

Use of Wind Energy in Aberdeenshire

part one

Guidance for Developers

August 2005

Supplementary Planning Guidance

Aberdeenshire
COUNCIL



Use of wind energy in Aberdeenshire:

Guidance for Developers

Supplementary Planning Guidance

This guidance forms part of the **RENEWABLE ENERGY STRATEGY:**
A strategy to promote the generation of energy from renewable sources

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Wind Energy

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Executive Summary

In making observations on, or in determining of, applications for one or more wind turbine generators, Aberdeenshire Council will expect information supporting each application to address the issues listed below. Applications for wind farms may be subject to an environmental impact assessment.

1. Technical information

Full technical details of the turbines (including the proposed foundations), ancillary equipment/structures (if proposed), and proposals for decommissioning.

2. Site infrastructure (for wind farms only)

Details of temporary and permanent access requirements, including earthworks, for construction, maintenance and eventual decommissioning. Details of any landscaping works proposed.

3. Ecological assessment

Classification and evaluation of the natural habitat and species, and agricultural context, hydrological impact, determination of the zone of influence of the proposal, carbon emissions from disturbance of peat, evaluation of impacts, and the scope of mitigation of those impacts. An ecological assessment will only be necessary for a single wind turbine if it were mounted on a tower and is located within a designated natural heritage site or it may adversely affect a protected species.

4. Landscape and townscape assessment(s)

These assessments should include classification and evaluation of the landscape context and/or townscape setting, including quality, value, and scale of the landscape/townscape. A landscape or townscape assessment will not be necessary for a single wind turbine not mounted on a tower. A landscape or townscape assessment will not be required for a development of three or less wind turbines mounted on a tower unless it were located within a designated landscape or a conservation area; a local or on-site borrow pit will be used for the construction based materials; or the turbine(s) will not be greater than 20m to hub and/or 32m to tip.

5. Visual assessment

This assessment should include a viewpoint analysis, determination of the zone of theoretical visibility of the proposed development, evaluation of the visual impact and the scope for mitigation of those impacts, and details of the location, visual impact and the restoration of borrow pits. Evaluation of impacts should include consideration of alternative siting for the individual turbines (as well as alternative colouring), borrow pits and ancillary equipment. Developers should consult with the Cairngorms National Park Authority where a proposed wind energy development will be sited on or adjacent to the National Park boundary/will be visible from the Park.

Represented viewpoints of the proposals should cover both long and short range visibility and presentation by 'photomontage' or 'videomontage' is recommended.

A detailed visual assessment (such as the use of photomontages) will not be necessary for a single wind turbine (either mounted on a tower or building) unless it were located within a designated landscape, conservation area or a town centre, or the turbine (if mounted on a tower) will be greater than 20m to hub and/or 32m to tip; visible from a popular tourist attraction; or within 1000m of an inhabited dwelling.

6. Noise assessment

This assessment will require taking into account the particular character and sensitivities of the area (including the prevailing winds and landform) and both the individual and cumulative effects of the noise sources – the mechanical and aerodynamic. A noise impact assessment will be required if a proposed wind energy development will be mounted on a tower and is located within a settlement; 400m from an inhabited dwelling house; or where an initial assessment identifies a potentially significant adverse effect on other dwellings within a 1000m of the proposed turbine(s). A noise assessment is not necessary for a small system – turbine manufacturer's information on noise outputs of the particular model should be used.

7. Shadow flicker/throw assessment (for all wind energy developments)

An assessment of potential shadow flicker and shadow throw throughout the year, should be provided for all dwellings within a 1000 metre radius of the proposed location of each wind turbine.

8. Built and cultural heritage assessment

A full assessment of any known or potential impacts on archaeological sites, listed buildings, conservation areas, historic gardens or designed landscapes or local sites of cultural importance.

9. Tourism and countryside access assessment

An assessment of any visual and amenity impacts on tourist and recreation facilities or tourism and countryside access, e.g. footpaths.

10. Public safety

Depending on the scale of the proposal a risk assessment of the proposed development should be submitted, taking particular account of proximity of any surrounding development, and risk of injury to humans through catastrophic equipment failure or ice throw. An informal risk assessment may be requested to ensure that the developer has considered this impact in order for mitigation measures to be proposed. For proposed wind farm developments, an assessment of any road safety as well as capacity implications of the proposal, including possible effects of visual distraction caused by the turbines themselves will be required.

11. Electro-magnetic interference (aviation and communication)

The applicant should consult with the British Aviation Authority, Civil Aviation Authority, Ministry of Defence and the Office of Communication who will in turn consult with the bodies that could have an interest in the proposal in terms of flight paths, radar and navigation aids, television and radio transmissions. Details of possible adverse effects and appropriate measures to alleviate effects should be submitted.

It may also be necessary to consult with the local emergency services, local authority services and the gas and electricity companies. Organisers of outdoor pursuits such as gliding and microlights should also be consulted.

12. Cumulative impact assessment

An assessment on the cumulative effects of the proposal in a locality, which will either feed into other assessments (e.g. noise) or will be prepared as a separate document, on for example, cumulative visual or ecological impacts. The need for cumulative impact assessment(s) will be at the discretion of the local planning authority.

