5.22. For the purposes of the noise assessment potential receptors are considered to be residential properties.

5.23. 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 occasional passing traffic, the operation of farm machinery where this occurs, and possible low level noise from the existing Cruach Mhor wind farm. The latter would only occur, if at all, for properties north to north-west of the proposal for critical wind speeds and directions. Other background noise is likely to be from animals and birds and from wind around trees and foliage, depending on wind speed.

Planning Policy and Guidance on Noise Issues

5.24. 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.

5.25. In respect of operational noise from wind farms, PAN 1/2011 refers to 'web based planning advice' on renewables technologies[1] which in turn refers to ETSU-R-97, The Assessment and Rating of Noise from Wind Farms, as the appropriate method for assessment of operational noise. Additional guidance on assessment of operational noise is contained in the UK Institute of Acoustics document Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise which has been endorsed by

[1] http://www.scotland.gov.uk/Resource/0044/00440315.pdf

the Cabinet Secretary for Finance, Employment and Sustainable Growth of the Scottish Government

Assessment Methodology

Construction Noise

5.26. On-site construction noise will be assessed by carrying out noise predictions based on assumed plant schedules and locations to determine worst case likely noise levels which will then be compared with appropriate criterion levels for day-time, evening and, where necessary, night-time noise as set out in BS5228.

5.27. Construction traffic will be assessed in terms of the increase in traffic noise at roadside locations, except where there is little or very little traffic movement in which case it will be assessed against the criteria in BS5228.

Operational Noise

5.28. Operational noise will be assessed according to the requirements of ETSU-R-97 as clarified and refined by the UK IoA Good Practice Guide. 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[2]' background noise levels from the results, with limits set at 5 dB 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. Where predicted noise levels are shown to be less than 35 dB LA90 up to a 'standardised[3]' 10 metre height wind speed of 10 m/s (the ETSU-R-97 'simplified' noise limit), then this is sufficient to show that impact will not be significant irrespective of baseline/background noise level, thus negating the need for such measurements.

Cumulative Assessment

5.29. The provisions of ETSU-R-97 require that all wind turbine noise at a given residential locations meets its requirements, irrespective of whether it emanates from a single site or from multiple sites acting together. It is highly likely that, because of the separation distances between turbines and residential properties at this site, predicted noise levels will be shown to meet the simplified noise limit, even when acting alongside the existing Cruach Mhor site, and that the proposal will not add significantly to existing low levels of noise from this site at locations to the north to north-west of it. In such circumstances background/baseline noise measurements will not be required. If measurements are required then the measurement location(s) will be agreed with the relevant Planning Authority officers.

[2] The results of a polynomial regression line through a plot of individual 10 minute measurements of noise against wind speed.
[3] Derived or measured hub-height wind speed converted to 10 metres height assuming a reference ground roughness length of 0.05 metres.

Mitigation

Construction Noise

5.30. It is unlikely that any form of mitigation will be required unless any major site access track works are required in the very close vicinity of residential properties which would normally be avoided. Normal generic mitigation measures would be incorporated into site design by avoiding track proximity to residential properties, following good practice in construction techniques including avoiding work out of normal day-time construction hours wherever possible.

Operational Noise

5.31. Similarly, it is unlikely that any form of mitigation will be required because of the separation distances between turbines and residential properties at this site which is the inherent mitigation built in to the site design. It should be noted that modern pitch regulated turbines, of the type proposed in this development, have the ability to reduce noise under critical wind speed and direction conditions by reducing rotor speed, at the cost of a certain amount of power output, in the unlikely scenario that this is required to meet noise limits in practice.

Landscape and Visual Impact

Introduction

5.32. The Landscape and Visual Impact Assessment (LVIA) evaluates the effects of the Ardtaraig Wind Farm (the 'Proposed Development') on the landscape and visual resource. The requirement to assess the environmental impacts of the Proposed Development is provided for in 'The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011'. The assessment will accord with the 'Guidelines for Landscape and Visual Assessment Third Edition (2013)'. The LVIA will be undertaken by Optimised Environments Limited ('OPEN'), a practice registered with The Landscape Institute and experienced in this field of work.

5.33. The study area for the LVIA of the Proposed Development will cover a radius of 40 km from the nearest turbine, as shown in Figure 5.1. This is considered to be the maximum radius within which a significant landscape and/or visual effect could occur given the height of the turbines that are being considered and follows guidance given in 'Visual Representation of Wind Farms Good Practice Guidance' (Version 2.1 December 2014). The study area and the location of the turbines are shown in Figure 5.1 of the scoping figures supporting this section of the document.

5.34. The cumulative assessment will cover a study area to be agreed with AB&C and SNH. The Proposed Development is located approximately 1km to the south of the operational Cruach Mhor windfarm (as shown in Figure 5.2). The existing Cruach Mhor turbines are relatively small (71 metres to blade tip) and are located within an upland valley. However, other consented turbines within the wider area are larger in size, including A' Chruach (126.5m), which is the

next closest operational wind farm some 15km to the north-west. The cumulative assessment will consider the comparative scale of the turbines proposed with those that exist or that have been consented nearby.

5.35. A review of the broad windfarm context within a 60km radius has been undertaken by OPEN, based on the latest SNH mapping of large scale wind farm development. It is considered that any cumulative effects that will occur will arise as a result of the pattern of development within the 40km study area radius rather than as a result of changes beyond this. It is proposed that following a detailed review of the cumulative sites within the area, a plan will be produced showing the locations of wind farms within 40km that are operational, under construction, consented or which are at application stage and where the turbines are greater than 50m to blade tip. A&BC and SNH will be consulted over the final list of sites to be considered within the detailed cumulative assessment. Exceptionally, scoping stage sites may also be included where they are considered to be of specific relevance to Ardtaraig.

5.36. Known baseline wind farms within a 40 km study area are shown for scoping purposes in Figure 5.2.

Site context

5.37. The preliminary application site boundary, which comprises approximately 7.7 sq km, covers an area of open, rugged moorland on the west facing flanks of A'Chruach (365m AOD) and Cruach nan Cuilean (432m AOD). It is centred within the Cowal Peninsula in Argyll and Bute. It is located approximately 3.2km to the south-east of the A886 and north and west of the B836 minor road which provides a link east towards Dunoon and is also the route of National Cycle Route 75. The eastern slopes of Cruach nan Cuilean and A'Chruach fall steeply towards the Balliemore Burn and the head of Loch Striven. The sloping sides to the upland area and the set-back of the Proposed Development from the edges ensures that many of the close proximity areas, where there is settlement, are shielded from views by intervening landform. This is confirmed in the blade tip ZTVs in Figures 5.3a, 5.3b.

5.38. Glendaruel lies at a low level to the west of the site and is a 'u' shaped valley with a number of properties strung along the base and lower valley sides, set back from the parallel routes which run through the valley. The westernmost of these is also the route of the Cowal Way long distance route, shown in Figure 5.7. Clachan of Glendaruel is a small group of properties with a church and primary school located at a distance of approximately 3.9 km to the west of the nearest proposed turbine.

5.39. The operational Cruach Mhor wind farm is located at a distance of approximately 850 m to the north. It comprises 35 turbines of 71m to blade tip. It is sited at an elevation of between 240m and 290m AOD on open hill land between the minor summits of Cruach Mhor and An Cruachan.

5.40. The site is surrounded on all sides by commercial forestry plantations which have a modifying effect on the landscape so that the irregularity of some of the landform is overlain and less apparent than within the open areas where knolly, rocky landforms are visible in close range views. The forestry helps to simplify the appearance of the upland landscape in this way.

5.41. Apart from properties along the routes through Glendaruel and at the head of Loch Ruel to the south, the distribution of residential property is very sparse. There are a small number of properties located on the B836 around the head of Loch Striven.

5.42. To the south-west of the site lies Loch Ridden or Loch Ruel, which extends southwards and splits into the Kyles of Bute, which wrap around the north of the Isle of Bute, separating it from mainland Cowal. This is a particularly scenic area and the focus for the Kyles of Bute National Scenic Area, largely due to the attractive relationship between land and sea. On either side of Bute, the 'limbs' of Cowal extend southwards to Ardlamont Point in the west and Ardyne Point and Toward Point in the east. The western landform provides the setting for the settlements of Tighnabruaich and Kames, which are located on the east coast whilst Dunoon, Sandbank and Innellan are settlements located on the east coast of the eastern landform of Cowal.

5.43. West of Cowal lies Loch Fyne with Kintyre beyond. This extends southwards to the Sound of Bute and the Isle of Arran. East of Cowal lies the Firth of Clyde and the coastal settlements of Gourock, Greenock and Inverclyde on the southern coastal area and Helensburgh to the north. Loch Lomond, which is the focus for the Loch Lomond and the Trossachs National Park, is located to the east of the Proposed Development, on the edge of the study area.

5.44. To the west of Cowal and Loch Fyne lies Argyll and to the north-west, beyond, are the islands of Jura, Scarba, Luing and Shuna.

Landscape Character

5.45. SNH has prepared Landscape Character Assessments (LCAs) for the whole of Scotland and these provide a consistent and valuable source of information against which the development or management of a piece of land can be assessed, albeit that it is recognised within SNH's Siting and Designing Windfarms Guidance from May 2014 that they have some limitations. SNH notes "It should be noted that many of the LCAs were produced during the 1990s and, although they remain relevant as descriptors of landscape character, do not necessarily address the sensitivity of particular landscape character types to wind farm development..".

5.46. The relevant SNH LCAs will be referred to in the baseline character assessment. In parts of the Study Area for the Proposed Development the various Planning Authorities have undertaken capacity studies for wind farm development. Within these areas, some modifications have been made to the distribution and descriptions associated with the landscape character, sometimes to take account of wind farm development that has altered the characteristics since the SNH LCAs were undertaken, but also to take account of local variations that were not captured in the earlier regional studies.

5.47. The more recent studies that will be used to inform the landscape assessment are as follows:

- Argyll & Bute Landscape Windfarm Capacity Study, 2012;
- North Ayrshire Supplementary Landscape Wind Energy Capacity Study, 2013;

- Landscape Capacity Study for Wind Farm Development in North Ayrshire, 2009;
- Landscape Capacity Study for Wind Turbine Development in Glasgow and the Clyde Valley, 2014;
- SNH Landscape Character Assessment – Loch Lomond & The Trossachs National Park, 2012; and
- SNH Landscape Character Assessment GIS dataset, downloaded by OPEN January 2016.

5.48. The LVIA will identify the relevant Landscape Character Types (LCTs) within a 40km radius of the wind farm. The distribution of the landscape character types (LCTs) within the Study Area described by these LCAs and capacity studies is shown in Figure 5.4a, with the blade tip ZTV overlaid. Because the LCTs can be split into different geographical areas across Cowal, the LVIA will also identify individual parts of each LCT as Landscape Character Units (LCUs), where these have the potential to be significantly affected by the Proposed Development.

5.49. The site is located within LCT 1, Steep Ridgeland & Mountains as identified in both the SNH and A&BC studies. While the character assessment will consider the effects of the Proposed Development on the landscape character types and units that lie across the study area, the assessment will focus on areas within a 15km radius, as significant effects on landscape character are unlikely to occur beyond this range.

Wild Land

5.50. No part of the application site is located within a Wild Land Area (WLA). The closest WLA to the Proposed Development turbines lies at a distance of over 28km to the south-east, as shown in Figure 5.6. It is the Waterhead Moor – Muirshiel WLA located to the east of the Firth of Clyde and east of Largs.

5.51. To the north-east, at a distance of approximately 33km, lies the Ben Lui WLA and to the north-west the Jura, Scarba, Luinga and the Garvellachs WLA at a distance of approximately 35.5km. To the south, the North Arran WLA is located at a range of approximately 35.5km.

5.52. The ZTV shows some patchy theoretical visibility across the closest parts of some of these WLA, at a range in excess of 32km. There is no ZTV coverage within the marginally closer Waterhead Moor – Muirshiel WLA. It is considered that wildness qualities/ wild land effects will not be a key consideration for this assessment. This is due to the character of the intervening landscape, the substantial separation distances and the existence of the Cruach Mhor and other wind farms in the immediate context of the Proposed Development. Therefore, it is proposed that Wild Land effects are scoped out of the LVIA as significant effects on Wild Land are unlikely to occur.

Landscape Designations

5.53. The site itself is not subject to any national landscape designations intended to protect its landscape quality (Figure 5.5). The site lies within an area designated at a local level by A&BC as an Area of Panoramic Quality (APQ). The LVIA will assess the likely effects of the Proposed Development on the special qualities of the APQ.

5.54. As well as this local designation (which occurs in a number of locations across the study area), a number of other landscape designations occur within the 40 km study area, as shown in Figure 5.5, with the blade tip ZTV overlaid. These include a number of nationally important National Scenic Areas and the Loch Lomond & Trossachs National Park. In addition to the APQ designation, other local tier designations include Special Landscape Areas (SLA) on Arran and North Ayrshire (including the Cumbraes) and the West Renfrew Hills Scenic Area.

5.55. The Kyles of Bute National Scenic Area (NSA) is the closest of the NSAs to the proposed site, located to the south-west while further south is the North Arran NSA. The Loch Lomond NSA lies to the east, the Knapdale NSA to the west and to the north-west the Scarba, Lunga and the Garvellachs NSA is located on the edge of the study area. The LVIA will assess the likely effects of the Proposed Development on the special qualities of these areas, with reference to SNH Commissioned Report No. 374 'The Special Qualities of the National Scenic Areas'.

5.56. The Loch Lomond and the Trossachs National Park covers the eastern areas of Cowal and extends over a large area covering the north-eastern quadrant of the study area, centred on Loch Lomond. The LVIA will assess the likely effects of the Proposed Development on the integrity, key characteristics and special qualities of the designated area.

5.57. There is a large number of nationally important Inventory Gardens and Designed Landscapes within the study area. The LVIA will assess the likely effects of the Proposed Development on the importance of the GDL as described in the Inventory held by Historic Environment Scotland.

5.58. Table 5.1 below lists the designated areas and provides information about their distance to the Proposed Development turbines and relationship to the ZTV, as shown in Figure 5.5. Thereafter, it is assessed in the final column whether or not, in OPEN's opinion, these designated areas can be scoped out of the assessment, unless changes to the layout during the detailed design process materially alter the potential for significant effects. The boxes that are shaded grey will be assessed further within the LVIA. A&BC's and SNH's agreement to this is sought through this scoping exercise in order to enable the LVIA to be focussed on key considerations.

Table 5.1: Designations

Designation / WLA		Distance to nearest turbine (km)	Subject to ZTV-theoretical visibility?	Need to assess effects further within LVIA?
National Park	Loch Lomond & The Trossachs National Park	2.33	Yes	Yes - some limited ZTV shading in south-west of NSA
NSA	Loch Lomond	26.38	Yes	No - very limited ZTV shading at c27km+
	Scarba, Lunga and the Garvellachs	35.81	Yes	No – due to separation distance of 35km+
	Knapdale	18.74	Yes	No - very limited ZTV shading at c20km+, existing influence of Cruach Mhor wind farm from similar high points and physical and visual separation by Loch Fyne.
	Kyles of Bute	1.92	Yes	Yes – ZTV shading across northern and western parts of NSA
	North Arran	31.50	Yes	Yes – ZTV shading across northern parts of NSA
Garden and Designated Landscape	Ardanaiseig House	38.73	No	No – no ZTV shading
	Ardgowan	18.41	No	No – no ZTV shading
	Ardkinglas	25.45	No	No – no ZTV shading
	Arduaine Gardens	34.63	No	No – no ZTV shading
	Ballimore	10.27	No	No – no ZTV shading
	Balloch Castle	34.23	No	No – no ZTV shading
	Benmore (Younger Botanic Garden)	7.26	Yes	No – very limited ZTV shading
	Buchanan Castle	39.36	No	No – no ZTV shading

Designation / WLA		Distance to nearest turbine (km)	Subject to ZTV-theoretical visibility?	Need to assess effects further within LVIA?
	Castle Toward	16.54	Yes	No – very limited ZTV shading and screening by intervening woodland
	Crarae	12.42	No	No – no ZTV shading
	Duchal House	34.08	No	No – no ZTV shading
	Duntrune Castle	26.36	No	No – no ZTV shading
	Finlaystone House	32.32	Yes	No – very limited ZTV shading at 35km and screening by intervening woodland
	Formakin	38.54	Yes	No – very limited ZTV shading at 39km
	Gareloch House (Achnashie)	20.34	No	No – no ZTV shading
	Glenarn	22.95	No	No – no ZTV shading
	Inveraray Castle	21.54	No	No – no ZTV shading
	Kelburn Castle	30.62	No	No – no ZTV shading
	Linn Botanic Gardens	18.05	No	No – no ZTV shading
	Mount Stuart (Kirrieniven)	23.53	Yes	No – very limited ZTV shading and screening by intervening woodland
	Overtoun House	38.23	Yes	No – very limited ZTV shading
	Rosneath	21.74	No	No – no ZTV shading
	Ross Priory	36.78	No	No – no ZTV shading
	Rossdhu	30.85	No	No – no ZTV shading
	Stonefield Castle Hotel	20.26	Yes	No – very limited ZTV shading

Designation / WLA		Distance to nearest turbine (km)	Subject to ZTV-theoretical visibility?	Need to assess effects further within LVIA?
	Strone	27.83	No	No – no ZTV shading
APQ	Bute & South Cowal	0.00	Yes	Yes, the Proposed Development is located within the APQ
	East Loch Fyne (Coast)	8.15	No	No – no ZTV shading
	Jura	34.94	Yes	No – due to separation distance of c35km+
	Knapdale / Melfort	20.59	Yes	No – due to very limited ZTV shading at 20km+ existing influence of Cruach Mhor wind farm from similar high points and physical and visual separation by Loch Fyne.
	Loch Lomond	24.08	Yes	No – very limited ZTV visibility shown at 24km+.
	Loch Long (Coast)	19.36	No	No – no ZTV shading
	North Argyll	20.73	Yes	No – due to limited ZTV shading at 20km+
	West Kintyre (Coast)	37.34	Yes	No – due to very limited ZTV shading at 37km+
	West Loch Fyne (Coast)	10.27	Yes	Yes – although limited ZTV shading
Scenic Area	West Renfrew Hills	21.73	Yes	No – due to very limited ZTV shading at 22km+
SLA	1 - Kilbirnie Loch	40.44	No	No – no ZTV shading
	4 - Little Cumbrae	32.91	Yes	No – due to limited ZTV shading at approximately 33km+
	5 – Millport/ Great Cumbrae	27.97	Yes	Yes - ZTV shading across northern parts of SLA along with

Designation / WLA		Distance to nearest turbine (km)	Subject to ZTV-theoretical visibility?	Need to assess effects further within LVIA?
				potential cumulative effects
	6 - Arran	32.59	Yes	Yes – ZTV shading across northern parts of SLA along with potential cumulative effects
	9 - East of Largs/ Waterhead Moor	21.99	Yes	No – very limited ZTV shading at 35km+

Visual Receptors and Visual Amenity

5.59. The LVIA will undertake an assessment of the likely visual effects from the Proposed Development through consideration of the specific visual effects at a selection of representative viewpoints and by considering the wider effects on visual amenity with reference to a range of principal visual receptors.