13. Wind regime

Where there is concern about the siting of a wind turbine (e.g. its height or location in the built environment), the applicant must demonstrate that the proposal is viable i.e. that there is enough wind speed after a period of four to twelve months monitoring the site where this can be reasonably predicted. For all domestic scale applications or where the development will not be connected to the national grid, consideration should be given to the use of alternative renewable energy technologies.

14. Grid network

Details of the proposed grid connection or of supply to local user if relevant.

15. Other issues

- Community consultation;
- local employment/business considerations;
- associated community benefits;
- the need for a forestry design and management plan; and
- the visual impact of borrow pits and the need for a waste management license to dispose of waste in a borrow pit.

1. Introduction

1.1 Aberdeenshire Council adopted the “Renewable Energy Strategy” in December 2004. In support of wider objectives regarding the generation of energy from renewable sources the strategy recommends the preparation of supplementary planning guidance (SPG), to assist applicants, and provide consistency with interpretation of development plan policy. This guidance is one of three pieces of planning guidance that are proposed covering the topics of wind energy, biomass energy, and small-scale renewable energy generation.

1.2 The purpose of this guidance is to inform and help landowners wishing to erect wind turbine(s) for private use, and for developers proposing commercial wind farm developments (see Figures 1 and 2), and has been divided three parts:

- Policy overview, which details the planning policies under which an application would be considered and the overall approach that Aberdeenshire Council will adopt in assessing applications;
- Development principles, which sets out general good practice advice on a range of issues relevant to wind farm developments and design principles; and
- Information requirements, which sets out what information may be required to accompany a planning application.

1.3 Further information on assessing a proposed wind energy development is available in the “Use of Wind Energy in Aberdeenshire - Guidance for Assessing Wind Energy Developments”, which accompanies this guidance.



Figure 1
‘Wall’ mounted
wind turbine

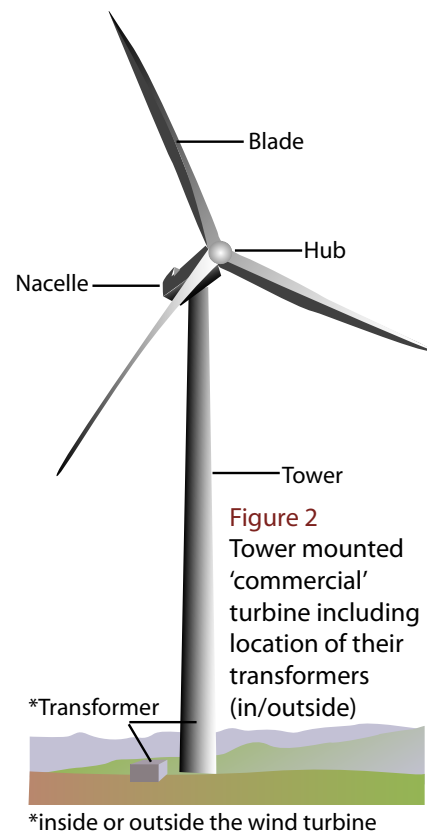


Figure 2
Tower mounted
'commercial'
turbine including
location of their
transformers
(in/outside)

1.4 Additional information in the form of a decision support tool is also available to developers to identifying areas of land with characteristics that make them suitable for wind energy developments (primarily wind farms). This tool has been prepared in association with Macaulay Enterprise Ltd, and is only available to Aberdeenshire Council planning officers. Developers are advised to contact the local planning department to discuss areas with potential for wind farms.

2. Policy Overview

- 2.1 The Aberdeen and Aberdeenshire Structure Plan 2001-2016, which was adopted on 21st December 2001, will favourably consider renewable energy facilities, subject to ecological, transportation, landscape and amenity considerations, as set out in the local plan.
- 2.2 Policy 26 of the Structure Plan sets out a sequential exploration of tiered planning designations, which all wind farm proposals should be assessed against. The tiered approach will be used as a basis for deciding planning applications and identifying areas of search for wind farms.
- 2.3 Policy Inf7 of the finalised Aberdeenshire Local Plan relates specifically to wind energy developments, and it is shown in Table 1 below. The sequential exploration of the four-tier approach is fully defined in Appendix 12 of the local plan and is shown in Table 2.

Table 1 Finalised Aberdeenshire Local Plan Policy Inf7

Policy Inf7 Renewable Energy Facilities - Wind energy	
Wind energy developments will be approved, in principle, if located, sited, and designed in accordance with the following criteria:	
a)	the proposal should be set back from roads and railways to at least the height of the turbine(s) proposed, to assure safety;
b)	it has been demonstrated that no part of any proposed wind energy development will give rise to electro-magnetic interference to communications installations; radar or air traffic control systems of both the National Air Traffic Services (NATS) and the Ministry of Defence (MoD); or adversely affect the quality of radio or TV reception;
c)	it has been demonstrated that no part of any proposed wind energy development will have a detrimental impact on the safeguarding zones for airports; airports, airfields or airstrips either licensed or unlicensed; aircraft flight paths; or MoD low-flying areas;
d)	the proposal has an impact (visual or other) which is assessed and is acceptable on sites of importance to natural heritage, national and local landscape designations, and areas of local ecological importance, in accordance with policies Env1 to Env7;
e)	the proposal would not have an adverse effect on any existing or proposed public access for walking, cycling or horse riding, in accordance with policy Env22;
f)	the proposal is appropriate in terms of the scale and nature of the setting of listed buildings, conservation areas, archaeological sites, and historic gardens and designed landscapes, as listed in "The Inventory of Historic Gardens and Designed Landscapes" as prepared by The Countryside Commission for Scotland (now SNH);

g) the proposal is sited to minimise adverse impact on the safety or amenity of any regularly occupied buildings and the grounds which they occupy - with regard to: ice throw in winter conditions, shadow flicker and shadow throw, visual intrusion, and the likely effect of noise generation. It is not anticipated that, taking into account all these factors, development would be less than 400m from the nearest dwelling and it is possible that a greater separation distance will be required;

h) the proposal is unlikely to result in a material loss of amenity to other sensitive receptors, such as those involved in leisure or recreation on land or water; and

i) the proposal takes into consideration the cumulative impacts of neighbouring wind turbines or wind farm developments.

Subject to compliance with all of the criteria above, wind farm proposals in particular must also conform to a sequential exploration of the following four tier approach, which is fully defined in Appendix 12. In all cases of wind farm development, where there is a significant impact the developer will be required to demonstrate why a site in a less sensitive area is impractical.

Tier 1 - Wind farm developments that would have an adverse impact on international designations will not be permitted unless there is an imperative reason of overriding public interest for doing so and there is no alternative solution. Such alternatives must include taking account of locating the development in lower tier areas.

Tier 2 - Wind farm developments will only be permitted in national designations where it can be demonstrated that the objectives of the designation and the overall integrity of the area will not be compromised, and that there is no alternative site for the development. Such alternatives must include taking account of locating the development in lower tier areas.

Tier 3 - Wind farm developments will only be permitted following careful consideration of its impact on Tier 3 designations. Where harmful effects are likely, it should be demonstrated that no suitable alternatives exist in Tier 4 areas.

Tier 4 - Wind farm developments will be permitted where they respect the character and amenity of the surrounding area.

In all cases, if consent is granted, appropriate conditions (along with a legal agreement under Section 75, where necessary) will be imposed, relating to the removal of the turbine(s) and associated equipment, and to the restoration of the site, whenever the consent expires or the project ceases to operate for a specific period.

Table 2 Finalised Aberdeenshire Local Plan Four Tier Policy Areas

Tiers	Designation	Policy statement
1	<ul style="list-style-type: none"> ■ Special Protection Areas (SPAs) ■ Special Areas of Conversation (SACs) ■ Priority habitats and species, as defined in Annex 1 of the Habitats Directive ■ River and stream beds ■ Ramsar Sites 	<p>Wind farm developments that would have an adverse impact on international designations will not be permitted unless</p> <ul style="list-style-type: none"> ■ there is an imperative reason of overriding public interest for doing so, and there is no alternative solution. <p>Such alternatives must include taking account of locating the development in lower tier areas.</p>
2	<ul style="list-style-type: none"> ■ National Scenic Areas ■ National Nature Reserves ■ Sites of Special Scientific Interest which are not SPAs or SACs ■ Scheduled Ancient Monuments (and their settings) ■ Historic Gardens and Designed Landscapes ■ Listed Buildings (and their settings) ■ Green Belt ■ Strategic Reserve Land ■ Coastal sand and dune systems ■ UK Biodiversity Action Plan priority habitats and species ■ Lowland Raised Peat Bogs ■ Prime Agricultural Land (classes 1,2 and 3.1) 	<p>Wind farm developments will only be permitted in national designations where:</p> <ul style="list-style-type: none"> ■ it can be demonstrated that the underlying objective and overall integrity of the designated area will not be compromised; OR ■ any adverse effects on the qualities for which the site has been designated are outweighed significantly by the national benefits that could come from the development; and ■ there is no alternative solution. <p>Such alternatives must include taking account of locating the development in lower tier areas.</p>

Table 2 continues on the next page.

Table 2 continued.

3	<ul style="list-style-type: none"> ■ Areas of Landscape Significance ■ Archaeological sites appearing on the Sites and Monuments Record ■ Sites of Interest to Natural Science ■ District Wildlife Sites ■ Local Nature Reserves ■ Local Biodiversity Action Plan priority habitats and species ■ Recreation areas and facilities ■ Pipeline wayleave routes carrying water, oil, gas and petrochemical products ■ Settlements ■ Buffer zones extending 400m from settlement boundaries 	<p>Wind farm developments will only be permitted following careful consideration of their impact on Tier 3 designations.</p> <p>Where harmful effects are likely, it should be demonstrated that no suitable alternatives exist in Tier 4 areas.</p>
4	<ul style="list-style-type: none"> ■ Areas not covered by designations included in Tiers 1 to 3. 	<p>Wind farm developments will be permitted where they respect the character and amenity of the surrounding area.</p>

Classifying wind turbines

2.4 The scale and size of a development, along with landscape and amenity impacts

have a profound effect on the way that Aberdeenshire Council will consider any application and the level of accompanying information that will be required.