Visualisations

5.60. Visualisations and figures will be produced to SNH's standards as set out in 'Visual Representation of Wind farms: Version 2.1' (December 2014).

Viewpoint Selection

5.61. A preliminary viewpoint list is shown in Table 5.2 below. The locations of the viewpoints are shown on Figure 5.3a. This list has been derived from the viewpoints used in the Cruach Mhor wind farm LVIA with some amendments to make it more suited to the assessment of the Proposed Development. The final list will be established through the scoping process and in agreement with A&BC and SNH. The viewpoints were selected to represent sensitive visual receptors with the potential to undergo significant effects. They were also selected to represent landscape receptors and with consideration of the potential for cumulative effects to arise.

Table 5.2: Preliminary Viewpoint List

ID	Viewpoint name	Grid ref. (Preliminary)		Dist. nearest turbine (km)	Description
1	Footpath-Dunnoon to Loch Striven, Ardtaraig Estate	205766	682483	2.22	C212(b) - Port Lamont to Ardtariag, Loch Strivan (Core Path), Bute & South Cowal APQ, scattered settlement
2	B836, east of Stronafian	203112	681723	2.25	B836, NCR75, Bute & South Cowal APQ, adjacent to Kyles of Bute NSA
3	Glendaruel, minor road, Cowal Way north of Caravan site	200017	687292	4.22	Cowal Way (LDWR), C214(m) - Cowal Way Glenbranter to Portavadie (Core Path), Minor Road, adjacent to Bute & South Cowal APQ, scattered settlement
4	Cowal Way east of Garvie	205577	690010	4.36	Cowal Way (LDWR)
5	A886, north of Ardachuple Farm	201501	679838	4.68	A886, Kyles of Bute NSA, adjacent to Bute & South Cowal APQ, scattered settlement
6	Minor road west of Glendaruel	198466	682608	5.46	Minor Road, Regional Cycle Route 94, C215 - Glendaruel to Otter Ferry (Core path), Bute & South Cowal APQ, close to Kyles of Bute NSA
7	Cruach nan Caorach	199150	680450	5.87	Kyles of Bute NSA, hill top
8	A8003 Creagan Dubh, Kyles of Bute VP	200021	677527	7.42	A8003, NCR75, Kyles of Bute NSA
9	Beinn Mhor	210731	690800	8.15	LLTNPA, summit of a 'Graham'
10	Cowal Way, Loch Ruel, north of Eilean Dubh	200510	676198	8.36	Cowal Way (LDWR), C214(f) - Cowal Way Glenbranter to Portavadie (Core Path), Kyles of Bute NSA
11	Kyles of Bute	199887	673881	10.73	Kyles of Bute NSA, people on water-borne craft
12	Beinn Ruadh	215538	688360	11.46	LLTNPA, summit of a 'Graham'
13	Glenstriven Road, north of Ardyne Point	209725	670036	14.92	Minor Road, C212(a) - Port Lamont to Ardtariag, Loch Striven (Core Path), Bute & South Cowal APQ,
14	Unnamed 'b' road Car Park by Blair's Ferry, South of Kaimes	198000	670017	15.03	Cowal Way (LDWR), Minor Road, Regional Cycle Route 94, Junction of C217(e) - Otter Ferry to Blairs Ferry, Kames/C214(d&e) - Cowal Way Glenbranter to Portavadie (Core Path), Bute & South Cowal APQ, parking area

ID	Viewpoint name	Grid ref. (Preliminary)		Dist. nearest turbine (km)	Description
15	McInroy's Point, Gourock	221749	676703	19.13	A770 (Cloch Road), NCN753, Core Path, settlement
16	A844, Bogany Point, Rothesay, Isle of Bute	210305	665471	19.39	A844 (Mountstewart Road), C232(c) - Port Bannatyne to Ascog, Bute (Core Path), Bute & South Cowal APQ, settlement
17	A83, east of Meall Mor	186261	674474	19.95	Major road, scattered settlement.
18	B8024, west of Inverneil	183373	681245	20.50	Minor road, scattered settlement.
19	Arran, Lochranza Pier	192686	651056	34.64	Core Path, North Ayrshire SLA, North Arran NSA, settlement

Principal Visual Receptors

5.62. The pattern of theoretical visibility on the ZTV shows that close range and more distant landform has a strong influence, markedly restricting theoretical visibility of the Proposed Development. The Proposed Development would be sited on a west facing slope between a series of higher ridges that lie to the west and east. These generally contain visibility in these directions except at greater distances or from higher vantage points. Even where visibility is shown to occur at lower elevations, such as along the eastern shores of Kintyre and around Gourock, this potential visibility is restricted to small parts of a few turbines.

5.63. Theoretical visibility is found to extend to the south along the lower ground/water of the sea lochs (Loch Riddon/Loch Ruel and Loch Striven). These allow theoretical visibility to extend further southwards towards northern Arran and Bute and Great Cumbrae.

5.64. Outwith these areas, visibility is generally from high ground locations where there are few visual receptors.

5.65. A number of potential visual receptors are found within the 40km study area, as shown in Figure 5.7. The landscape and visual assessment will include consideration of the receptors listed below, although it should be noted that this is not intended to be a definitive list of receptors, but rather examples of those receptors that may be included.

Settlements and Residents

5.66. Due to the relatively rural location of the Proposed Development, settlements are relatively limited in the study area. The nearest residential property to the Proposed Development is Craigendive at a distance of approximately 1.05km, however it would not gain visibility of the Proposed Development. The closest

properties with theoretical visibility are at Lochhead and Balliemorie at a distance of approximately 1.5km to the east. Villages and rural clusters occur most frequently within the valleys and along coastlines where there is road access. Whilst there are individual properties and groups of properties there are no settlements within 15km of the Proposed Development that are shown to lie within the ZTV.

5.67. Settlements at a greater distance and which are located fully or partly within the ZTV include Inverneil, Ardrishaig, Gourock, Greenock, Port Glasgow, Rothesay and West Kilbride. The effect of the Proposed Development on these settlements will be assessed in the LVIA, but is likely to be extremely limited due to the pattern of the ZTV and separation distances involved.

Routes

5.68. There are relatively few routes running through the Study Area due to the upland nature of much of the terrain. The routes tend to follow the valleys or the coastlines of lochs, sea lochs and sea and their low lying locations often limits the potential for visibility of the Proposed Development due to intervening, higher landform.

5.69. There is a number of routes – roads, railway lines, cycle routes and walking routes - running though the study area, and some of these require to be considered in the LVIA as views from them may be affected by the Proposed Development. The key routes to be considered are described below.

5.70. To the south of the Proposed Development the B836 links across the high ground between Glendaruel and the A815 to Dunoon. This route also forms a section of National Cycle Route 75 and would gain views of the turbines at a range of 1.6km at its closest point. To the west of the site the A886 hugs the base of Glendaruel and the coast of Loch Ruel. There is the potential for a very limited stretch of the route, to the south of the junction with the B836, to have visibility of the Proposed Development at a range of approximately 3.5km.

5.71. Also running through Glendaruel and north-south from there is a minor road and the Cowal Way Long Distance Route. The greatest extent of visibility from this part of the route through Glendaruel occurs near the caravan and camping site at a range of approximately 4.2km. Further south, the Cowal Way follows the A8003 before dropping to the edge of Loch Ruel and the Kyles of Bute to pass through Tighnabruaich and Kames. Theoretical visibility is shown to occur on the A8003 to the north and south of the Kyles of Bute Viewpoint, however, actual visibility would be substantially reduced due to intervening forest cover. There would be visibility from the Kyles of Bute Viewpoint, however, views from this location are very much drawn towards the south-east, and Kyles, rather than towards the Proposed Development which is in a peripheral location. This section of the A8003 is also part of NCR 75.

5.72. Visibility of the Proposed Development would occur from parts of the Cowal Way, generally where they lie to the north of Eilean Dubh. To the south of Kames there would also be a short section from where visibility may be possible.

5.73. The A83, where it runs along the eastern shore of Knapdale, is shown on the ZTV to have some theoretical visibility of the Proposed Development. Actual visibility is markedly reduced by roadside vegetation along this section of the route, whilst wirelines indicate that visibility would be restricted to small numbers and extents of turbines.

5.74. The ZTV shading is shown across a number of ferry routes and areas of sea/sea lochs which are popular with water craft. The visual effects on such users will also be considered.

Mitigation Measures

5.75. The principal mitigation of landscape and visual effects of wind farms is achieved through careful layout design and turbine height selection, which can reduce effects, or in some cases, prevent effects from arising. The potential for mitigation of landscape and visual effects will be considered throughout the iterative design and assessment processes. SNH's Siting and Designing Wind Farms in the Landscape Version 2, May 2014 will be a key reference.

Methodology

5.76. The landscape and visual assessment will assess the potential effects of the Proposed Development on landscape character and visual receptors around the study area. This includes the effects of the access tracks, substation, operations and maintenance building, and other associated infrastructure, as well as the turbines.

5.77. The assessment will be carried out using a methodology that has been specifically devised by OPEN for the landscape and visual assessment of wind farms. This methodology generally accords with 'Guidelines for the Assessment of Landscape and Visual Impacts: Third Edition (2013)'. The following summary provides information on the methodology.

5.78. The potential effects of the Proposed Development on the landscape and visual resource are grouped into four categories: physical effects, effects on landscape character, effects on views, and cumulative effects.

5.79. Physical effects are restricted to the area within the site boundary, and are the direct effects on the fabric of the site and its access, such as the removal or addition of trees and alteration to ground cover. This category of effects is made up of landscape elements.

5.80. Effects on landscape character arise either through the introduction of new elements that physically alter the pattern of elements that makes up landscape character, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is made up of landscape character receptors, which are landscape character types, designated areas and WLAs.

5.81. The assessment of effects on views is an assessment of how the introduction of the wind farm will affect views throughout the study area. The assessment of effects on views is carried out in two parts:

- an assessment of the effects that the wind farm will have on a series of viewpoints that have been selected to represent the views of people, for example, residents, walkers and road-users, throughout the study area; and

- an assessment of the effects that the wind farm will have on views from principal visual receptors, which are the notable settlements, routes, features and attractions found throughout the study area.

5.82. Cumulative effects arise where the study areas for two or more wind farms overlap so that both of the wind farms are experienced at proximity where they may have an incremental effect, or where wind farms may combine to have a sequential effect, irrespective of any overlap in visibility. The cumulative assessment will include existing wind farms, those that are under construction and consented, and those for which planning applications have been submitted, where the turbines are greater than 50m to blade tip. Sites that are at scoping stage will only be included exceptionally, if they are of specific relevance to the assessment. The cumulative assessment will focus on the most relevant cumulative sites as recommended in SNH's guidance.

Significance of Effects

5.83. The broad objective in assessing the effects of the Proposed Development is to determine, as required by the EIA Regulations, what the predicted significant effects of the Proposed Development on the landscape and visual resource will be. In this LVIA, effects will be assessed to be either significant or not significant.

5.84. The significance of effects is assessed through a combination of two considerations; (i) the sensitivity of the landscape element, landscape character receptor, view or visual receptor, and (ii) the magnitude of change that will result from the introduction of the Proposed Development.

5.85. Sensitivity is an expression of the ability of a landscape element, landscape character receptor, view or visual receptor to accommodate the Proposed Development, and is dependent on baseline characteristics including its susceptibility to change, value, quality, importance, the nature of the viewer, and existing character.

5.86. Magnitude of change is an expression of the scale of the change on landscape elements, landscape character receptors and visual receptors that will result from the Proposed Development.

5.87. The factors that are considered in sensitivity and magnitude of change are assimilated to assess whether the Proposed Development will have an effect that is significant or not significant. OPEN's methodology for assessing wind farm development is not reliant on the use of a matrix to determine the significance of landscape and visual effects, nor does it define levels of significance. It is, however, considered useful to include a matrix in the methodology to illustrate how combinations of sensitivity and magnitude of change can give rise to a significant effect and to provide an understanding as to the threshold at which significant effects may arise. Table 5.3 below provides this illustration.

Table 5.3: Illustrative Matrix of Significance of Effects

Magnitude Sensitivity	High	Medium-High	Medium	Medium-Low	Low	Negligible
High	Significant	Significant	Significant	Significant or not significant	Not Significant	Not Significant
Medium-High	Significant	Significant	Significant or not significant	Significant or not significant	Not Significant	Not Significant
Medium	Significant	Significant or not significant	Significant or not significant	Not Significant	Not Significant	Not Significant
Medium-Low	Significant or not significant	Significant or not significant	Not Significant	Not Significant	Not Significant	Not Significant
Low	Significant or not significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

5.88. Effects that are assessed within the dark grey boxes in the matrix are assessed to be significant in terms of the requirements of the EIA Regulations. Those effects that are assessed within the light grey boxes may be significant, or not significant, depending on the specific factors and effect that is assessed in respect of a particular landscape or visual receptor. In accordance with the Landscape Institute's Guidelines for Landscape and Visual Impact Assessment (GLVIA3) (paragraph 3.23), experienced professional judgement is applied to the assessment of all effects and reasoned argument is presented in respect of the findings in each case.

5.89. A significant effect occurs where the Proposed Development will provide a defining influence on a landscape element, landscape character receptor or view. A significant cumulative effect occurs where the combined effect of the Proposed Development with other existing and Proposed Developments will result in a landscape character or view that is defined by the presence of more than one wind farm and is characterised primarily by wind farms.

Nature of Effects

5.90. Electricity Works (Environmental Impact Assessment) (Scotland) Regulations (2011) state that the Environmental Statement should include a description of the likely significant effects of the Proposed Development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short and long-term, permanent and reversible, positive and negative effects of the Proposed Development. Guidance provided by the Landscape Institute

on the Nature of Effect, in its publication 'Guidelines for Landscape and Visual Impact Assessment' 3rd Edition, is limited to a single entry which states that "One of the more challenging issues is deciding whether the landscape (or visual) effects should be categorised as positive or negative. It is also possible for effects to be neutral in their consequences for the landscape. An informed professional judgement should be made about this and the criteria used in reaching the judgement should be clearly stated..".

5.91. In relation to many forms of development, the ES will identify beneficial, neutral and adverse effects under the term Nature of Effect. The landscape and visual effects of wind farms are difficult to categorise in these brackets as, unlike other disciplines, there are no definitive criteria by which these effects can be measured as being categorically beneficial or adverse. For example, in disciplines such as noise or ecology it is possible to identify the nature of the effect of a wind farm by objectively quantifying its effect and assessing the nature of that effect in prescriptive terms. However, this is not the case with landscape and visual effects, where the approach combines quantitative and qualitative assessment. The LVIA will determine whether effects are beneficial, neutral or adverse in accordance with defined criteria.

5.92. Judgements on the nature of effect are based on professional experience and reasoned opinion informed by best practice guidance.

Cumulative Assessment

5.93. The operational, consented, application stage and scoping stage cumulative wind farms within a 40 km radius of the Proposed Development are shown on Figure 5.2.

5.94. The cumulative assessment will be carried out in accordance with 'Assessing the cumulative impact of onshore wind energy developments', SNH 2012, and advice will be sought from A&BC and SNH as to sites to be included in the assessment, as well as agreement of a cut-off date for updating cumulative data prior to submission.

5.95. The cumulative assessment will focus on the most relevant cumulative sites as recommended in SNH's guidance.

<u>Key Issues</u>

5.96. The following bullet points summarise the key considerations that will be addressed in the LVIA. This is not intended to be a definitive list, but indicates OPEN's assessment of the potential key effects of the Proposed Development at the Scoping stage:

- The potential effects of the Proposed Development on the special qualities of the Loch Lomond & Trossachs National Park and Kyles of Bute National Scenic Area; on the surrounding Landscape Character Types and on the Bute and South Cowal Area of Panoramic Quality;
- The comparative scale of the turbines within the Proposed Development, as seen alongside the existing Cruach Mhor Windfarm and the features of the surrounding landscape;

- The visual effect on key routes through the area (including water based craft) and the key viewpoints along them (ie Kyles of Bute Viewpoint);
- The potential cumulative effects of the Proposed Development in respect of the cumulative context comprising other existing, consented and proposed wind farms; and
- The potential effects on the views and visual amenity of nearby residents and views of walkers and cyclists on the Cowal Way LDR and NCR 75 respectively.

Cultural Heritage

5.97. The Cultural Heritage Impact Assessment (CHIA) considers the potential impact of the Ardtaraig Wind Farm (the 'Proposed Development') on cultural heritage assets. Both physical and setting impacts are considered by the CHIA. The CHIA will be prepared by CgMs Ltd a Registered Organisation of the Chartered Institute for Archaeologists (CIfA). CgMs has extensive experience in this field.

5.98. The CHIA will be prepared with reference to:

- CIfA 2015 Standard and Guidance for Historic Environment Desk-Based Assessment; and
- Historic Environment Scotland 2016 Managing Change in the Historic Environment: Setting.

5.99. Presented below is the proposed scope of the CHIA. The proposed scope is informed by an initial study of readily available sources (summarised below) and experience from previous similar work.

Initial baseline

Designated heritage assets

5.100. Designated heritage assets in this area are focused upon the low ground in the major valleys (Figure 5.8), reflecting the distribution of land suitable for settled agriculture and the historical importance of the valleys as communication corridors.

5.101. Designated heritage assets within 5km of the proposed turbines are identified in Table 5.4. Their locations are shown on Figure 5.8. The closest designated heritage assets to the Proposed Development are the scheduled Ardtaraig chapel (SM3333) and the Category C-listed Ardtaraig House (LB50863). These respectively lie 2km and 2.2km to the south-east of the nearest of the scoping-layout turbines. They are located on the shore of Loch Striven near its northern end.

5.102. Approximately 3.5km to the west of the proposed development is the valley of Glendaruel. Scattered along the valley floor are three scheduled monuments, two Category A-listed buildings, five Category B-listed buildings and four Category C-listed buildings. Not all of these are within 5km of the proposed turbines those that are have been listed in Table 5.4. The scheduled

monuments comprise two mottes (SM11102 & 11103) and a church (SM3333), the Category A buildings comprise a sundial (LB11810) and a bridge (LB11806), the Category B buildings a gateway (LB11803), a house (LB11805), a bridge (LB11808) and two churches (LB11800 & 11802), whilst the Category C-listed buildings comprise a burial ground (LB11804), a mausoleum (LB11807), a farm (LB11809), a bridge (LB13041) and a house (LB50863).

5.103. Owing to their location in valley bottoms, the setting of the above assets generally relate only to the valley. Views from them are generally short range and constrained by the valleys in which they lie. Similarly, they are generally only visible from their immediate surroundings.

5.104. The nearest inventory garden or designed landscapes are Benmore, approximately 7.2km to the east of the Proposed Development, and Ballimore, approximately 10.3km to the west. The nearest conservation area is Clachaig, approximately 8.2km to the south-east and there are no inventory battlefields within 40km of the Proposed Development.

Table 5.4 Designated heritage assets within 5km of proposed turbines

Category	Ref. No.	Name	Distance from nearest turbine (km)
Scheduled monument	SM3333	Ardtarig, chapel W of Glentarsan	2
	SM11102	Ardacheranmor, motte 190 m N of	3.7
	SM11103	Clacheranmor, motte E of	4
	SM90318	Kilmodan Church, burial ground, sculptured stones & burial aisle	4
Category A listed building	LB11810	Sun-dial at Ormidale House	4.2
Category B listed buildings	LB11800	Kilmodan Kirk, Clachan of Glendaruel	4.1
	LB11802	St. Sophia's R.C. Chapel, Glendaruel	4.3
	LB11803	Gate-way, Glendaruel Park	4.1
	LB11808	Ballochandrain Bridge, River Ruel	4.2
Category C listed buildings	LB11804	Campbell of Glendaruel burial-place	4
	LB11809	Ballochandrain Farm	4.6
	LB13041	Glendaruel Bridge, River Ruel	4
	LB50863	Ardtaraig House	2.2

Non-designated heritage assets

5.105. Non-designated assets within 5km of the proposed development and in the surrounding area are, like the designated assets, concentrated on the valley

floors. However, they also extend up the sides of the valleys and into associated minor valleys. These include chambered cairns, standing stones, farmsteads and shielings. Very few heritage assets have been recorded on the higher slopes and ridge-tops.

5.106. With one exception, heritage assets currently recorded within the application area, lie in its southern part, below 150m AOD. These comprise a farmstead and associated features alongside the Tamhnich Burn (Canmore 40534, 140176, 346620 and 346621) and a stock enclosure (Canmore 346639), to the west of Coille Mhòr. These are probably of Post-Medieval date. The exception is a cluster of shieling huts near a tributary of the Tamhnich Burn (Canmore 165784) that lies at approximately 240m AOD. Again these are likely to be of Post-Medieval date. The stock enclosure (Canmore 346639) is crossed by the existing track that will serve the Proposed Development. Aside from this the closest recorded asset to the Proposed Development is approximately 300m west of the nearest of the proposed turbines.

5.107. There is some potential for previously unrecorded assets to be present in the vicinity of the proposed development as this upland area has not been subject to systematic survey previously. This potential relates principally to shieling huts. These are generally of Medieval or Post-Medieval date, though examples have been recorded with Prehistoric phases, and tend to be located next to watercourses. To the north of the proposed turbines is Allt nah-Airigh Loisgte. Given the 'airigh' component of the name, it may be assumed that there are shieling huts in the vicinity of this stream. Preliminary examination of historic mapping has not identified any other place names indicative of settlement in the vicinity of the Proposed Development and there is no indication on historic maps and satellite imagery that the area of the Proposed Development has been subject to agricultural improvement. Consequently, most classes of heritage asset are likely to survive as upstanding features and hence may be identified through a walkover survey.

Data sources

5.108. Data will be gathered from the following sources:

- Historic Environment Scotland datasets;
- West of Scotland Archaeology Service (WoSAS) Historic Environment Record (HER);
- Maps held by the National Library of Scotland;
- Aerial photographs held by National Collection of Aerial Photography (NCAP); and
- Readily available published sources.

Study areas

5.109. The following study areas will be applied:

- Site. Based on the application area, data will be gathered for this area in order to identify designated and non-designated heritage assets that may be physically impacted by the proposed development and to identify

variations in archaeological potential, resulting from factors such as topography.

- Study Area. This will extend 5km from the Site. Data will be gathered within this area to identify heritage assets that may be subject to significant impacts as a result of change in their setting, specifically all designated heritage assets and non-designated assets that are considered to be of national importance. Designated assets comprise scheduled monuments, listed buildings, registered parks and gardens, registered battlefields and conservation areas. Non-designated assets of national importance will be identified with reference to WoSAS HER's Non-Statutory Register.

5.110. Nationally important designated assets within 40km of the proposed turbine will be subject to rapid consideration. Where it is considered that such assets may be subject to significant impacts or where raised specifically by consultees, they will be subject to detailed assessment.

Walkover survey

5.111. The Site will be subject to a walkover survey to verify and augment the results of the documentary research. The survey will take in the application area but will be focussed upon the construction footprint.

5.112. Heritage assets will be located using a consumer-grade GPS (generally accurate to ±2m), photographed and described.

5.113. Selected assets outside the site boundary will be visited in order to gather baseline setting data.

Potential impacts

5.114. There is limited potential for significant impacts upon designated assets in the area. Most of the designated assets in the area are located in low-lying areas where visibility of the proposed turbines is likely to be limited by topography. Clear views of the proposed turbines from designated assets are only likely to be available from a substantial distance; the closest likely examples being Ormidale Lodge, a Category C-listed building approximately 6.9km to the south-west of the Proposed Development, and Inverchaolain Manse, a Category B-listed buildings approximately 10km to the south-east of the Proposed Development.

5.115. No heritage assets beyond 5km from the proposed turbines have been identified where it is considered that there is potential for significant impacts.

5.116. No heritage assets have been recorded previously in proximity to the Proposed Development. The land has not been subject to survey previously and it is considered that there is some potential for previously unrecorded assets to be present. This potential is greatest on the lower slopes and in the vicinity of watercourses.

Proposed visualisations

5.117. The initial scoping study has not identified any assets where specific heritage visualisations are likely to be necessary. Where appropriate visualisations

produced for the LVIA will be referred to; the LVIA scoping report proposes viewpoints at Ardtaraig and Glendaruel that will inform the setting impact assessment of relevant assets in these locations. This approach will be confirmed through consultation.

Mitigation measures

5.118. In the first instance physical impacts will be avoided through design. In the context of wind farms in upland areas avoidance is generally readily achievable as heritage assets tend to be upstanding and of relatively small scale and hence may be identified early in the design process and avoided.

5.119. Where avoidance is not possible the physical loss of assets may be offset through a programme of archaeological works that allows for their preservation by record. The scope of such work will be agreed with the planning authority's archaeological advisors, WoSAS.

Assessment methodology

5.120. Impacts upon the physical fabric and setting of heritage assets will be assessed with reference to the change in their cultural significance. CgMs' assessment methodology is presented below.

5.121. The assessment of an effect's significance depends on the sensitivity of the asset affected and the magnitude of predicted change. The sensitivity of an asset will be determined on the basis of designation or, in the case of undesignated assets, with reference to the criteria provided in the Historic Environment Scotland Policy Statement 2016, for the determination of national importance for scheduling. Sensitivity reflects the level of importance of the asset as presented below (Table 5.5).

Table 5.5: Sensitivity Criteria

Sensitivity	Importance	Description
High	National	Nationally important designated assets (scheduled monuments, Category A listed buildings, inventory gardens and designed landscapes and inventory battlefields), assets with a C grading in the WoSAS Non-Statutory Register of sites of schedulable quality or assets meeting the criteria for national importance. Some conservation areas are of national importance.
Medium	Regional	Category B listed buildings, conservation areas and undesignated cultural heritage assets and historic buildings of regional importance.
Low	Local	Category C listed buildings and undesignated cultural heritage assets and historic buildings of local importance.

5.122. The magnitude of change will be assessed with reference to the degree of change in the asset's cultural significance (Table 5.6). The term 'cultural significance' is used in Historic Environment Scotland Policy Statement 2016; and is distinct from sensitivity and significance of effects (as used in standard

Environmental Impact Assessment terminology). The cultural significance of an asset can be characterised by reference to one or more characteristics, namely:

- Intrinsic – those inherent in the monument;
- Contextual – those relating to the monument's place in the landscape or in the body of existing knowledge; and
- Associative – more subjective [considerations] of the associations of the asset, including with current or past aesthetic preferences.

5.123. The cultural significance of each asset potentially affected will be described and the degree to which the overall cultural significance of the asset is affected will be used to arrive at a magnitude of predicted change as set out below.

Table 5.6: Magnitude Criteria

Magnitude of Change	Description
Major	Total loss or substantial alteration to key elements of the asset or its setting, such that post-development cultural significance of the asset will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements of the asset or its setting, such that post-development cultural significance of the asset will be materially changed.
Minor	Marginal shift away from the baseline conditions. Change arising from the loss/alteration will be readily detectable but not material: the asset's cultural significance post development will be slightly diminished.
Negligible	Change in cultural significance barely detectable.

5.124. It should be noted that it is possible for appreciable change to occur in the setting of a heritage asset without there being any adverse effect upon its cultural significance. Where change occurs but this does not affect cultural significance it would be concluded that there will be no effect.

5.125. The sensitivity of the asset, together with the magnitude of change, defines the significance of the effect (Table 5.7). Where there is scope for two levels of effect (e.g. major or moderate), professional judgement will be used.

Table 5.7: Significance of Effects

Sensitivity	Magnitude of Change			
	Major	Moderate	Minor	Negligible
High	Major	Major or Moderate	Moderate or Minor	Negligible
Medium	Major or Moderate	Moderate	Minor	Negligible
Low	Moderate or Minor	Minor	Minor or Negligible	Negligible

5.126. Major and moderate effects are considered significant in the context of the Environmental Impact Assessment (Scotland) Regulations 2011 ("EIA Regulations").

Cumulative assessment

5.127. The potential for cumulative effects is restricted to potential setting effects. The cumulative assessment will consider operational, consented, application stage and scoping stage windfarms within 10km of the proposed development; developments beyond 10km will be considered where raised specifically by consultees.

Ecology

5.128. The ecology assessment will assess the effect of the Proposed Development on important ecological features (excluding ornithological features - refer to Chapter 7 for details of the ornithology baseline and methodology).

5.129. The Proposed Development site comprises an area of open moorland, bordered by watercourses and a conifer plantation to the west, and ridges of steep slopes downwards to Balliemore Burn and Loch Striven to the east. There are small areas of broadleaved woodland within the southern part of the Proposed Development site.

Legislation, Policy and Guidance

5.130. The ecology chapter of the Environmental Statement (ES) will set out the results of an ecological impact assessment, which will be carried out in accordance with guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2016[4]). The assessment will also consider the following international and national legislation, policy and guidance:

- Environmental Impact Assessment Directive 85/337/EEC (as amended);
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna ("Habitats Directive");
- Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ("Water Framework Directive");
- European Commission (27 October 2010) Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels;
- SERAD (Scottish Executive Rural Affairs Department) 2000. Habitats and Birds Directives, Nature Conservation: Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('The Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995;
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;

[4] CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (the Habitats Regulations);
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- Nature Conservation (Scotland) Act 2004 (as amended);
- Scottish Executive (2004). The Scottish Biodiversity Strategy: It's in Your Hands;
- Argyll and Bute Local Biodiversity Action Plan 2010 – 2015;
- The Wildlife and Natural Environment (Scotland) Act 2011;
- Planning Circular 3 2011;
- Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations (2011);
- Policy Advice Note PAN 1/2013 - Environmental Impact Assessment (Scottish Government 2013);
- Scottish Government (2013). 2020 Challenge for Scotland's Biodiversity.
- Scottish Government (2014). National Planning Framework 3 (NPF3);
- Scottish Government (2014). Scottish Planning Policy (SPP);
- The Scottish Biodiversity List (http://www.biodiversityscotland.gov.uk);
- SEPA (2014) Guidance Note 4 - Planning Advice on Windfarm Developments;
- Scottish Natural Heritage (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- Scottish Natural Heritage (2013). Planning for development: What to consider and include in Deer Management Plans for development sites;
- Scottish Natural Heritage (2013) Planning for Development: What to consider and include in Habitat Management Plans;
- Natural England (2014) Natural England Technical Information Note TIN 051. Bats and Onshore Wind turbines - Interim Guidance;
- SEPA (2014). Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Land Use Planning System SEPA Guidance Note 31; and
- Scottish Renewables, SNH, SEPA, FC (Scotland) (2015, Version 3) Good Practice during Windfarm Construction.

Baseline

Desk Based Study

5.131. The desk study will gather ecological information (including relevant designated sites) from a variety of online sources and consultation with conservation organisations, such as those listed below:

- Scottish Natural Heritage (SNH), including Sitelink [http://gateway.snh.gov.uk/sitelink/index.jsp];

- Any relevant project information such as the Cruach Mhor Wind Farm Environmental Impact Assessment or other Proposed Developments;
- The National Biodiversity Network (NBN) Gateway website [https://data.nbn.org.uk/];
- Argyll & Bute Council;
- Scottish Badgers;
- Lorn Natural History Group;
- The Bat Conservation Trust; and
- Argyll Fisheries Trust.

Designated Sites

5.132. Table 5.8 details the designated sites located within 5 km of the Proposed Development site that have an ecological (non-ornithological) interest. The potential connectivity of these sites to the Proposed Development site will be fully considered in the ecological impact assessment.

Table 5.8 Ecological Designated Sites within 5 km

Designated Site	Distance from the Proposed Development site	Ecological Qualifying Features
Ruel Estuary Site of Special Scientific Interest (SSSI)	550m SW	Fen meadow Floodplain fen Saltmarsh Upland oak woodland
Glendaruel Wood and Crags SSSI	2.8km NW	Rocky slopes (includes inland cliff, rocky outcrops, chasmophytic vegetation) Upland oak woodland

5.133. In addition there are also areas of woodland listed in SNH's Ancient Woodland Inventory[5] that have been identified adjacent to the south-western edge of the Proposed Development site boundary, and elsewhere within 1km. These will also be included as part of the assessment.

Field Surveys

5.134. The following ecological surveys have been undertaken at the Proposed Development site and within recommended survey buffers:

- National Vegetation Classification (NVC) habitat surveys (completed in July and September 2016) within the maximum proposed developable area and up to 250 m buffer from proposed infrastructure where appropriate. An

[5] https://gateway.snh.gov.uk/natural-spaces/dataset.jsp?dsid=AWI

assessment of Groundwater Dependent Terrestrial Ecosystems (GWDTEs) will also be undertaken using the information obtained.

- Protected species survey (for otter, water vole, badger, red squirrel, pine marten, wildcat, reptiles and bat roost suitability) was completed in June 2016 within the maximum proposed developable area (the area inside the Proposed Development site boundary where all infrastructure will be located) and up to a 250 m buffer within suitable habitat. A second visit, primarily for recording water vole presence in line with recent guidance[6], was undertaken in September 2016.
- Bats – following a desk study and initial site visits, the Proposed Development site was classified as being of "low" suitability habitat for bats (as per Hundt (2012[7]) and Collins (2016[8]) guidance). Therefore, one round of manual transect surveys and one round of static surveys using AnaBat detectors were undertaken per season (spring, summer and autumn 2016) within the Proposed Development site boundary.

Field Surveys Scoped-out

5.135. It is proposed that fish and fisheries are scoped out of the EIA. The watercourses within the developable area are generally small, upland, often first order, streams. Many are only a couple of decimetres wide and shallow; they are also inaccessible to migratory salmonids due to small dams downstream and steep gradients and numerous natural waterfalls. The small watercourses in the western half of the Proposed Development site flow towards Tamhnich Burn on the west site boundary, and eventually into Auchenbreck Burn to the southwest of the Proposed Development site. The Tamhnich Burn is the largest burn around the developable area and reaches a few metres in width, it is a typical rocky and often turbulent upland watercourse, and it is likely to contain a population of small brown trout (one was observed during walkover surveys). A dam and waterfalls at Tom a'Chodail is likely to prevent free movement of any salmonids up the Tamhnich Burn. In the east of the developable area, small tributary streams flow steeply across the hill and down through crags to the Balliemore Burn; it is highly unlikely fish are present within these small streams in the site.

5.136. It is acknowledged that there is the potential for accidental events including the discharge of silt contaminated surface water or hydrocarbon/chemical spill from construction areas into these small watercourses and therefore the wider catchments. However, the Construction Environmental Management Plan for the Proposed Development would be designed to incorporate good practice measures to control and monitor surface water run-off rate and water quality, and to implement good practice pollution prevention measures. As a result of accepted and robust measures being put in place, there would be no likely significant direct or indirect effects on aquatic species during construction, operation and decommissioning.

[6] 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.
[7] Hundt L (2012) Bat Surveys: Good Practice Guidelines, 2nd edition, Bat Conservation Trust.
[8] Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London;

Methodologies

Habitats

5.137. Vegetation surveys used the NVC scheme methods (Rodwell, 1991-2000; five volumes[9]) and were conducted in accordance with NVC survey guidelines (Rodwell, 2006[10]). Homogenous stands and mosaics of vegetation were identified and mapped by eye, and drawn as polygons on high resolution aerial imagery field maps. These polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other notable species present. NVC communities were attributed to the mapped polygons using surveyor experience and matching field data against published floristic tables (Rodwell, 1991-2000).

5.138. On assessment of the results of the NVC survey, if any GWDTEs are located within (i) 100 m from roads, tracks and trenches or (ii) 250 m from borrow pits and foundations (as per SEPA, 2014[11] guidance), the likely impact of these features will be subject to further assessment.

Protected Species

5.139. All accessible watercourses within 250m of the maximum proposed developable area were surveyed for otter and water vole field signs. Otter field signs and survey methods are described in Bang & Dahlstrøm (2001)[12], Sargent & Morris (2003)[13] and Chanin (2003)[14]. Searches for water vole field signs followed the methodology prescribed in Dean et al. (2016)[15].

5.140. Land with the potential to support badger within the maximum proposed developable area and a buffer of 100 metres, was searched for field signs with particular attention given to any areas underlain by mineral soils as opposed to peat. Field signs of badger are described in Neal and Cheeseman (1996)[16], Bang and Dahlstrøm (2001)[17], and SNH (2001)[18].