- 2.5 Aberdeenshire Council believes that it is useful to classify turbines into a number of categories depending on the size of the turbines and the number of turbines in one development. This allows consistent application of policy and ensures that all stakeholders know exactly what is meant by some of the descriptions used:

Single (Domestic):	1 Turbine of installed capacity less than 0.25MW
Single:	1 Turbine of installed capacity between 0.25MW and less than 3MW
Cluster:	2-3 turbines or installed capacity between 3MW and less than 6MW
Small scale:	4-10 turbines or installed capacity between 6MW and less than 16MW
Medium scale:	11-20 turbines or installed capacity between 16MW and less than 31MW
Large scale:	21 or more turbines or installed capacity greater than 31MW

- 2.6 Given the current position of the turbine sizes available, it may be reasonable to categorise turbine sizes into small, medium and large.

- 2.7 Perceived size will vary according to whether a turbine is in an urban or rural context. In a rural environment wind turbines should be classified as follows:

Large	>50m+to hub and/or >80m to tip
Medium	30-50m to hub and/or 48-80m to tip
Small	<30m to hub and/or <48m to tip

- 2.8 In an urban environment, the hub height of a wind turbine will have a greater impact than in a rural environment. Turbine technology has advanced rapidly and turbine heights are now much greater than they used to be, and are likely to further increase. Therefore, wind turbines should be classified as follows:

Large	>40m+to hub and/or >65m to tip
Medium	20-40m to hub and/or 32-65m to tip
Small	<20m to hub and/or <32m to tip

Note: As a design principle, it is desirable that where a wind energy development already exists nearby (depending on topographical features) a similar scale and design of turbine is proposed.

Assessing wind energy developments – principles adopted

- 2.9 All wind energy developments have common planning and environmental issues,

but the impacts of each individual proposal will vary depending on its scale and location. Aberdeenshire Council uses a method for assessing impact, which considers significance of impact.

- 2.10 The significance of impact is a function of sensitivity of the site and magnitude of effect. The significance of impact is used to help assess whether permission should be granted for a particular application. Any assessment is a matter of balancing often highly subjective criteria and a degree of judgement always comes into the process when deciding whether a particular development is appropriate or not.
- 2.11 The final evaluation of a particular proposal will be an assessment of the overall significance of impact of the whole range of issues. In this way the individual assessments are a starting point for the final evaluation and are an indication of the values that Aberdeenshire Council place on the various constraints. In essence the matrix below, provides an indication of the height of the bar over which developments must pass to be deemed acceptable.

Significance

- 2.12 Aberdeenshire Council will use the combined assessment of the magnitude of effect and the sensitivity of the site/area (or any component) to determine whether or not an impact is significant. Table 3 below shows the relationship between sensitivity, magnitude, and significance. This assessment will be undertaken for all relevant aspects of the development and a view will be taken as to whether a potential impact is significant. If a highly significant impact, or a large number of medium impacts are identified then this may be a justification for refusing the application. Aberdeenshire Council encourages early discussion with prospective developers to ensure the identification and reduction, through mitigation, of potentially significant impacts early in the development process.

Table 3 Matrix of magnitude of effect and sensitivity used to test the significance of impact.

		Sensitivity		
		High	Medium	Low
Magnitude	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Negligible or positive
	Negligible	Low	Negligible or positive	Negligible or positive

- **High** represent a significant impact and proposals with one or more assessments which result in a 'high' significance and will only be granted planning permission in exceptional circumstances.
- **Medium** represents a potentially significant impact and should normally be refused planning permission unless it is at a scale that may be resolved by revising the design of the proposal, or undertaking appropriate mitigation, as identified

in the Environmental Statement (if required). Any proposal that falls under this category will require careful individual assessment.

- **Low, negligible or positive** are not normally of concern. However, care should be taken to ensure that the siting and design of the proposal minimises any potential impacts.

- 2.13 This methodology is provided as an aid to transparent decision making and it may not be applicable in every case.

Sensitivity

- 2.14 The level of sensitivity of the application site and surrounding area is broadly determined by the designation or characteristics of that site and have been categorised as High, Medium and Low.

Magnitude

- 2.15 Wind farms for example can cover large areas and will impact on different sensitivities. Defining the terms relating to the magnitude of effect is determined by the level of loss or change, and have been categorised as High, Medium, Low and Negligible.
- 2.16 This guidance does not presume that all impacts will be negative. Large magnitude positive impacts may be possible, particularly where the development provides improvements to the baseline position. However, in assessing impacts Aberdeenshire Council consider that positive impacts are equivalent to negligible negative impact.
- 2.17 Further advice on the issues which Aberdeenshire Council consider in determining an application, and clear advice on the scale of magnitude and degree of sensitivity for particular scenarios is given in the *“Use of Wind Energy in Aberdeenshire: Guidance for Assessing Wind Energy Development”*. This document is essentially a guide for development control officers to assist them in the evaluation of proposals.

3. General Location, Siting and Design Principles

- 3.1 The following shows general guidance on locating, siting and designing a wind

energy development. In all cases, it is recommended that the local planning authority is contacted at the earliest possible stage.