5.141. Habitat was also surveyed and evaluated for wild-cat and pine marten with reference to the habitat preferences of these species and their wider ecological requirements. Any signs of these species observed during fieldwork were noted.

[9] Rodwell, J.S. (Ed), et al. (1991 – 2000). British Plant Communities (5 volumes). Cambridge, Cambridge University Press.
[10] Rodwell, J.S. (2006). NVC Users' Handbook. ISBN 978 1 86107 574 1.
[11] SEPA (2014). Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Land Use Planning System SEPA Guidance Note 31.
[12] Bang, P., and Dahlstrøm, P. (2001). Animal Tracks and Signs. Oxford University Press, Oxford.
[13] Sargent, G., and Morris, P. (2003). How to Find and Identify Mammals. The Mammal Society, London.
[14] Chanin, P. (2003). Monitoring the Otter (Lutra lutra). Conserving Natura 2000 Rivers Monitoring Series No.10 English Nature, Peterborough.
[15] Dean, M., Strachan, R., Gow, D., Andrews, R.M., Mathews, F. (Ed.), Chanin, P.R.F. (Ed.) (2016). The Water Vole Mitigation Handbook. The Mammal Society.
[16] Neal, E., and Cheeseman, C.L. (1996). Badgers. Poyser Natural History, London.
[17] Bang, P., and Dahlstrøm, P. (2001). *Animal Tracks and Signs*. Oxford University Press, Oxford.
[18] SNH (2001). Scotland's Wildlife: Badgers and Development. SNH, Battleby.

5.142. It is not considered necessary to undertake targeted reptile surveys; however, incidental records of reptile sightings, or signs such as shed skins, and features of particular importance (i.e. potential hibernacula) were recorded.

5.143. As with reptiles, it is not considered necessary to undertake specific surveys for terrestrial invertebrates; however those habitats of particular importance to the group (e.g. dead wood, wild flower assemblages etc.) were recorded.

5.144. Detailed surveys for great crested newt were not conducted due to the lack of suitable water bodies within the survey area.

Bats

5.145. Following Hundt (2012) guidance for low risk sites, surveys were carried out seasonally over the main period of bat activity (May to September). The key objectives of the survey work were as follows:

- determine the assemblage of bat species using the site, noting high, medium and low risk species;
- establish patterns of bat activity across the Proposed Development site;
- investigate the seasonal use of the site by bats in spring, summer and autumn;
- identify any potential impact on bats in relation to the Proposed Development; and
- identify any requirements for impact avoidance, mitigation or compensation.

5.146. The following survey methods were employed for the spring, summer and autumn bat activity surveys:

- walked transects with stopping points which target representative habitats throughout the site.
- The use of remote bat detectors deployed in representative habitats throughout the site at six locations to monitor bat activity in the spring, summer and autumn.

Habitats

5.147. The Proposed Development site comprises an area of open moorland, ranging from approximately 80m to 432m above sea level. The western Proposed Development site boundary follows the Tamhnich Burn, which in turn is bordered to the west by conifer plantation with some mixed woodland. To the east the Proposed Development site boundary broadly follows the ridges of steep slopes which lead watercourses downwards to Balliemore Burn and eventually to Loch Striven. There are small areas of broadleaved woodland within the southern part of the Proposed Development site.

5.148. The dominant NVC communities within the central and northern areas of the site are M25 (Molinia caerulea-Potentilla erecta mire), M19 (Calluna vulgaris-Eriophorum vaginatum blanket mire), and M23 (Juncus effusus/acutiflorus-Galium palustre rush-pasture). The communities M15 (Tricophorum cespitosum-Erica tetralix wet heath) and H12 (Calluna vulgaris-Vaccinium

myrtillus heath) were recorded across the more elevated summits along the eastern boundary.

5.149. The southern area of the site is dominated by the wet grassland communities M23 and M25, particularly at lower levels across the more level ground. The bracken dominated community U20 (Pteridium aquilinum-Galium saxatile) is particularly abundant across this area of the site.

5.150. The proposed access option, to the south of the site, extends predominantly through M23, M25, and U20. The alternative proposed access, partly along an existing forestry track to the west, extends mainly across mature conifer plantation woodland, clear-fell areas (with replanting evident), M23, M25 and occasional small woodland stands of W4.

5.151. Habitats M25, M23, M15 and W4 are classifiable as either moderately or highly groundwater dependent, and will be considered in the layout design and ecological impact assessment.

Protected Species

5.152. The Proposed Development site is limited in its suitability to contain protected species but does support some habitats and features that could be utilised. Historic records for otter, wildcat and red squirrel exist in the wider local area (NBN Gateway data), but none were made within the Proposed Development site boundary.

5.153. During the protected species survey in June 2016, potential areas that may be used for otter holts or resting places were recorded along watercourses (tributary into Tamhnich Burn, Auchenbreck Burn), but no signs of presence were observed for otter or any other protected species.

5.154. A second survey to establish the presence of water voles on site was undertaken in September 2016, and signs of presence of any other protected species were also noted during this visit. No signs of water vole were found. The only protected species sign recorded were likely pine marten scats, within the plantation area to the west of the developable area; this species was confirmed as present in the local area due to the observation of a road killed pine marten along the B836 near the site during surveys.

Bats

5.155. The Proposed Development site was considered to be of low suitability for bats, comprising open moorland with relatively few linear features and suitable habitats for roosting, feeding or commuting. No historic bat records from within the Proposed Development site or surrounding area were made available via the NBN Gateway. Manual transect and static detector surveys were undertaken, and the results of these will be used to inform the ecological impact assessment.

5.156. During the protected species survey, it was noted that individual trees in broadleaved woodland at the south Proposed Development site boundary (NS 02669 81741) were considered to have potential for bat roosts. The locations

of these trees are unlikely to be close to any proposed infrastructure and so the risk of the Proposed Development to roosting bats is likely to be low.

Assessment of Potential Effects

Potential Effects

5.157. The assessment will cover the effects of construction, operation and decommissioning of the Proposed Development upon those important ecological features identified during survey work and as advised by consultees. In general, effects upon the following will be assessed:

- Designated sites - effects include direct (i.e. derived from land-take) and indirect (i.e. changes caused by effects to supporting systems such as groundwater);
- Terrestrial habitats - effects include direct (i.e. derived from land-take) and indirect (i.e. changes caused by effects to supporting systems such as groundwater or overland flow);
- Aquatic habitats and species - effects are limited to the ecological effects of changes in water conditions through potential pollution effects or habitat loss/change due to watercourse crossings. Hydrological effects are considered in Chapter 12; and
- Protected species - effects considered include direct (i.e. loss of life as a result of the Proposed Development; loss of key habitat; displacement from key habitat; barrier effects preventing movement to/from key habitats; and general disturbance) and indirect (i.e. loss/changes of/to food resources; population fragmentation; degradation of key habitat e.g. as a result of pollution).

Assessment Methodology

5.158. The assessment of potential effects on ecological interests will be based on CIEEM (2016) guidelines and will take into account national legislation and policy, and the aims of the European Habitats Directive.

5.159. The assessment process involves the following:

- Identification of the potential effects of the Proposed Development site;
- Incorporating potential effects into the design process as appropriate;
- Consideration of the likelihood of occurrence of remaining potential effects where appropriate;
- Defining the Nature Conservation Value of the important ecological features present;
- Establishing the magnitude of the likely effect (both spatial and temporal);
- Based on the above information, a professional judgement as to whether or not the resultant effect is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant, measures to mitigate or compensate for the effect are suggested where required;
- If required, opportunities for enhancement may be considered; and

- Residual effects after mitigation, compensation or enhancement are considered.

5.160. Nature Conservation Value is defined on the basis of the geographic scale, and it is necessary to consider each important ecological feature's conservation status, its distribution and its population trend (species) based on available historical records.

5.161. The significance of potential effects is determined by integrating the assessments of Nature Conservation Value and magnitude in a reasoned way.

5.162. A set of pre-defined significance criteria will be used in assessing the effects of the Proposed Development. It requires to be established whether there will be any effects which will be sufficient to adversely affect the important ecological feature to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e. the 'do nothing' scenario).

5.163. The mitigation hierarchy of avoidance, mitigation, then compensation, will be employed to address effects on important ecological features. Opportunities for biodiversity gain will be identified, where possible, in accordance with the recommendations within NPF3 and SPP.

Cumulative Assessment

5.164. An assessment of cumulative effects will be undertaken following published guidance (SNH 2012). Cumulative effects on each receptor relevant to this Proposed Development will be assessed in relation to other projects and activities subject to the EIA process within a relevant search area, and their effects on a relevant reference area/population (for example at a watershed or Natural Heritage Zone level).

Key Issues for Consideration in the EIA

5.165. The key issues for the ecology and nature conservation are:

- effects on designated sites;
- effects on habitats;
- effects on protected species;
- effects on aquatic species; and
- appropriate mitigation measures.

Ornithology

5.166. This section details the proposed approach to the evaluation of bird interest on the Proposed Development and surrounding area, and the assessment of potential effects. The ornithology surveys, site evaluation and assessment of potential effects are being undertaken by Natural Research (Projects) Ltd (NRP).

Legislation and Guidance

5.167. The following legislation, guidance and policy will be considered as part of the assessment:

- SERAD (Scottish Executive Rural Affairs Department) (2000) Habitats and Birds Directives, Nature Conservation: Implementation in Scotland of EC Directives on the conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('The Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995;
- EU Council Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive');
- The Wildlife and Countryside Act 1981 (as amended);
- Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- SNH Guidance (2013): Recommended bird survey methods to inform impact assessment of onshore windfarms;
- SNH Guidance (2006): Assessing significance of impacts from onshore windfarms on birds outwith designated areas;
- SNH Guidance (2010): Use of avoidance rates in the SNH wind farm collision risk model;
- SNH Guidance (2012): Regional population estimates of selected Scottish breeding birds;
- SNH Guidance (2012): Assessing the cumulative impact of onshore wind energy developments;
- Pendlebury et al (2011): SNH Commissioned report: Literature review to assess bird species connectivity to Special Protection Areas;
- JNCC (2012) The UK Biodiversity Action Plan (UKBAP);
- Eaton et al (2015) The Birds of Conservation Concern (BoCC) 'Red List'; and
- Scottish Biodiversity Forum (2013) Scottish Biodiversity List.

Baseline

Designated Sites

5.168. The Proposed Development is not designated internationally or nationally for bird interests. The nearest Special Protection Area (SPA) is the Renfrewshire Heights SPA (approximately 23km south-east) which is designated for breeding hen harrier. The nearest Site of Special Scientific Interest (SSSI) designated for birds is the North end of Bute SSSI (approximately 10km south), which is partly designated for the upland breeding bird assemblage.

Methodology

Field Survey

5.169. Surveys of the Proposed Development and surrounding area were completed between 2013 and 2015. Twenty-four months of surveys were completed following the SNH guidance (SNH 2013), with the prime objectives to survey breeding, migrating and wintering birds within prescribed buffers of the Proposed Development and to quantify flight activity.

5.170. The survey effort was split into two periods and the area of interest was altered between those two periods. Surveys commenced in April 2013 and ran for 12 months until March 2014. Surveys then restarted in September 2014 with a revised (smaller) area which was then enlarged in November 2014, and surveys then continued until November 2015.

5.171. The survey areas used encompass the area of interest at that time plus a buffer appropriate to the species under consideration (Figure 5.9 & 5.10). Survey results will be tailored to the relevant buffers around the layout to allow an assessment consistent with the Proposed Development.

5.172. The following surveys were undertaken:

- Generic flight activity (vantage point watches);
- Breeding scarce raptors and owls;
- Breeding birds of open ground areas;
- Black grouse; and
- Autumn / winter walkovers.

5.173. Surveys were undertaken by experienced field ornithologists, under licence from SNH (where required). Full details of the survey effort, weather conditions and methods will be presented in the Environmental Statement (ES).

Generic Flight Activity – vantage point watches

5.174. Flight activity within the vicinity of the Proposed Development was quantified in order to: identify areas of greatest importance to birds; and generate quantitative data on activity levels to inform an assessment of collision risk. The methods given in Band et al (2007) will be used.

5.175. Four Generic Vantage Points (GVPs) were established with the aim of maximising ground visibility within a 500m survey boundary using the minimum number of points. GVPs were selected through a mix of Geographical Information System (GIS) analysis and field trials. Visibility was modelled at 20m elevation with a 2km cut-off (Figure 5.11).

5.176. A minimum of 36 hours of observation has been completed from each GVP for each season (between April and August (breeding season) (Table 5.9) and September and March (non-breeding season) (Table 5.10)). Due to the alteration in the area of interest two 500m survey boundaries were used. For

the first survey boundary GVP1 and GVP2 were utilised during April to August 2013 for 39 hours each, then GVP2 and GVP3 were utilised from September 2013 to March 2014 for 36.5 hours each. For the second survey boundary GVP3 and GVP4 were utilised. GVP3 was used from December 2014 to March 2015 then September to November 2015 for 43 hours and April to August 2015 for 38 hours.

Table 5.9: Survey Effort from Generic Vantage Points for each breeding season

Year	GVP	Apr	May	Jun	Jul	Aug	Total
2013	1	7.50	8.00	8.00	8.00	7.50	39.00
	2	7.50	8.00	8.00	8.00	7.50	39.00
2015	3	7.50	8.00	8.00	8.00	7.50	39.00
	4	7.50	8.00	7.25	8.00	7.50	38.25

Table 5.10: Survey Effort from Generic Vantage Points for each non-breeding season

Year	GVP	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
2013/14	2	3.00	6.00	6.00	4.50	5.00	6.00	6.00	36.5
	3	3.00	6.00	6.00	4.50	5.00	6.00	6.00	36.5
2014/15	3	6.00	5.00	5.00	4.00	5.00	5.00	6.00	36.00
	4				8.00	5.50	9.67	5.00	28.17
2015/16	4	5.00		10.00					15.00

5.177. Observers positioned themselves to minimise their effects on bird behaviour and a viewing arc not exceeding 180 degrees was scanned. Watches were undertaken during daylight hours by a single observer in a range of weather conditions, excepting poor ground visibility and were spread temporally to include a representative number of hours early and late in the day.

5.178. During each watch three hierarchical recording methods were used: once a focal species was detected the bird was followed until it ceased flying or was lost to view. The duration was noted and the bird's flying elevation above the ground estimated at the point of detection and at 15 second intervals thereafter; other focal species (such as geese and wader species) were not timed but their flight paths were mapped and elevation recorded at the start and when it changed during the flight bout; finally a count of species of lower conservation importance was summarised for each 5 minute period of the watch.

Migratory Flight Activity

5.179. Scottish Natural Heritage was consulted at the start of field surveys and agreed (email to NRP from E. Pryor May 2013) that given the location of the Proposed Development additional watches to record migratory movements of geese, swans and waders at a landscape scale were not required.

Breeding Scarce Raptors and Owls

5.180. Surveys were carried out during the breeding season within a 2km survey boundary surrounding the Proposed Development. Extreme care was taken to avoid unnecessary disturbance to breeding birds. Methods followed those described in Hardey et al (2009), and priority was given to the species considered most likely to occur: hen harrier, peregrine, short-eared owl and merlin. Contact with the Argyll Raptor Study Group was maintained and data were obtained from them on the locations of nearby active golden eagle and white-tailed eagle territories.

Black Grouse

5.181. Suitable habitat within a 1.5km survey boundary was checked for displaying ('lekking') males during the spring of 2013 and 2015. Care was taken to avoid disturbing the birds.

5.182. Two visits were undertaken (in April and in May) to all areas identified as potentially suitable for holding displaying males. Visits were made on calm, dry days with good visibility, within three hours of sunrise. Observers listened carefully for displaying males from suitable locations, and any located leks were watched to allow total counts of males and females present to be made.

Autumn/winter walkovers

5.183. These surveys were designed to counter-balance the surveys of breeding birds undertaken during the spring and summer and occurred within the 500m survey boundaries surrounding the Proposed Development. Walk routes aimed to meander to examine as much ground as practical. Where practicable, observers used a different route on each visit to maximise spatial coverage of the site. Location, time of detection, species, count and for some species flight routes, were recorded and mapped.

<u>Assessment</u>

5.184. The assessment will follow the process set out in the EIA Regulations (2000) and Scottish Government guidance. The process of evaluating the effects of the Proposed Development on birds will ensure that the consenting authority has sufficient information to determine whether the Proposed Development (either alone or in combination with other plans or projects) is likely to have a significant effect on bird interests.

5.185. Potential effects on birds associated with the construction and/or operation of the Proposed Development include:

- A short-term reduction in breeding or wintering bird populations due to construction disturbance;
- A permanent reduction in breeding or wintering bird populations due to loss of habitat critical for nesting, roosting or feeding;
- A permanent reduction in breeding or wintering populations due to loss of individuals through collision with the turbines; and

- Cumulative effects with other nearby development proposals that are constructed during the same period, and/or with other developments which pose either a potential collision risk or loss of habitat displacement.

Evaluating Effects

5.186. In assessing whether an effect is significant or not, three factors will be considered:

- The Nature Conservation Importance (NCI) of the species involved;
- The magnitude of the likely effect; and
- The conservation status of the species.

Determining Significance

5.187. Following the classification of each species' NCI and consideration of each effect, professional judgement will be used to make a reasoned assessment of the likely effect on the conservation status of each potentially affected species. In accordance with the EIA Regulations, each likely effect will be evaluated and classified as either significant or not significant, in the context of the status of, and trends within, regional populations as defined by SNH Natural Heritage Zones (NHZs). If necessary, measures will be presented to mitigate any effects deemed to be significant.

Key Issues for Consideration in the EIA

5.188. Based on the data collected and also information from the adjacent constructed Cruach Mhor wind farm (operated by SPR) the key issues are anticipated to be the potential for disturbance and displacement of breeding hen harrier, short-eared owl and black grouse, and potential for collision with rotating turbine blades or displacement of foraging golden eagle and hen harrier.

Geology and Soils

5.189. The Geology and Soils ES Chapter will consider the potential issues arising from the construction, operation and decommissioning of the Proposed Development in relation to potential impacts on the geological, soils and peat resources of the Site.

Baseline Conditions

5.190. The Proposed Development is in an upland area with craggy bedrock outcrops in the south and central area separated by a shallow wide valley feature in which the burn known as Bearach Gaoith flows south-west.

5.191. Baseline data have been collected from publically available data sources, including the British Geological Survey (BGS) and Soil Survey of Scotland mapping. Additionally, a preliminary geomorphological and peat depth survey was undertaken between the 15th and 19th August 2016 on the south and central areas of the identified peat survey area, as shown on drawing ED11733-001. The northern area will be subject to survey at a later date; and the area adjacent to the eastern boundary will be omitted from the surveys

due to steepness of slope. The preliminary peat survey area covers approximately 275ha and was designed to include the proposed turbine locations (plus a 250m buffer); locations of proposed site access and haul roads; and areas along the existing community forest access road which may require widening works to facilitate turbine delivery.