General location and siting principles

- 3.2 A wind energy development will have an impact on landscape and peoples perception of that landscape. It is important to ensure that the development fits in appropriately with the character of its location while meeting all health and safety best practice (see Table 4).

Table 4 General principles on locating or siting wind turbines in a rural setting

Issue	General Siting Principles
Environmental sensitivity	Wind farm proposals should carry out a sequential exploration of the four tier areas outlined in the finalised Aberdeenshire Local Plan (ALP) Policy Inf\7 above. Proposals should generally avoid Tier 1 and 2 areas. Where there is likely to be a significant impact, the developer/applicant will be required to demonstrate why a site in a less sensitive area is impractical. A rigorous justification of the reasons for dismissing alternative sites should be provided.
	Potential applicants/developers should avoid siting wind energy developments within internationally or nationally designated natural heritage sites of importance. For further information see NPPG 14 (Natural Heritage) and finalised ALP Policies Env\1 and Env\2.
	Bird and mammal species can be sensitive to disturbance. Breeding and feeding locations, and bird flight paths (including migration routes) and pathways will need to be taken into account in the location and design of wind farms.
Cumulative effect	Consideration should be given to static and sequential cumulative visual impacts and cumulative landscape impacts, and steps taken to ensure minimal cumulative impacts.
	Consideration should also be given to potential cumulative impact on hydrology, hydrogeology, ecology, traffic and transport, aviation and defence, recreation, and amenity of residents.
Scale and character of the landscape	A wind energy development should be appropriate for its location, in terms of its layout, scale and shape, both for turbines and for ancillary elements.
	Single and cluster-scale wind energy development should be discouraged in sites more suited to larger scale development in order to use landscape resources efficiently for energy production.

Scale and character of the landscape (continued)	Single to small-scale wind energy developments are suited to more small scale intimate landscapes structures, often featuring a variety of diverse elements, such as intricate field patterns divided by shelter (tree) planting and small to medium sized woodlands.
	Larger wind farms, including small-scale wind farms are more suited to open larger scale landscape character areas. However, development should concentrate in one landscape character type or feature.
How turbines relate to the visual horizon	The impact wind turbine blades have on the skyline will depend on where they are visible from, and any wind energy development should avoid prominent ridges or sensitive skyline locations, or where they appear to reduce the height of a local hill or range of hills. Visual clutter should also be avoided with existing vertical structures, such as pylon towers.
	Where it is unavoidable that wind turbines break the skyline they should be seen as a clear feature on the horizon, or have a full landscape backdrop when viewed. Turbines that are pulled off a horizon can result in blades being partially seen or tips only being seen at regular intervals as they rotate. The 'slashing' effect often created by this approach is most unsatisfactory and should be avoided. Generally it is visually satisfactory to see a development well spread along a visual horizon rather than arranged in a non-continuous series of clusters and lines.
	In terms of visual impact, popular viewpoints, listed buildings and other heritage landmarks popular with visitors in urban or rural areas can be adversely affected by the siting of wind turbines and should be avoided.
Existing features within the landscape	Wind energy developments can fit reasonably well into a scene that already has man-made features, such as transport corridors, farm buildings, communication equipment, and strong field boundaries, providing the proposed development complies with the development plan. The density of a layout is also important, and best practice suggests that turbines should be spaced at least 5 rotor blade diameters apart. The number of wind turbines should be appropriate to the landscape character.
	Wind turbines in lowland valley landscapes should avoid being sited in locations where they would dominate residential property or significantly affect the setting of locally prominent landmarks or buildings.
Disruption during the construction period	With the exception of domestic scale wind turbines, when identifying suitable sites for a wind energy development, consideration should be given to the safety of existing road users, provision of emergency services in the case of road closure, and the duration and extent of construction traffic noise and disruption during the construction period.

Private water supplies	Sites should be selected that avoid underground private springs/water supplies and the aquifers on which they depend.
Water courses	Watercourses and underground streams should be avoided.
Aviation	Wind turbines should not be located in the flight path of military or civil aircraft, including helicopters.

3.3 In recent years there has been increasing interest in siting wind turbines in an urban context for example in harbours (onshore) or ancillary to industrial sites, or just beyond the settlement boundary. Due to their scale villages and rural service centres are more sensitive to wind energy developments. Therefore, wind energy developments will only be permitted where they do not adversely impact upon the overall character and amenity of the surrounding area. The table below shows general guidance for siting wind energy developments in an urban setting.

Table 5 General principles on locating or siting wind turbines in an urban setting

Issue	General Urban Siting Principles
Outwith a defined settlement	Providing any wind farm proposed complies with the tiered approach of the development plan, wind energy developments may occur in an isolated industrial development, on brownfield land, or on business/technology parks.
	A 'community scheme' (a wind energy development primarily owned by the local community), limited to two turbines may be permitted adjacent to a settlement subject to ecological, landscape, transportation and amenity considerations, and any wind farm proposed complies with the tiered policy approach in the development plan.
	A domestic scale wind turbine may be permitted on a residential property where the character of the townscape is retained and there is no significant adverse impact on amenity of neighbouring dwellings.
Main settlements (as defined in the Aberdeenshire Local Plan)	Single, cluster or, exceptionally, small-scale wind energy developments may occur on industrial or brownfield land, business and technology parks, or in an industrial seafront zoned in the local plan as an employment land use.
	Single or cluster wind energy developments may occur in a retail park, retail outlet (greater than 5000m sq), large commercial office accommodation, hospital, college or university grounds, or storage and distribution centre.
	No development should take place on the beach or on defined "undeveloped" coast.
	Wind energy developments that require a tower/hub will not normally be permitted within a defined town centre. Hub mounted turbines will only be acceptable in exceptional circumstances. Turbines should be mounted onto a building or be incorporated into the fabric of a building if proposed within a defined town centre.

Main settlements (continued)	Developments will only be permitted subject to ecological, townscape, transportation and amenity considerations, and where a proposed wind farm complies with the tiered policy approach in the development plan.
Small rural service centres (as defined in the Aberdeenshire Local Plan)	Single or cluster wind energy developments may occur in industrial or brownfield land, business and technology parks.
	Developments will only be permitted subject to ecological, townscape, transportation and amenity considerations, and where a proposed wind farm complies with the tiered policy approach in the development plan.
Residential areas within a settlement	Single turbines that can be mounted onto a building or be incorporated into the fabric of a building will be permitted. Hub mounted turbines will only be acceptable in exceptional circumstances.
	Developments will only be permitted subject to ecological, townscape and amenity considerations.

General design principles

- 3.4 Wind energy development is by its nature a very difficult type of development to screen or even partially disguise. A wind energy development will influence the character of its location visually, and the priority is to fit the development appropriately with the character of its location while meeting all health and safety best practice. The table below sets out the general design principles.

Table 6 General design principles for wind turbines

Issue	General Design Principles
Layout of turbines	Where a wind farm is proposed in a flat location, linear patterns of layout should follow features such as field boundaries or canals, or at a distance, transport corridors or roads.
	If a wind farm is proposed in a coastal location, it should be sited in an area with an industrial character, containing structures of a similar vertical scale. No development should take place on a beach or an undeveloped coast.
	A wind energy development should appear as part of a group, avoiding the isolation of any turbines from the main 'group'.
	The risk of birdstrike should be minimised by avoiding the siting of turbines straddling regular flight lines.
	The natural heritage value and sensitivity of different habitats and species will vary and the siting of wind turbine(s) within a site should take this into account.
	Whether in a rural or urban setting, wind turbines should be appropriate in terms of the scale and nature of the setting of listed buildings, conservation areas, archaeological sites, and historic gardens and designed landscapes (as listed in "The Inventory of Historic Gardens and Designed Landscapes").

Rotor speed	Slower rotor speed rotations are preferred.
Sensitive viewpoints	Wind turbines should be sited to avoid any unacceptable visual impacts, which will be dependant on the viewpoints level and type of use, such as well-used transport corridors, local settlements or communities (a cluster of dwellings not in a settlement), and areas of interest for tourism and recreation. Any development proposed should look appropriately scaled and balanced when seen from these locations.
	It is important that unsatisfactory visual effects such as clutter and turbines being seen to line up behind one another is avoided at sensitive viewpoints.
Turbine design	The height of the proposed turbine(s) should normally not unduly tower over or dominate existing buildings, nor should they dominate or be out of scale with local topography.
	The turbine shape should be simple, elegant and slim with no more than three blades. Lattice towers should, be avoided.
	In most circumstances, no more than three blades will be permitted for 'commercial' wind turbines.
	Where a turbine is proposed within a residential area or town centre, it should normally be mounted on a building or be incorporated into the fabric of a building.
	Other designs may be acceptable depending on the specifics of the site and form of the turbine.
Innovative design	Use of vertical designs such as the use of vertical axis turbines, will normally be accepted for small scale turbines
Noise impact	In very quiet locations with very low background noise levels a minimum noise level of 38dB(A) $L_{A90,10min}$ (night time) and 35dB(A) $L_{A90,10min}$ (day time), measured externally at noise sensitive premises, are promoted.
	Under most operating conditions, and at sufficient distance, wind turbine noise may be masked by wind noise as the wind speed increases, although the background noise will be more critical in light air conditions. However, noise levels at properties affected by prevailing winds may well be greater than in other areas.
	Good acoustical design and siting of turbines is essential to ensure there is no significant increase in ambient noise levels as they affect the environment and any nearby noise-sensitive properties. In some instances, turbines are likely to fit better into sites close to roads or where there is already other regular, unnatural noise.
	A reasonable standard to protect residential amenity would be a limit of 5dB(A) above measured background noise levels, using the $L_{A90,10min}$ descriptor for both day- and night-time, (subject to a lower fixed limit) (N.B. the background level for each period may be different). However, this limit could be varied, depending on the specific localised circumstances for instance, where the occupier of a property has some financial interest in the wind farm or turbine.