5.192. The bedrock is recorded on BGS mapping as strata of the Beinn Bheula Schist Formation of the Southern Highland Group. The rocks generally comprise Psammite and Pelite (metamorphosed sandstone and mudstone) in the north of the development area and Metaconglomerate in the south and along the access track. The site is crossed by numerous olivine microgabbro dykes of the Mull Dyke Swarm which are generally orientated in a NW – SE direction. At the north-western boundary of the development area, the south-western boundary where the proposed access track passes into the community forest; and various locations along the proposed access track in the community forest, the bedrock is overlain by superficial deposits of Devensian Till. In other areas superficial deposits are absent.

5.193. The Soil Survey of Scotland 1:250,000 mapping shows that the soils are predominantly peaty gleys, peats and rankers; with some peaty podzols. Scottish Natural Heritage's (SNH) Carbon and Peatland map (2014) records the majority of the development area as Class 2, Most of the vegetation cover indicates priority peatland habitats and all soils are carbon-rich soil and deep peat. The community forest area appears to be mainly Class 3, Vegetation cover does not indicate priority peatland habitat, but is associated with wet and acidic soil types. Most soils are carbon-rich soils, with some areas of deep peat.

5.194. The preliminary peat depth survey (100m by 100m grid basis) confirmed that peat is present across the main body of the site, however the area has been heavily drained and is crossed by a large number of man-made drainage ditches. Consequently, the peat deposits are heavily degraded with dense grass cover, rather than typical bog vegetation. Although sphagnum is still present in the understory of the sward, it is dry and in some areas bleached. Therefore, across the majority of the site, the surface of the peat has dried out and is currently acting as a carbon rich soil rather than an actively forming peat deposit. Peat depths vary across the site from approximately 0.1 m to 3.0 m, with the deeper peats generally concentrated along the shallow valley feature separating the south and central area, as shown in drawing ED11733-001.

5.195. Due to the high level of disturbance, peat depths within the forested areas to the west of site (proposed access) and along the existing access track, are highly variable over short distances.

5.196. The Land Capability for Agriculture 1:250,000 mapping (Soil Survey of Scotland, 1982) records the majority of the development area and the access track as being within Class 6.3, which is defined as land unsuited to improvement by mechanised means and of low grazing value. Localised areas of Class 6.1 (of high grazing value) soils are recorded on the southern boundary of the development area and localised areas along the track in the forest. Class 5.3 soils which are defined as land marginally suited to

reclamation and capable of use as improved grassland are recorded across the southern extent of the track in the forest.

5.197. The Land Capability for Forestry 1:250,000 mapping (Forestry Commission, 1988) records the eastern side of the development area as Class F7, Unsuitable for tree crops. The remainder of the development area is recorded as Class F6, having Very Limited flexibility for growth and management of trees. The access track through the forest varies between Class F4 and F5, having Moderate and Limited flexibility for growth/management of trees.

5.198. There are no Regionally Important Geological/Geomorphological Sites within 20km of the site. The closest Geological Conservation Review (GCR) site (Cove Bay to Kilcreggan (Ref. No 2707) which is located c.20km east of the site) is not designated as a SSSI, nor notified as an interest feature within a SSSI.

Potential Impacts

5.199. There is a potential risk of peat slide hazard as a result of wind farm construction, should construction activities impact areas of deeper or unstable peat deposits. The EIA will therefore incorporate an assessment of the likely impact of the proposed wind farm development on peat resources and the potential risk of peat slide.

5.200. The excavation of peat through construction of access tracks, turbine foundations and cable trenches has the potential to impact the peat habitat as a result of localised changes in drainage leading to possible further drying and oxidation.

5.201. There is also the risk of peat loss, should the peat resource be handled and stored incorrectly. This may consequently lead to a deterioration in downstream water quality as a result of the potential release of organic matter and nutrients.

5.202. There is also the potential for a deterioration in the biodiversity of the site; and a reduction in the site's capacity for carbon storage and sequestration.

5.203. Considering the limited value of the mineral soil to agriculture or forestry, and that any mineral soils excavated would be reused in restoration areas, the potential impact on mineral soil is negligible and can therefore be discounted from further assessment as part of the EIA.

5.204. Although it is recognised that bedrock would be quarried from borrow pit(s) to generate aggregate for track construction, considering the size of the resource and that there are no GCR sites within 20km the potential impact on bedrock is negligible and can therefore be discounted from further assessment as part of the EIA.

Potential Mitigation

5.205. Both preliminary (high resolution) and detailed peat depth survey will be undertaken across the development area. These data will inform the iterative design process and allow, where practicable, construction operations to be

focused in areas with shallow or no peat. This will ensure that the disturbance to the peat resource and the volume of peat excavated will be minimised.

5.206. Peat survey data will also inform the development of a peat slide risk assessment, following the guidance contained in the Scottish Executive's 'Peat Landslide Hazard and Risk Assessments', (2006). This will ensure that areas at 'serious risk' of instability are avoided; and appropriate site specific mitigation and best practice measures are adopted in other areas. Where practicable, development will be focussed in areas with the lowest risk of instability.

5.207. A peat restoration plan will be developed if the potential impacts to peat are considered to be significant. This will involve long-term monitoring of peat restoration. The degraded nature of the peat resource on site also provides the opportunity for the restoration of areas within, or adjacent to, the site which will not be impacted by construction activities; these opportunities will be discussed with the consenting authority, SEPA and SNH during project consultations.

5.208. A peat management scheme will also be developed and incorporated into the construction method statement. This will outline appropriate mitigation and working methods, such as the correct handling and storage of the peat resource, including the timing of construction activities, to minimise impacts to the peat resource and peatland habitats.

5.209. Appropriate guidance will be followed, including, but not limited to, Good Practice during Wind Farm Construction (Joint Publication by Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency and Forestry Commission Scotland), Version 1, October 2000.

Assessment Methodology

5.210. Assessment presented in the EIA will be based on site visits; peat depth and peat characterisation surveys; desk-based study; and consultation with Argyll and Bute Council, SNH and SEPA.

5.211. Peat survey will follow the Scottish Government's guidance document 'Guidance on Developments on Peatland: Site Surveys (February 2014). The preliminary peat depth survey, based on a 100m x 100m grid pattern, will be completed across the site to inform the initial design phases. The survey will also record the following features:

- All topographic features related to geology and geomorphology;
- Exposures of superficial deposits;
- Exposures of any bedrock outcrops and potential borrow pit locations; and
- Indications of slope instability, including any features observed from an inspection of aerial imagery; and identified through initial desk based review of site geomorphology.

5.212. Further detailed peat depth survey on a 50m by 50m grid across the development area (based around the preliminary survey points) will be undertaken at the detailed design stage (when the masterplan is fully developed). The density of survey will be further reduced to a 10m by 10m

grid in areas of peat removal such as turbine locations (grid based around the centre of each proposed turbine base), crane pads, substations and site compounds etc.; and to 50 to 20m intervals along proposed new track/road locations using 10m right angled offsets.

5.213. Peat core survey will be undertaken at the detailed design stage to establish the condition of the peat resource on site. These data will further inform site design and the peat slide risk assessment. The density and distribution of sampling will be dependent upon site specific conditions identified during the preliminary site survey; and a detailed sample methodology will be developed once those data are available. Cores will also allow the extent (depth) of the acrotelm (upper aerobic peat layer) and catotelm (lower anaerobic peat layer) to be identified, and their excavation volumes to be calculated.

5.214. The peat surveys will therefore record:

- The wetness of the ground;
- The depth to rockhead;
- Peat profiles and depth measurements (including depths of the aerobic acrotelm and anaerobic catotelm layers);
- Peat structure and moisture content;
- An assessment of peat strength;
- Slope angle measurements;
- Geomorphology assessment; and
- Details of sub-profile drainage.

5.215. To further inform the peat slide risk assessment, data relating to rainfall and climate will also be obtained.

5.216. The scope of the assessments described above will be used to support the EIA for the proposed development in line with relevant legislation and guidance, following processes set out under the EIA Regulations (2000). The significance of effects will be determined and, where required, appropriate mitigation measures will be described. The assessment will provide the consenting authority with sufficient information to determine whether the proposal (either alone or in combination with other developments) is likely to have a significant effect on soils and geology at the site.

Water Resources

5.217. The Water Resources ES Chapter will consider the potential issues arising from the construction, operation and decommissioning of the Proposed Development in relation to potential hydrogeological and hydrological impacts. It will assess the potential impacts on:

- surface waters and groundwaters;
- flood risk, and
- anthropogenic features such as Private Water Supplies (PWS), water abstractions and discharges.

5.218. The assessment will develop a baseline dataset, assess potential through each stage of the Proposed Development and consider potential mitigation and management measures, to assess the significance of residual effects. The assessment will also consider if there may be any cumulative impact arising from the Proposed Development and other current or future (known) developments within the same catchment(s).

Baseline Data

Surface Water Features

5.219. In the surrounding area of the turbines there are a number of watercourse and waterbodies. Cruach nan Cuilean (hill) forms a watershed boundary between the Balliemore Burn and Auchenbreck Burn catchments. The east, north and northeast of the turbines drains into the Balliemore Burn, which outfalls to Loch Striven northwest of the village of Ardtaraig. The southeast of the turbines drains directly into Loch Striven. The west and southwest drains to the Tamhnich Burn / Auchenbreck Burn, which has a confluence with the River Ruel west of Auchenbreck Wood. The River Ruel flows into Loch Ruel, which is also known as Loch Riddon.

Water Quality

5.220. The Balliemore Burn is monitored by SEPA under the Water Framework Directive (WFD) as part of SEPA's River Basin Management Plans (RBMP). In 2014, SEPA classified the Balliemore Burn as having moderate ecological potential[19]. The Tamhnich Burn was also classed as have moderate ecological potential in 2014. In 2014, the River Ruel was classified as having good ecological potential. Loch Striven and Loch Ruel / Loch Riddon as coastal waterbodies were in 2014 classes as having overall WFD statues of good. In 2013, the Cowal and Lomond groundwater body, also monitored under the WFD, was classified by SEPA as having good overall status.

Hydrogeology

5.221. A review of the British Geological Survey (BGS) online hydrogeology map indicates the turbines and surrounding area are underlain by a low productivity bedrock aquifer in which there are only small amounts of groundwater in near surface weathered zones and secondary fractures. According to BGS[20], the turbines are located in at area with a groundwater vulnerability class of 5, which means the groundwater is vulnerable to most pollutants, with rapid impact in many scenarios.

Flood Risk

5.222. The SEPA indicative flood maps[21] indicate that along the valleys of the Balliemore Burn and the Tamhnich Burn / Auchenbreck Burn there is high likelihood of fluvial flooding. In the vicinity of the turbines, there are small

[19] Scotland's Environment partnership (2016) Scotland's Environment [online]. Accessed 04.08.2016. Available at: http://map.environment.scotland.gov.uk/seweb/map.htm.
[20] British Geological survey, 2011 Groundwater Vulnerability (Scotland) GIS Dataset Version 2.
21 Scottish Environment Protection Agency (2016) Flood Maps [online]. Accessed 04.08.2016. Available at: http://map.sepa.org.uk/floodmap/map.htm.

areas at risk of surface water flooding but these areas are likely due to local depressions in the topography. Loch Striven and the surrounding shores have a high likelihood of tidal flooding. With reference to groundwater, the local topography of the turbines locations is likely to result in hydraulic gradients that are unlikely to lead to a high risk of groundwater flooding.

Designations

5.223. The turbines are not in or near Bathing Waters, Cyprind Waters[22], Salmonid Waters, an Urban Waste Water Treatment Area[3], a Nitrate Vulnerable Zone[1] or a river or lake / loch Drinking Water Protection Areas (DrWPA) according to SEPA's RBMP interactive map[3]. The turbines are in a groundwater DrWPA[3] and Loch Striven is designated as a Shellfish Growing Waters[3].

Hydro-ecological Designated Areas

5.224. The turbines are not located in a hydro-ecological designated area. The nearest site is the Ruel Estuary, which is a biological Site of Special Scientific Interest (SSSI).

Potential Impacts

5.225. The assessment will identify potential impacts mainly due to construction of the access tracks, watercourse crossings, turbine foundations, cable trenches, compound, substation, converters and storage areas etc. and those resulting in the decommission stage. Some activities have the potential to continue having an impact during the operational stage. The potential impacts identified include the following:

- increased runoff on exposed ground causing erosion and pollution;
- increase in silt and sediment loads as a result of construction works;
- disturbance or erosion of bed and banks of watercourses and land drains;
- increased runoff from hardstanding areas causing erosion and pollution;
- increase downstream flood risk from watercourses crossings;
- changes to watercourse morphology;
- point source pollution from accidental spillages; and
- disruption/cut off of natural surface and groundwater pathways.

Methodology

Desk Based Studies

5.226. The desk based study will examine the catchments as a whole and the conditions of the water resources onsite and downstream of the Site. It is

[22] Scottish Environment Protection Agency (2016) River Basin Management Plan Interactive Map. Accessed 04.08.2016. Available at: http://map.sepa.org.uk/rbmp/.

proposed that the following tasks will be undertaken to ensure the baseline data informs the impact assessment:

- review of Ordnance Survey (OS) maps to identify surface water features;
- review of the Scotland River Basin Management Plan;
- review Scottish Water's asserts maps;
- identification of the locations and characteristics of catchments, surface water features and springs within and adjacent to the Site;
- identification of Water Framework Directive (WFD) classifications and objectives, obtained from the SEPA website for watercourses and waterbodies within and adjacent to the Site;
- collation of data and location of abstractions and discharge consents within and adjacent to the Site; and
- collation of information on climate (including long term average monthly rainfall figures), surface hydrology and flood risk, and Identification of hydrogeological conditions and groundwater resources (including groundwater vulnerability and productivity); together with secondary information relating to:
    - the bedrock and superficial geology maps; and
    - a review of soil maps.

Field Based Survey

5.227. The walkover survey will validate the recorded characteristics of watercourses and waterbodies within the Site and in surrounding area, as defined by the surface water catchment. Characteristics that will be recorded include bank height, channel width and depth of water and bank vegetation. A photographic record of the observed watercourses and waterbodies will also be taken. The data from the survey will be used to determine the location and type of any proposed watercourse crossing. A table will be included in the Water Resources chapter that will summarise all proposed watercourse crossings and will provide measurements and a photograph of each watercourse or a typical watercourse with the same development area and an indication as to the level of CAR authorisation required.

Consultation

5.228. As part of the desk based study, SEPA would also be consulted regarding incident of flooding, surface water and groundwater quality data and CAR (Controlled Activities Regulations) licenced activities (including abstractions and discharges) within the Site and in the surrounding area. Under the Private Water Supplies (Scotland) Regulations 2006, Councils have a duty to compile a list of PWS in their area and monitor the quality of the supplies. Argyll and Bute Council will be contacted regarding the presence of PWS within or close to the Site.

Water resources legislation, policy and guidance

5.229. A qualitative assessment will be undertaken using a combination of professional judgment, legislation and other statutory policy and guidance. Key acts of legislation, policy and guidance, which will be considered in the preparation of this assessment include: Water Framework Directive (2000/60/EC), Priority Substances Directive (2008/105/EC), Groundwater Daughter Directive (2006/118/EEC), Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013, Water Environment (Controlled Activities) (Scotland) Regulations 2011, Water Environment and Water Services (Scotland) Act 2003, Scottish Planning Policy (2014) and National Planning Framework 3 (2014). Various guidance documents will be consulted including but not limited to SEPA Guidance Notes 4 and 31 and Scottish Natural Heritage et al (2010) Good practice during wind farm construction.

Impact Assessment Methodology and Mitigation

5.230. The assessment of groundwater abstractions (if applicable) within 100m of excavation of less than 1m deep (e.g. access tracks) and/or within 250m of excavations of greater than 1m deep (e.g. borrow pits and turbine foundations) abstractions will follow the guidance detailed in SEPA's Guidance Notes 31 and 4. Wherever possible the design of the Proposed Development will avoid groundwater abstractions and the respective 100/250m standoff distances.

5.231. A Level 1 - Flood Risk Assessment (FRA) will provide a general indication of the potential flood risk to the Site and identify whether there are any flooding or surface water management issues that may warrant further consideration or may affect the feasibility of a development. The FRA will consider the flood risk to and from the Site at all stages of the Proposed Development's lifecycle.

5.232. Wind farm construction would be in accordance with good industry practice and guidance. This includes avoiding hydrologically sensitive areas, retaining hydraulic connectivity across the Site and adopting pollution prevention measures. As a consequence, mitigation measures will be incorporated into the design and will adhere to the implementation of standard best practice, together with bespoke measures that relate to the baseline environment.

5.233. Mitigation measures will be designed to avoid, reduce or offset potential adverse impacts and these will feed into the development layout and design. The mitigation section will, if required, provide preliminary hydrological and hydrogeological monitoring proposals, the extent and nature of monitoring will depend on the finding of the baseline surveys and the impact assessment.

5.234. Impacts and cumulative impacts that have been determined to be major or moderate are considered to have a significant effect. This would then require the implementation of specific mitigation in addition to the good design, pollution prevention measures and mitigation measures contained in a Construction Environmental Management Plan (CEMP) or equivalent. Impacts that are identified as minor or negligible are not considered to have a significant effect and no further mitigation would be required.

Shadow Flicker

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

Policy Context

5.236. There are at present no formal guidelines available on what exposure would be acceptable in relation to shadow flicker. There is no standard for the assessment of shadow flicker. The specific advice sheet from Scottish Government, Onshore Wind Turbines a web-based guidance (Scottish Government, 2013) sets out the potential geographic area which may fall under assessment: "Where this (Shadow Flicker) could be a problem, developers should provide calculations to quantify effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule ten rotor diameters), 'shadow flicker' should not be a problem."

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

Baseline Overview

5.238. No properties lie within ten rotor diameters of the current turbine layout.

Methodology and guidance

5.239. Following a design freeze, a detailed assessment of the effects of shadow flicker will be undertaken which will identify regions where shadow flicker may be an issue and will take into consideration all sensitive receptors within ten rotor diameters and 130 degrees either side of north of the proposed wind turbines. If properties are identified within ten rotor diameters and 130 degrees either side of north of the proposed wind turbines a recognised computer software package will be used to then quantify the effects. The assessment will include an hours chart and zone chart of shadow flicker within the study area based on the assumption that a receptor containing a single vertical window will be facing towards the Proposed Development between ground and first level. The results of the assessment will be reported in the ES chapter which will also consider any potential mitigation options if required.