Noise impact (continued)	<p>Mitigating the effects of noise impacts can be achieved through established and novel soundproofing and screening techniques, and consideration should be given to the character and sensitivities of the area. Natural forms of mitigation include areas of woodland or undulating landscapes, although these depend on the location of the receptor. Therefore, consideration should be given to the direction of the prevailing winds and landform. In practice it is highly unlikely that mitigation of noise impacts by soundproofing and screening will be effective. If this is relied upon to make the noise impacts of a proposal acceptable Aberdeenshire Council will rigorously test claims of noise attenuation made.</p> <p>Consideration should be given to the potential noise impact within a designated natural habitat or landscape, listed building, archaeological site, designed garden or landscape.</p> <p>At the time of writing, little evidence has been found relating to the use of individual wind turbines in an urban area. A retail or employment use would be able to have an individual turbine or cluster wind farm on-site without causing significant nuisance to neighbouring land users, providing the noise level would not go above 5dB(A) above background noise measured using the $L_{A90,10min}$ descriptor.</p>
Shadow throw	<p>Shadow throw occurs when individual(s) outside a building are affected by the shadow cast by turbine(s) at frequent intervals. Turbines should be sited to avoid this effect on inhabited properties.</p>
Shadow flicker	<p>Shadow flicker is the strobe effect of light flashing through the moving blades can be predicted and mitigation measures introduced. Shadow flicker at frequencies below 2Hz are unlikely to cause serious problems for those suffering from epilepsy. Potential for shadow flicker should be minimised in line with best practice advice.</p> <p>Shadow flicker can be predicted as the seasonal duration of this effect can be calculated using the geometry of the machine and the latitude of the potential site. Preventative measures can be taken, and PAN 45 states that in most cases a separation distance of 10 rotor diameters between the wind turbines and the nearest dwelling should be adequate, although the local topography and the position of the turbine in relation to the dwelling(s) should be taken into consideration during any assessment.</p>
Colour	<p>A semi-matt white or off-white colour should be used (i.e. light grey). In some circumstances, other colours may be acceptable, depending on the background of the location. A semi-matt finish is preferred as a matt finish reduces the reflection of light</p> <p>Where individual or a cluster of turbines is proposed in or adjacent to a settlement or area industrial/commercial land (e.g. a business park), it may be more appropriate to match the colour of the turbine(s) with nearby infrastructure or woodlands.</p>

Colour (continued)	The use of non-conventional colours may be permitted, if it can be justified, for example, if the turbine is next to a sculpture park, amusement area or play park. The proximity of multi-storey buildings might also have a bearing on appropriate colours.
Safety aspects	Safety issues relate to impacts outwith the immediate vicinity in case of catastrophic equipment failure, and potential for ice throw.
	Risks from catastrophic equipment failure, while extremely low, will most likely be from rotor failure during storms, and, turbines should be sited a sufficient distance which as a minimum will be at least 400metres from occupied buildings, depending on the height of the turbine(s).
	Commercial scale turbines should be fitted with equipment that detects and prevents operation in conditions where ice is present, including vibration sensors and other means of detecting imbalance in the blades.
Cumulative impact	Consideration should be given to the colour and design of neighbouring or proposed wind energy developments.

General design principles for ancillary developments

- 3.5 In addition to the wind turbines themselves wind farms have a host of other development needs associated with servicing them. These include service roads and the transmission infrastructure (see Glossary). Table 7 provides guidance on the design of these elements.

Table 7 General design guidance for ancillary development

Issue	General Principles for Ancillary developments
Buildings, transformer equipment & power lines	The natural heritage value and sensitivity of different habitats and species will vary and the siting of ancillary equipment should take this into account.
	Power lines, fencing, buildings and anemometer masts should be located and designed in a way that minimises clutter. Transformer equipment should ideally be housed in the base of each tower, depending on the size and location of the turbine (i.e. a designated site or within a settlement), or housed in a separate 'building' adjacent to the turbine. Power lines connecting the individual turbines to the on-site substation should be underground.

Buildings, transformer equipment & power lines (continued)	In small isolated landscapes, built, cultural and natural heritage sites, and urban areas it will be necessary to avoid any clutter and have the transformer station or substation screened or buried, and the inter-connecting lines and national grid connection should be buried (unless the ground is protected for natural heritage and archaeological reasons), to avoid visual confusion. In all other cases, a standard 3-wire system mounted on wooden poles will be acceptable, unless visual amenity considerations were considered to be of sufficient importance to merit the burial of cables (e.g. in coastal, open hill, moorland, or forest landscapes).
	In coastal landscapes, substations should be low and inconspicuous, and sited away from turbines to reduce visual clutter.
	All buildings and equipment should be designed to be out of site of sensitive viewpoints.
	Whether in a rural or urban setting, any ancillary equipment proposed should be appropriate in terms of the scale and nature of the setting of listed buildings, conservation areas, archaeological sites, and historic gardens and designed landscapes (as listed in 'The Inventory of Historic Gardens and Designed Landscapes').
	Wind farms of up to 50MW can connect to the 33kv distribution line via an overhead line or cable.
	For wind farms approximately 50MW, it may be cheaper to extend the grid connection to 132kv circuit line by using low profile wooden poles.
	Wind farms between 50MW to 100MW will be required to connect to the 132kv circuit line using low profile wooden poles.
	Wind farms of more than 100MW will need more substantial infrastructure, and may require either a 132kv steel towers or two wooden pole mounted lines.
	Substations and power lines connecting to the national grid for offshore wind energy developments should be sited with minimum ecological, landscape, and cumulative visual impacts.
Drainage works	Consideration should be given to their scale, location and line, and potential effects of discharges and temporary or permanent changes to hydrology, particularly to wetland and peatland habitats.
	Drainage System scheme should be considered, to remove surface water runoff and prevent erosion. Consideration should be given to the scale, location, and line of any drainage works proposed. Culverting should be avoided.
Access tracks	The natural heritage value and sensitivity of different habitats will vary and the siting of access tracks within a site should take this into account.