Key Issues for Consideration in the EIA

5.240. If properties are identified within ten rotor diameters and 130 degrees either side of north of the final turbine locations a full shadow flicker assessment will be undertaken.

Telecommunications

5.241. This section considers potential issues associated with telecommunication and television reception as a result of the Proposed Development during the construction, operation and decommissioning phases.

Policy Context

5.242. There are no planning policy requirements relevant to the potential telecom impacts associated with the proposed wind farm.

Baseline Overview and Proposed Scope of Assessment

5.243. Any potential effects on communication links will be sought through formal consultation with Spectrum Licensing (previously known as Ofcom) and all relevant link operators. Where possible, the turbines will be designed to take into account the minimum separation distance from the communication link. An assessment will be made as to the significance of potential operational effects and where appropriate, suitable mitigation measures will be discussed.

Television Reception

5.244. The closest television transmitter for nearby properties is the Rosneath transmitter. This transmitter has switched to digital transmission only. Currently there is no widely accepted method of determining the potential effects of wind turbine on digital television, however digital television signals are better at coping with signal reflections, and do not suffer from ghosting that may occur with analogue signals.

5.245. Digital transmitter powers increase to around ten times previous levels at digital switchover. At the same time, digital signals will have been added to the relay transmitter network. These improvements greatly increase the availability and robustness of digital terrestrial reception. To date, there are no known cases of wind turbine interference with digital television reception post digital switchover.

5.246. Digital UK is the independent, not-for-profit organisation leading the process of digital TV switchover in the UK, and provides coverage predictions for digital television. A general rule of thumb indicates that the better the predicted reception, the better the protection against interference. This is currently the most reliable information on signal strength, and hence vulnerability to interference.

5.247. Given the strength of the digital signal in the area and the inherently resilient nature of digital television reception, we consider there is a low risk of any interference from a wind energy development at this location on domestic television reception

5.248. Due to the low risk of interference with television reception, and as the requirement to address any reception issues once the Proposed Development were operational could be conditioned in planning consent it is not proposed to carry out a detailed assessment of potential effects on television reception.

Key Issues for Consideration in the EIA

5.249. The EIA will take into consideration any construction or operational effects on telecommunication systems. It is proposed to scope out of further assessment effects on television reception.

6. OTHER SUPPORTING INFORMATION

Planning Application Documents

6.1. In addition to the ES the application will be supplemented by the following documents:

- Supporting Statement;
- Design and Access Statement; and a
- Statement of Community Consultation.

Consultation during the EIA Process

Community Consultation

6.2. The communities of Colintraive and Glendaruel are already familiar with this kind of development, given the presence of Cruach Mor wind farm and also recently having gone through the application process for a community wind farm. In consultation with the Community Council, we will develop the most appropriate plan to communicate locally.

6.3. We will, as a minimum, propose two rounds of community open days and project newsletter delivered to surrounding properties, inviting residents to attend to consider the plans and provide input to the proposal.

Statutory and Non-Statutory Consultees

6.4. It is anticipated that the most relevant consultees will be consulted as part of this scoping request. Where necessary we will maintain contact with the consultee to ascertain further information or agree the scope in more detail.

Project Timescales

6.5. It is anticipated that a planning application for the revised scheme will be submitted in early 2017. We would therefore anticipate that construction would begin in early 2018 and the wind farm would be operational by the end of the year.

FIGURES

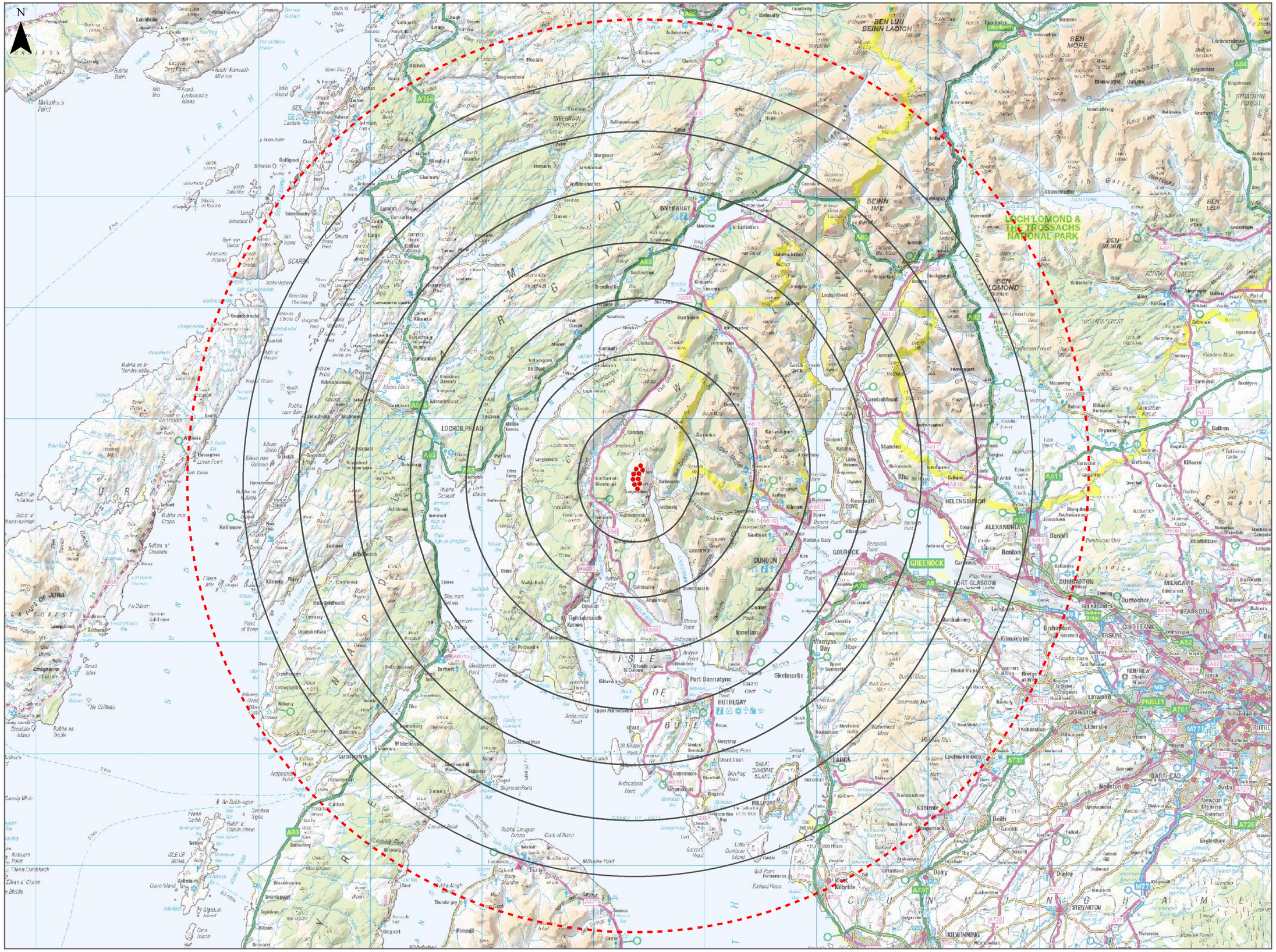
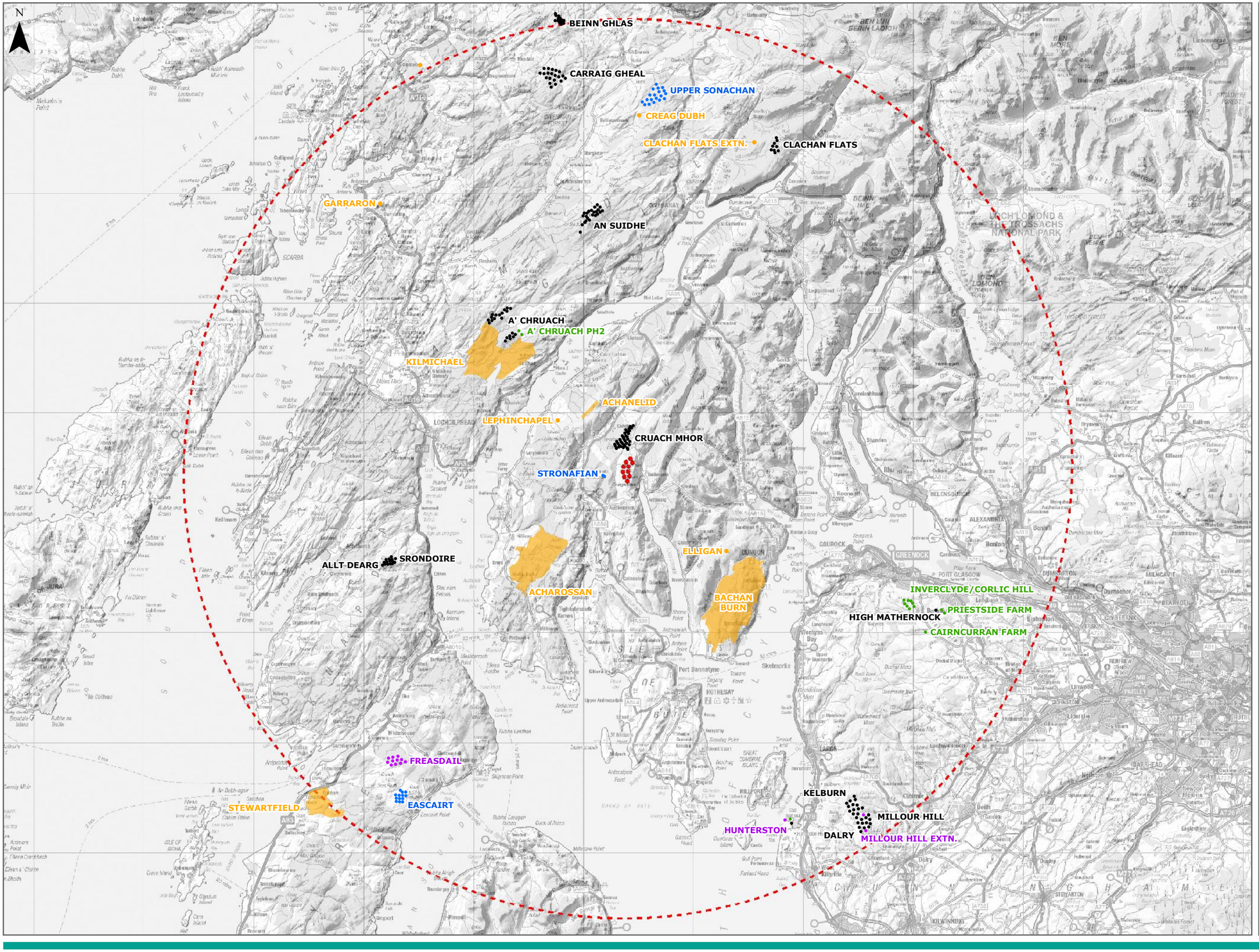

N
Legend:
Ardtaraig Turbines
5km Distance Radii
40km Study Area Boundary
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
INVERARAY
LOCHGILPHEAD
DUNOON
GREENOCK
HELENSBURGH
RUTHESAY
Port Bannatyne
Skelmorlie
LARGS
MILLPORT
Title:
Site Location & Study Area (40km)
Ardtaraig Wind Farm
Source: © Crown copyright and database rights 2016 Ordnance Survey 0100031673
Client: Infinergy
Drawn by: TH
Checked: JW
Date: 21/10/2016
Figure: 5.1
Scale: 0 2.5 5 km
Revision No: 0
INFINERGY

Figure 5.2: Cumulative Wind Farms (40km)

INFINERGY



Legend:

- Ardtaraig Turbines
- 5km Distance Radii
- 40km Study Area Boundary
- Operational Turbine
- Under Construction Turbine
- Consented Turbine
- Application Turbine
- Scoping Turbine
- Scoping Site

Note:
Cumulative wind farm status correct as per 04/08/2016

Title:
Cumulative Wind Farms (40km)

Ardtaraig Wind Farm

Source:

Client: Infinergy	
Drawn by: TH	**Checked:** JW
Date: 26/10/2016	**Figure:** 5.2
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY

INFINERGY

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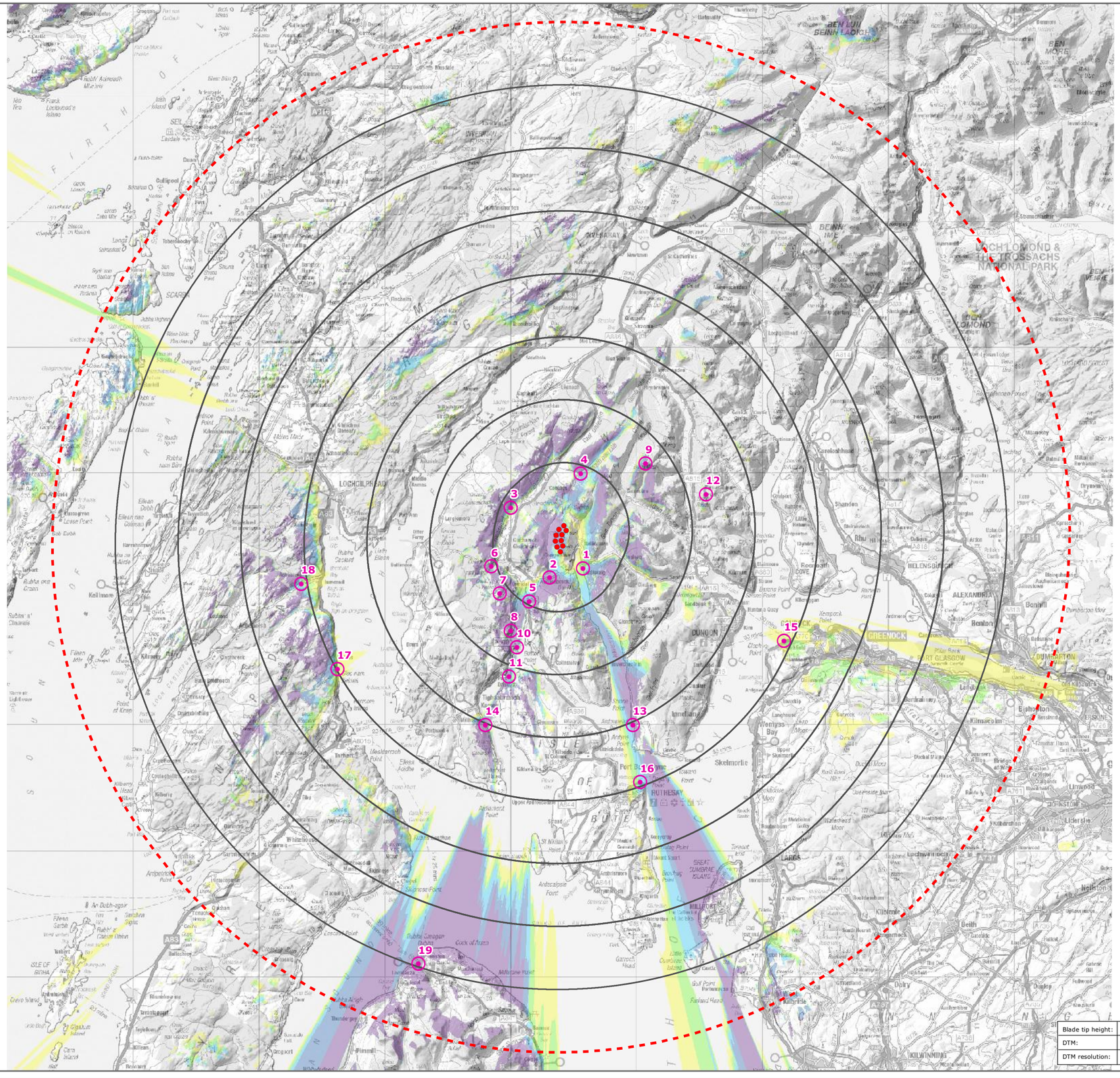


Blade tip height:	136.5m	Observer height:	2m
DTM:	OS T5	Surface features:	Excluded
DTM resolution:	10m	Earth curvature:	Included

Legend:

- Ardtaraig Turbines
- 5km Distance Radii
- 40km Study Area Boundary

Zone of Theoretical Visibility

No. of Blade Tips Visible

- 0
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10

Viewpoint Location

1 - Footpath-Dunnoon to Loch Striven, Ardtaraig Estate
2 - B836, east of Stronafian
3 - Glendaruel, Cowal Way north of Caravan site.
4 - Cowal Way east of Garvie
5 - A886, north of Ardachuple Farm
6 - Minor road west of Glendaruel
7 - Cruach nan Caprach
8 - A8003 Creagan Dubh, Kyles of Bute VP
9 - Beinn Mhor
10 - Cowal Way, Loch Ruel, north of Eilean Dubh
11 - Kyles of Bute
12 - Beinn Ruadh
13 - Glenstriven Road, north of Ardyne Point
14 - Unnamed 'b' road Car Park by Blair's Ferry, South of Kaimes
15 - McInroy's Point, Gourock
16 - A844, Bogany Point, Rothesay, Isle of Bute
17 - A83, east of Meall Mor
18 - B8024, west of Inverneil
19 - Arran, Lochranza Pier

Title: Blade Tip ZTV (40km)

Ardtaraig Wind Farm

Source:

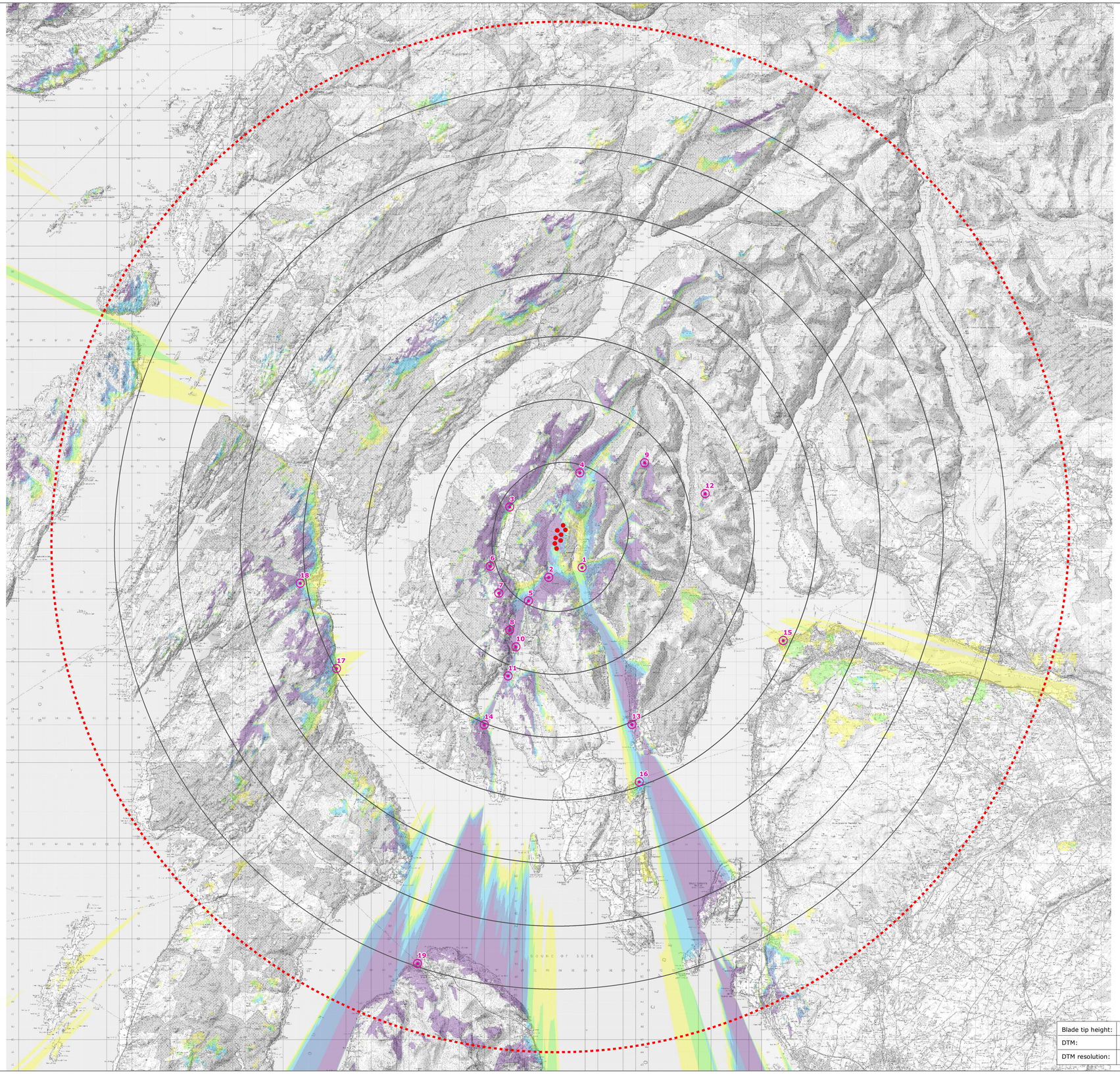
Client: Infinergy

Drawn by: TH	**Checked:** JW
Date: 21/10/2016	**Figure:** 5.3a
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY

Figure 5.3b: Blade Tip ZTV (40km)

INFINERGY



Legend:

- Ardtaraig Turbines
- 5km Distance Radii
- 40km Study Area

Zone of Theoretical Visibility

No. of Blade Tips Visible

- 0
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10

Viewpoint Location

1 - Footpath-Dunnoon to Loch Striven, Ardtaraig Estate
2 - B836, east of Stronafian
3 - Glendaruel, Cowal Way north of Caravan site.
4 - Cowal Way east of Garvie
5 - A886, north of Ardachuple Farm
6 - Minor road west of Glendaruel
7 - Cruach nan Caprach
8 - A8003 Creagan Dubh, Kyles of Bute VP
9 - Beinn Mhor
10 - Cowal Way, Loch Ruel, north of Eilean Dubh
11 - Kyles of Bute
12 - Beinn Ruadh
13 - Glenstriven Road, north of Ardyne Point
14 - Unnamed 'b' road Car Park by Blair's Ferry, South of Kaimes
15 - McInroy's Point, Gourock
16 - A844, Bogany Point, Rothesay, Isle of Bute
17 - A83, east of Meall Mor
18 - B8024, west of Inverneil
19 - Arran, Lochranza Pier

Blade tip height:	136.5m	Observer height:	2m
DTM:	OS T5	Surface features:	Excluded
DTM resolution:	10m	Earth curvature:	Included

Title: Blade Tip ZTV (40km)

Project: Ardtaraig Wind Farm

Source:

Client: Infinergy

Drawn by:	Checked:
TH	JW
Date: 21/10/2016	**Figure:** 5.3b
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY

INFINERGY

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Legend:

- Ardtaraig Turbines
- 40km Study Area Boundary
- 15km Buffer
- Argyll & Bute Landscape Character Areas
- North Ayrshire Landscape Character
- Loch Lomond & The Trossachs National Park LCA
- Glasgow and the Clyde Valley Landscape Character

See Figure 5b for LCA legend detail

Zone of Theoretical Visibility

No. of Blade Tips Visible

- 0
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10

Blade tip height:	136.5m	Observer height:	2m
DTM:	OS T5	Surface features:	Excluded
DTM resolution:	10m	Earth curvature:	Included

Data Source:
Argyll & Bute Landscape Windfarm Capacity Study, 2012
Landscape Capacity Study for Wind Turbine Development in Glasgow and the Clyde Valley, 2014
North Ayrshire Supplementary Landscape Wind Energy Capacity Study, 2013
SNH Landscape Character Assessment - Loch Lomond & The Trossachs National Park, 2012

Title: Landscape Character Areas with Blade Tip ZTV

Ardtaraig Wind Farm

Client: Infinergy

Drawn by:	Checked:
TH	JW
Date: 21/10/2016	**Figure:** 5.4a
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY

Figure 5.4b: Landscape Character Areas Legend

INFINERGY

Argyll & Bute Landscape Character Areas

Data Source: Argyll & Bute Landscape Windfarm Capacity Study, 2012

1. Steep Ridgeland & Mountains
2. High Tops
4. Mountain Glens
5. Open Ridgeland
5a. Bute Open Ridgeland
6. Upland Forest Moor Mosaic
6a. Loch Fyne Upland Forest Moor Mosaic
6b. Knapdale Upland Forest Moor Mosaic
7. Craggy Upland
7a. Craggy Upland with Settled Glens
7b. Craggy Coast & Islands
7c. North Loch Awe Craggy Uplands
8. Moorland Plateau
10. Upland Parallel Ridges
13. Rolling Farmland with Estates
13a. Bute Rolling Farmland with Estates
17a. Bute Basalt Lowlands
19a. Bute Coastal Plain
20. Rocky Mosaic
22. Coastal Parallel Ridges
23. Flat Moss & Mudflats

NSA

Glasgow and the Clyde Valley Landscape Character Areas

Data Source: Landscape Capacity Study for Wind Turbine Development in Glasgow and the Clyde Valley, 2014

1. Raised Beach
2. Floodplain
6. Rugged Upland Farmland
10. Broad Valley Lowland
12. Upland River Valleys
19. Moorland Hills and Ridges
20. Rugged Moorland Hills

U. Urban

North Ayrshire Landscape Character Areas

Data Source: North Ayrshire Supplementary Landscape Wind Energy Capacity Study, 2013

1a. North Ayrshire Raised Beach Coast
1b. Arran Raised Beach Coast
3b. Cumbraes Coastal Fringe with Agriculture
3c. Rugged Island Core
4a. Arran Coastal Headland
8a. Broad Valley Lowland
8b. Rolling Hill Slopes
8c. South-Western Rolling Hill Slopes
13a. Intimate Pastoral Valley: Brisbane Glen
19a. Rugged Moorland Hills & Valleys: Loch Thorn Area
19b. Rugged Moorland Hills & Valleys: Duchal Moor
19c. Rugged Moorland Hills & Valleys: Upland Core
19d. Rugged Moorland Hills & Valleys: Blaeloch & the Crosbie Hills
19e. Rugged Moorland Hills & Valleys: Haupland Muir
21b. Arran Rugged Granitic Upland

Loch Lomond & The Trossachs National Park LCA

Data Source: SNH Landscape Character Assessment - Loch Lomond & The Trossachs National Park, 2012

Highland

H1. Glen Side
H2. Hill
H3. Loch Island
H4. Loch Shore Fringe
H5. Sea Loch Foreshore
H6. Sea Loch Shore Fringe
H7. Strath and Glen Floor
H8. Strath and Glen Floor Loch
H9. Upland Glen
H10. Upland Glen Loch

Lowland

L1. Loch Island
L2. Loch Shore Fringe
L3. Lowland Loch
L4. River Valley Farmland with Estates
L5. Rolling Farmland with Estates

Transitional

T1. Loch Lomond Island
T2. Moorland
T3. Parallel Ridge
T4. Transitional Loch
T5. Upland Ridge

Land Cover

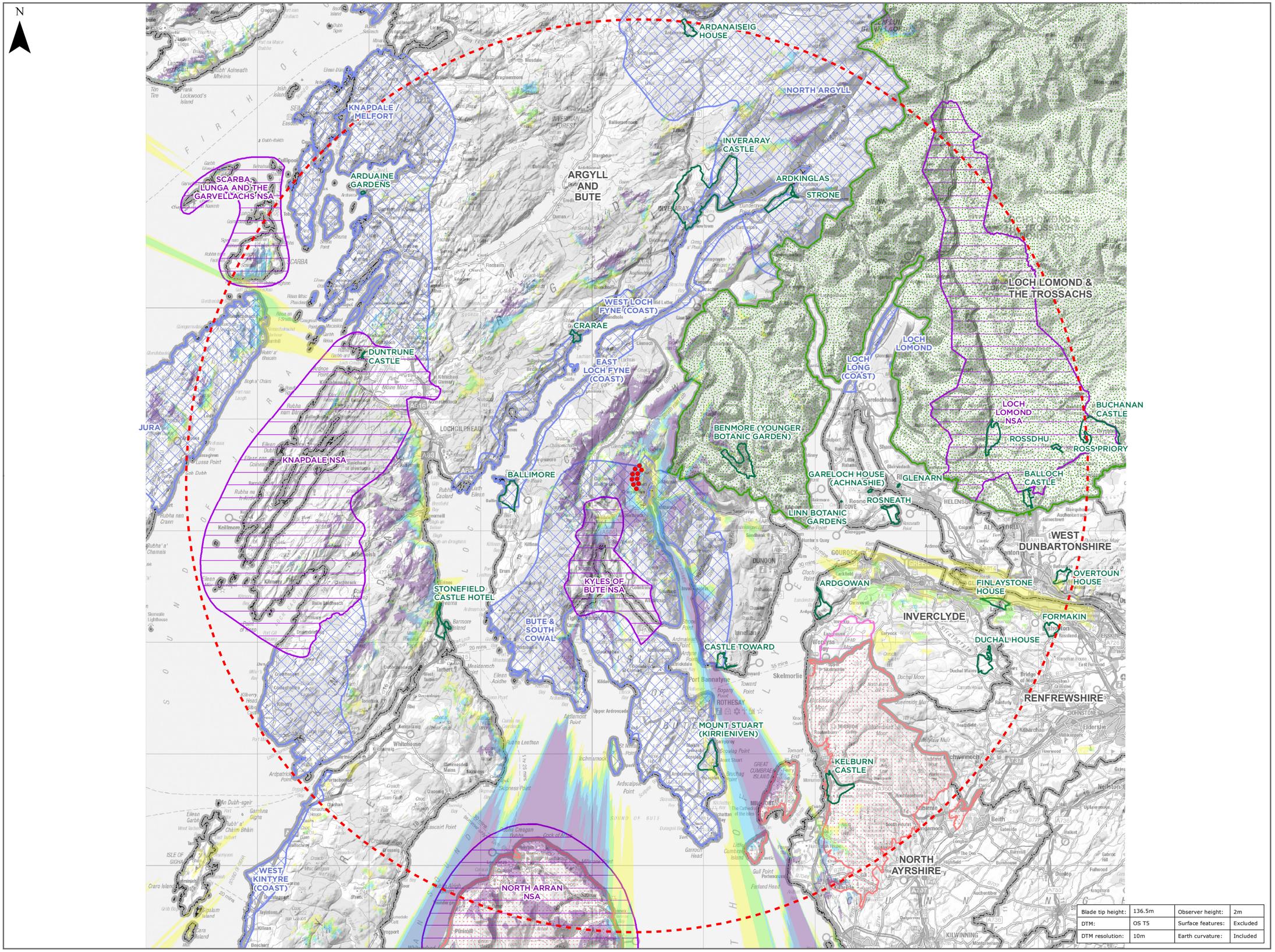
- Farmed
- Forested
- Open
- Wooded

Title: Landscape Character Areas Legend	
Ardtaraig Wind Farm	
Source: © Crown copyright and databse rights 2016 Ordnance Survey 0100031673	
Client: Infinergy	
Drawn by: TH	**Checked:** JW
Date: 21/10/2016	**Figure:** 5.4b
Scale: n/a	**Revision No:** 0

INFINERGY

Figure 5.5: Landscape Designations with Blade Tip ZTV

INFINERGY



Blade tip height:	136.5m	Observer height:	2m
DTM:	OS T5	Surface features:	Excluded
DTM resolution:	10m	Earth curvature:	Included

Legend:

- Ardtaraig Turbines
- 40km Study Area Boundary
- Planning Authority Boundary
- Garden & Designed Landscape
- Special Landscape Area
- West Renfrew Hills Scenic Area
- Loch Lomond & The Trossachs National Park
- National Scenic Area
- Area of Panoramic Quality

Zone of Theoretical Visibility
No. of Blade Tips Visible

- 0
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10

Data Source:
© Historic Scotland
North Ayrshire Local Development Plan, 2014
Inverclyde Local Development Plan, 2014
Argyll & Bute Local Development Plan, 2015
Scottish Government GI-SAT, 2010

Title: Landscape Designations with Blade Tip ZTV

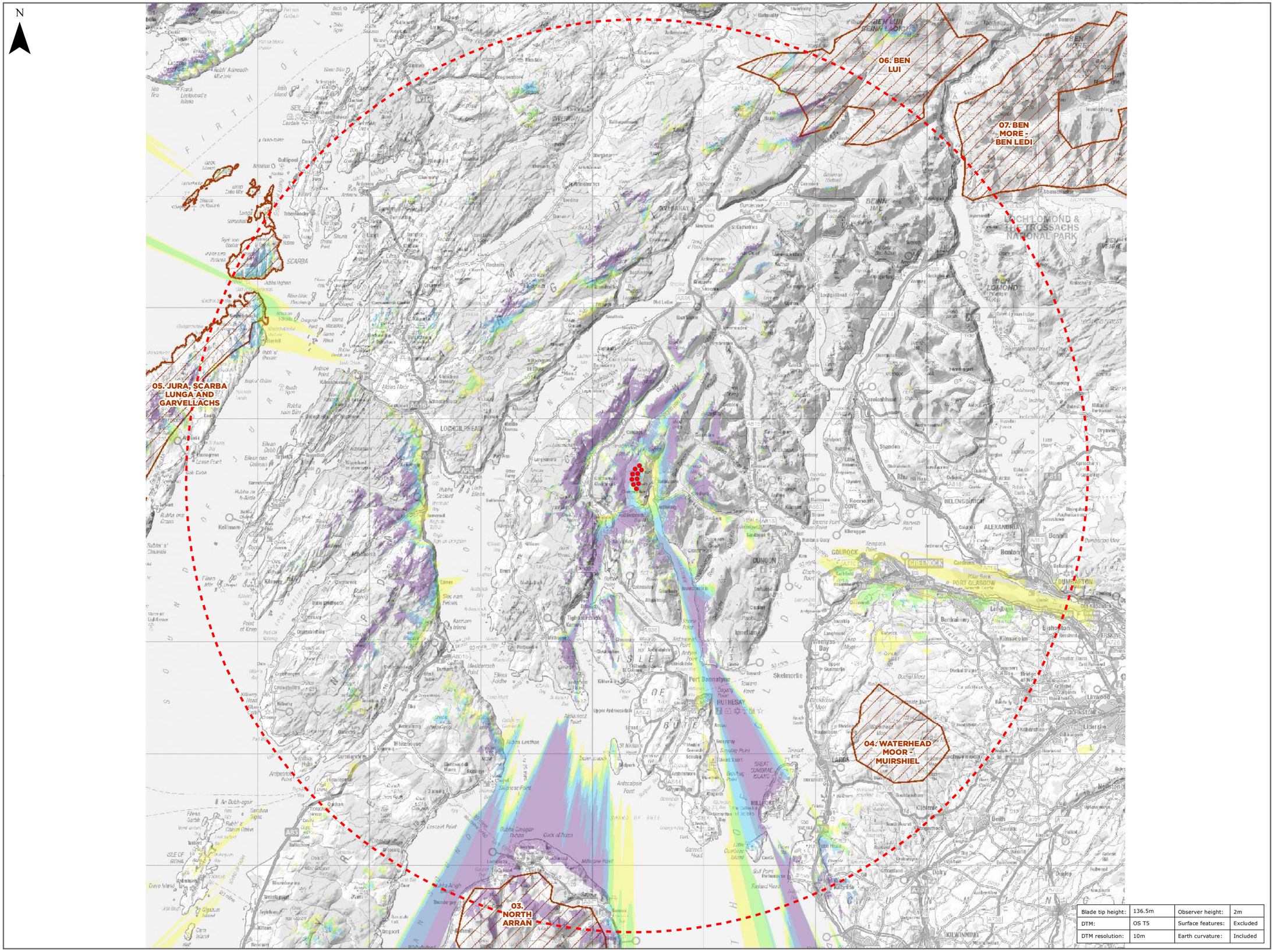
Ardtaraig Wind Farm

Source:

Client: Infinergy

Drawn by:	Checked:
TH	JW
Date: 21/10/2016	**Figure:** 5.5
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY



Legend:

- Ardtaraig Turbines
- 40km Study Area Boundary
- Wild Land Area

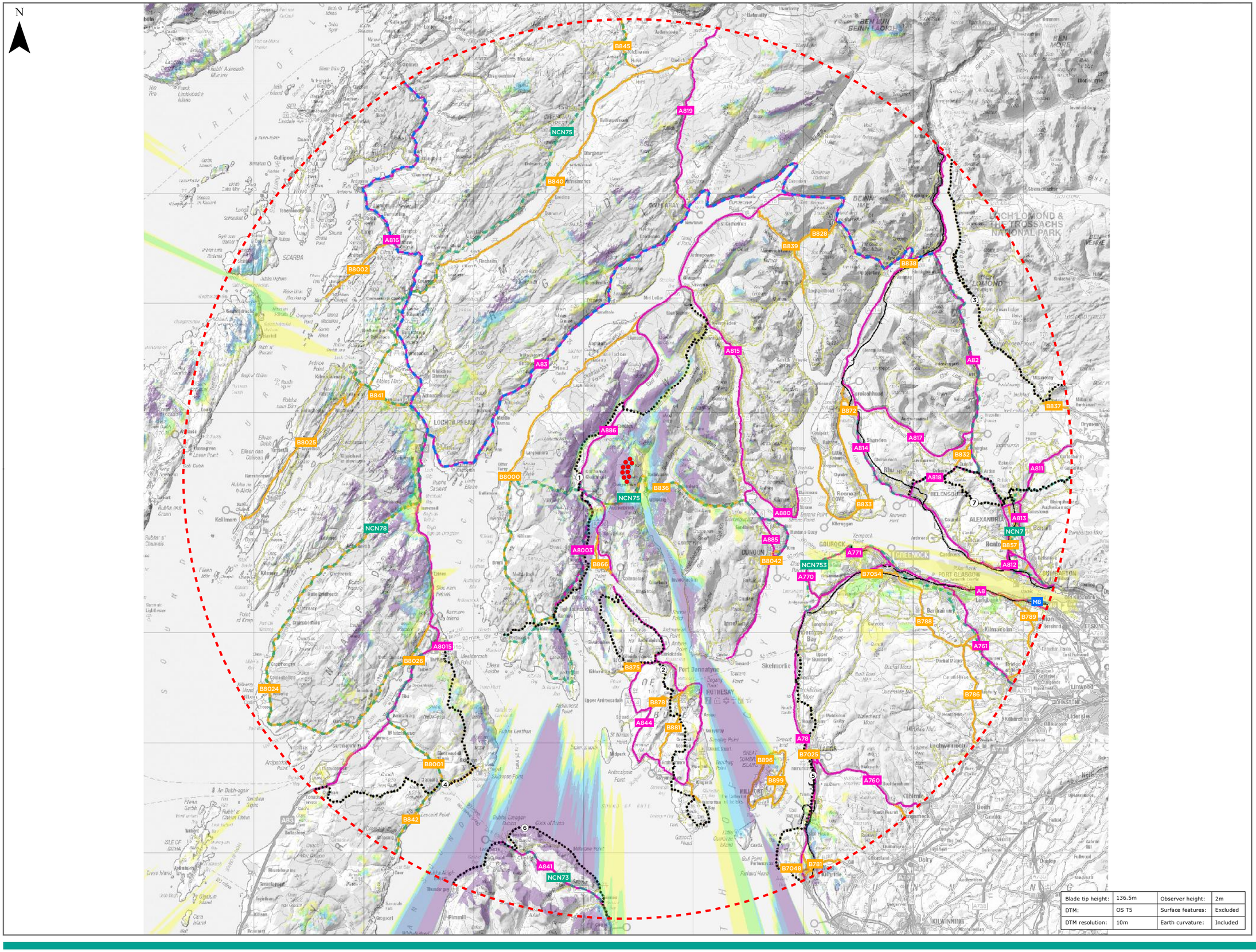
Zone of Theoretical Visibility
No. of Blade Tips Visible

- 0
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10

Data Source:
© Scottish Natural Heritage

Title: Wild Land Areas with Blade Tip ZTV	
Ardtaraig Wind Farm	
Source: © Crown copyright and database rights 2016 Ordnance Survey 0100031673	
Client: Infinergy	
Drawn by: TH	**Checked:** JW
Date: 21/10/2016	**Figure:** 5.6
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY



Legend:

- Ardtaraig Turbines
- 40km Study Area Boundary
- Motorway
- A Road
- B Road
- Railway
- National Cycle Route
- Core Path
- National Tourist Route
- Long Distance Route
  1. Cowal Way
  2. West Island Way
  3. West Highland Way
  4. Kintyre Way
  5. Ayrshire Coastal Path
  6. Arran Coastal Path
  7. John Muir Way

Zone of Theoretical Visibility

No. of Blade Tips Visible

- 0
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10

Data Source:
© SUSTRANS 2016
© Scottish Natural Heritage
Argyll & Bute Local Development Plan, 2015

Title: Visual Receptors with Blade Tip ZTV

Ardtaraig Wind Farm

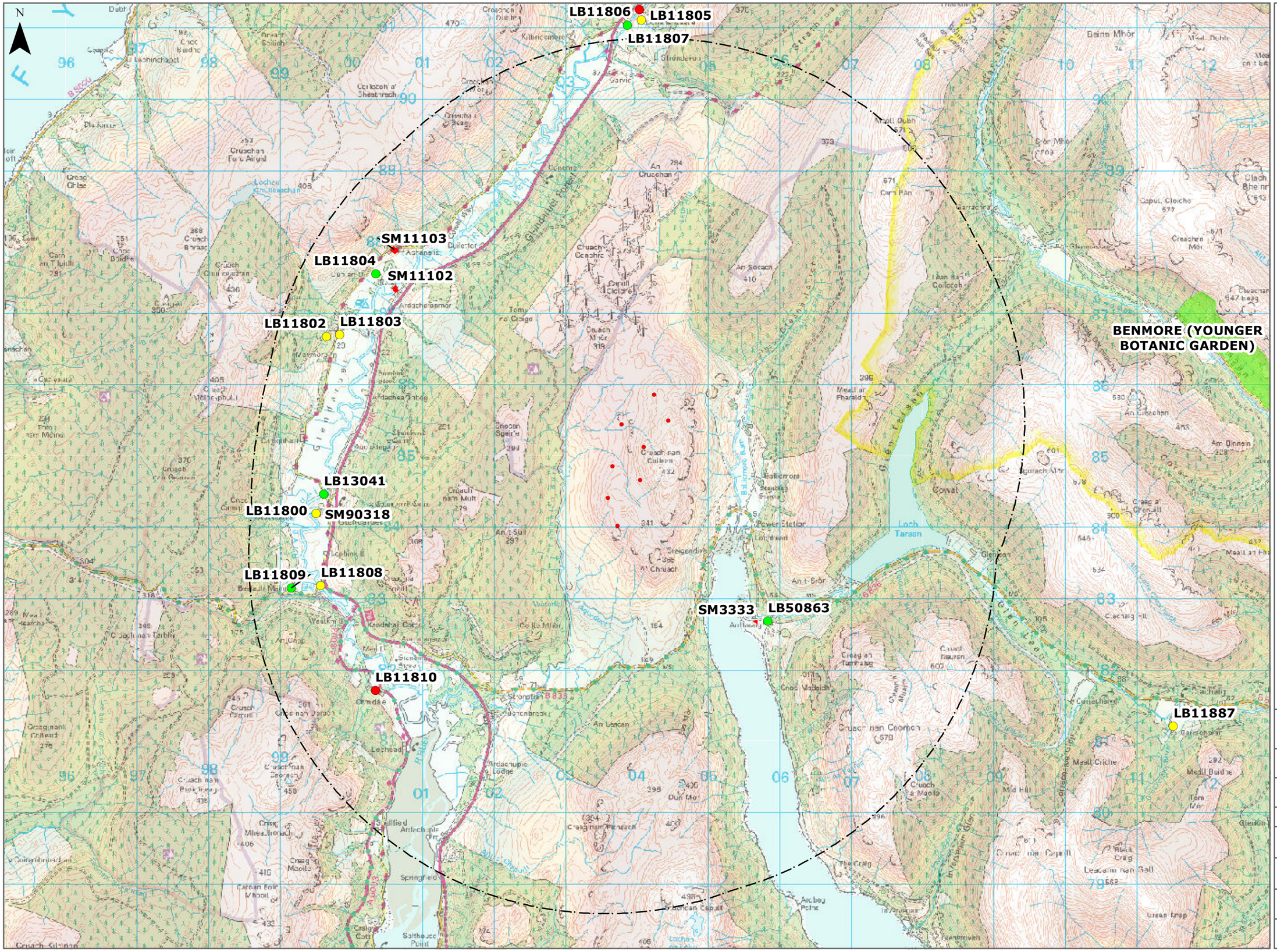
Source: © Crown copyright and database rights 2016 Ordnance Survey 0100031673

Client: Infinergy

Drawn by:	Checked:
TH	JW
Date: 21/10/2016	**Figure:** 5.7
Scale: 0 2.5 5 km	**Revision No:** 0

INFINERGY

INFINERGY



Legend:

- Ardtaraig Turbines

Listed buildings

- Category A
- Category B
- Category C
- Inventory garden or designed landscape
- Scheduled monument

Title: Designated heritage assets	
Ardtaraig Wind Farm	
Source: © Crown copyright and database rights 2016 Ordnance Survey 0100031673	
Client: Infinergy	
Drawn by: AR	**Checked:** RJC
Date: 24/10/2016	**Figure:** 5.8
Scale: 0 1 km	**Revision No:** 0

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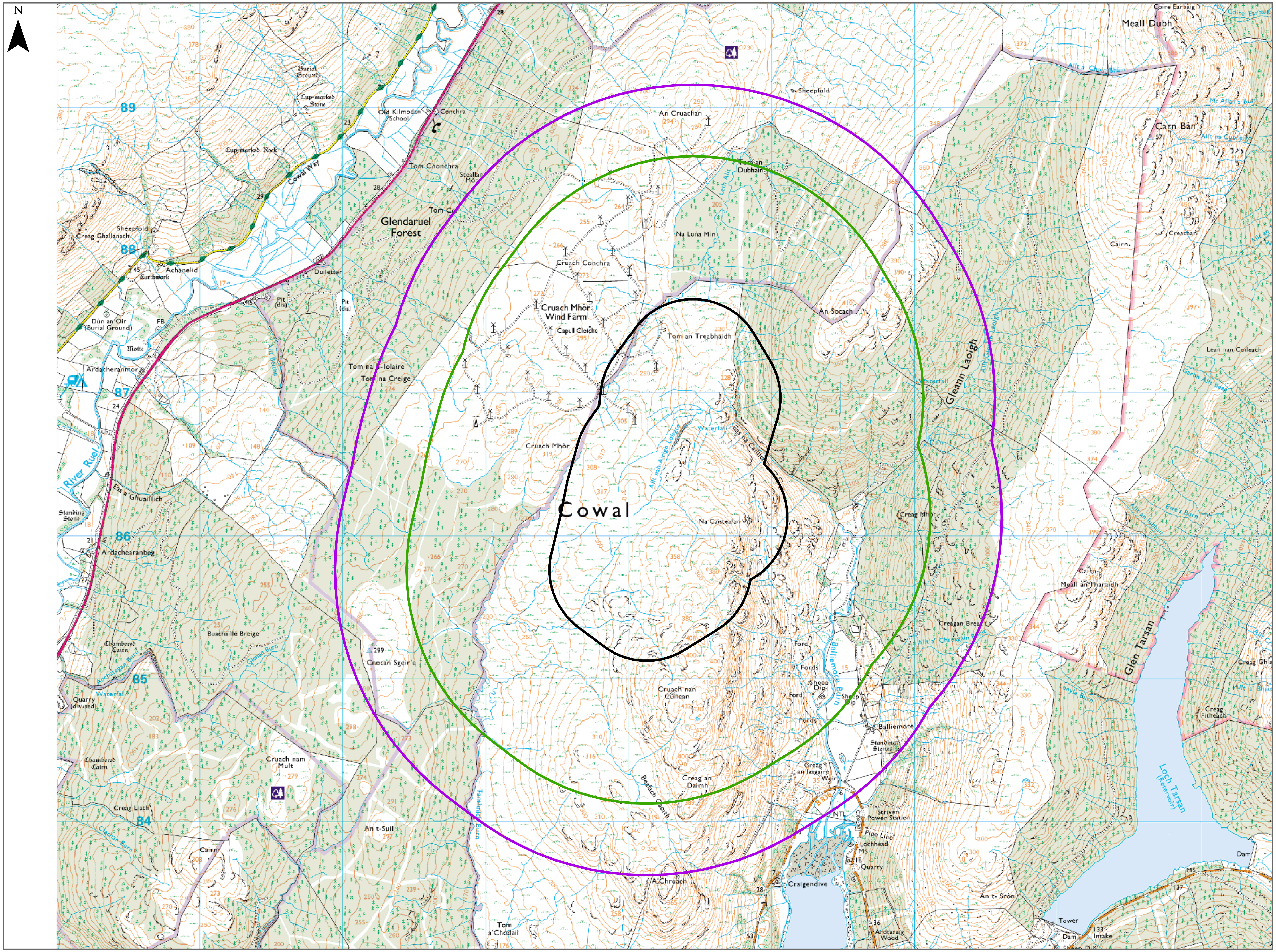
Figure 5.9: Ornithology Survey Boundaries April 2013 to March 2014

INFINERGY



Legend:

- 500 m survey boundary
- 1.5 km survey boundary
- 2 km survey boundary

Title: Ornithology survey boundaries April 2013 to March 2014

Ardtaraig Wind Farm

Source: © Crown copyright and database rights 2016. Ordnance Survey 0100031673

Client: Infinergy

Drawn by: FL	**Checked:** DS
Date: 19/10/2016	**Figure:** 5.9
Scale: 0 0.25 0.5 km	**Revision No:** 1

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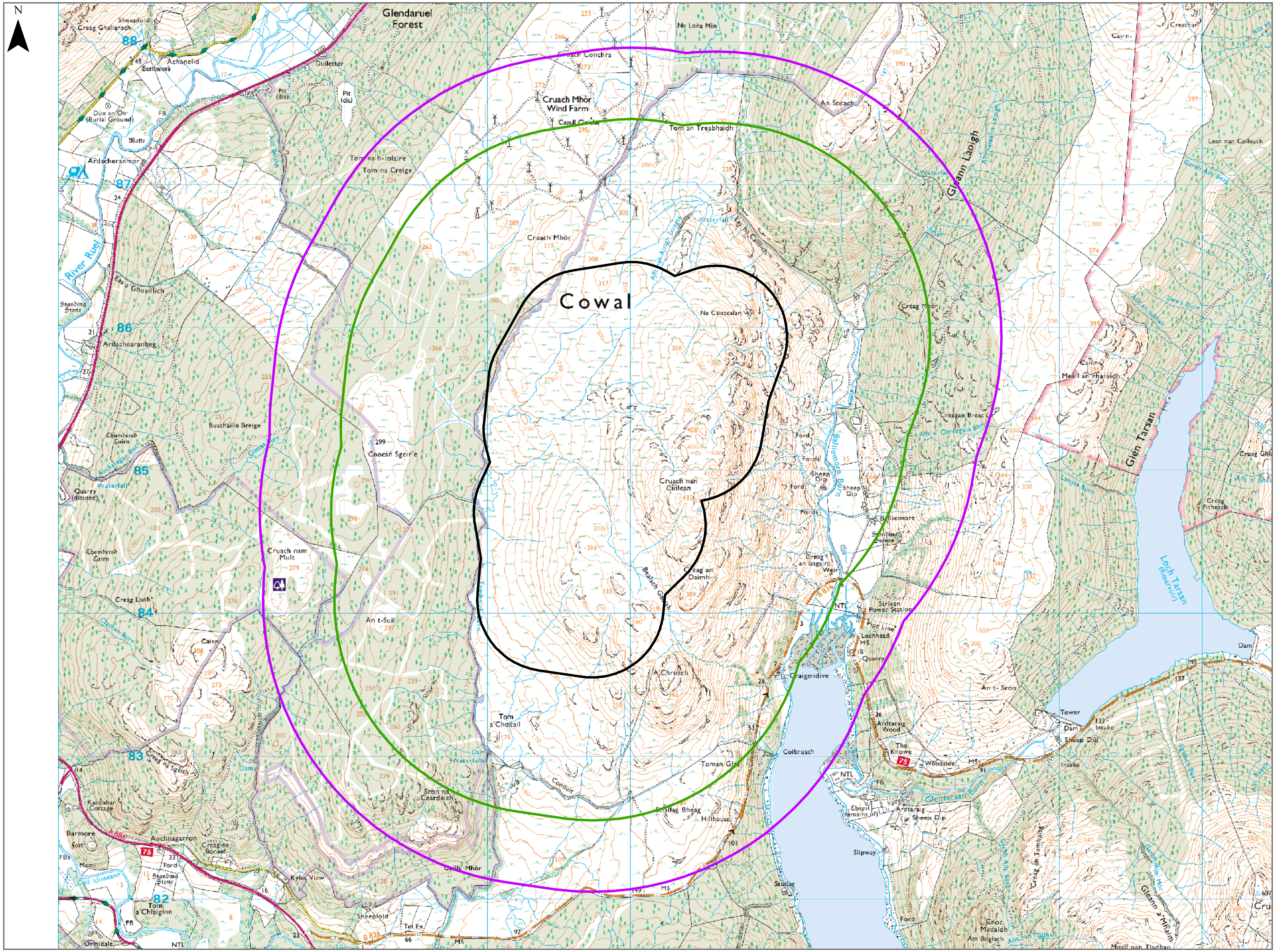
Figure 5.10: Ornithology Survey Boundaries September 2014 to November 2015

INFINERGY



Legend:

- 500m survey boundary
- 1.5km survey boundary
- 2km survey boundary

Title: Ornithology survey boundaries April 2013 to March 2014

Ardtaraig Wind Farm

Source: © Crown copyright and database rights 2016. Ordnance Survey 0100031673

Client: Infinergy

Drawn by: FL	**Checked:** DS
Date: 19/10/2016	**Figure:** 5.10
Scale: 0 – 0.25 – 0.5 km	**Revision No:** 1

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Figure 5.11: Ornithology Generic Vantage Point Locations

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Legend:

- 500m survey boundary - 1
- 500m survey boundary - 2
- Vantage point
- GVP1 viewshed
- GVP2 viewshed
- GVP3 viewshed
- GVP4 viewshed
- 500m buffer of proposed turbines

Title:	Ornithology survey boundaries April 2013 to March 2014
	Ardtaraig Wind Farm
Source:	© Crown copyright and database rights 2016. Ordnance Survey 0100031673
Client:	Infinergy
Drawn by: FL	**Checked:** DS
Date: 19/10/2016	**Figure:** 5.11
Scale: 0 0.25 0.5 km	**Revision No:** 1

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APPENDIX A: PRELIMINARY TURBINE COORDINATES

Ardtaraig Wind Farm
Preliminary turbine coordinates

ID	Easting	Northing	Altitude
1	204250	685857	346
2	204444	685492	381
3	203853	685535	300
4	204103	685120	360
5	203638	685094	268
6	204053	684663	330
7	203593	684602	295
8	203697	684162	303
9	204158	684252	315
10	203981	683801	314

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