<p>Access tracks (cont)</p>	<p>Access tracks need to be kept to a minimum in terms of length and impact on the landscape and ecology (see finalised ALP Policy Env\23 Vehicle Hill Tracks). Wherever practical, existing tracks should be used. If a new access track is needed, it should be routed out of sight from popular viewpoints, away from watercourses and habitats containing important species, and designed to reflect the contour gradient.</p>
	<p>Access tracks should be constructed from appropriate surface material, ideally from a local source, in order to minimise the level of contrast with its surroundings (see also “Construction materials” below).</p>
	<p>Where new access tracks are required along the coast, these should follow the linear pattern of the coastline (SNH, 1999). Wherever possible new roads should be of the floating type constructed ideally on mats. This results in minimum excavation.</p>
	<p>The batter of earth works should normally not be more than 30 degrees in order that native vegetation can re-establish itself quickly. It is often better to have larger areas featuring slight gradients/cut embankments, rather than smaller areas with steep embankments. Vegetation on slight gradients regenerates better than on steeper slopes.</p>
	<p>The civil engineers employed to install the roads should be asked to provide a method statement which details best practice in terms of environmentally compatible road construction and include best working practices. All method statements should meet with the approval of SNH and other appropriate agencies. The final line of each road should be selected to create minimal physical impact on the landscape and be designed to tie-in with the contours of its location.</p>
	<p>Measures to prevent erosion, sedimentation or discolouration will be required along with monitoring proposals and contingency plans.</p>
	<p>Particular attention requires to be given to the potential impact of access tracks which cross peatland with due attention to the need to minimise disturbance off the route of the road and restoration of damaged areas.</p>
<p>Disposal of overburden</p>	<p>Overburden from construction works should be disposed of in a sensitive manner, on site if this is appropriate to the character of the area, as fill for reinstating borrow pits or in a form that can be reclaimed for the long term reinstatement of the site at decommissioning. Disposal of overburden should be given due consideration in the method statement and should in all cases accord with Finalised ALP Policy Env\23 (Vehicle Hill Tracks).</p>

Parking areas	Consideration should be given to the scale, location, layout, material, markings and signing, ensuring there will be no unacceptable impact on the character and amenity of the surrounding area.
Landscaping works	Where the proposal is located on a sensitive site, such as an archaeological site, or in close proximity to housing or tourist attraction, landscaping should be a fundamental and integral part of the design. Any proposed works should be appropriate in their nature and scale, and should not incorporate trivial, ornamental or other 'cosmetic' treatments or attempts at screening proposals, as a result of poor quality siting or design.
Forestry	Where the proposal will result in the felling and reshaping of existing woodland the applicant should submit a forest design plan (in accordance with Forestry Commission guidelines).
Construction materials	If the applicant proposes to source construction base material from local or onsite borrow pit(s), consideration should be given to the likely visual impact, proposed mitigation measures, and how the land will be reinstated/ made good.
	Recycled materials should be assessed as to whether they are the best environmentally practical option for materials, particularly for items such as aggregate and road construction materials.
Enclosures or fencing	In 'sensitive' (e.g. popular with tourists) or designated areas, any proposed method of enclosure should reflect detailed design, materials and construction method of locally traditional banks, walls and fences. Any enclosed area should avoid using rigid geometric shapes, but be set out in relation to subtle local landforms.
	Enclosure fencing may not be appropriate if black grouse and Cappercaillie are present in the area.
Method statement	Where a proposed wind energy development might impact upon the environment, a method statement should be prepared for all aspects of site works during the construction phase.
	Where road widening or improvements to the road network are proposed to allow the turbine(s) to be transported to the application site, details should be given to the potential loss of roadside habitat, trees, hedges and dykes.
Roadside facilities	Wind farms can often attract people to stop and view them. Consideration should be taken of the potential risks from such action by people on the public road network and appropriate provision made.

4. Information Requirements

Pre-application discussions

- 4.1 Pre-application discussions should, where appropriate, include neighbouring authorities where there will be cross boundary viewing and potential long-distance cumulative effects. Such discussions enable the scope of information which should be supplied to be agreed with the planning authority and enables the developer to commission necessary studies timeously. This is particularly true of large applications which will require an Environmental Impact Assessment where the relevant regulations allow for the authority to provide a “scoping opinion” to inform the content of that study.

Presentation of the planning application

- 4.2 All information should be provided in sufficient quantity for the Councils own internal uses and for statutory consultees. For major proposals a minimum of 11 sets of documents is required for this purpose. Again, the largest applications, spanning more than one administrative area, may require the submission of anything up to 30 sets of documents. Provision of this information in digital format, on CD-ROM is encouraged to ease dissemination, although hard copies of such information should accompany all planning applications. Domestic scale applications are unlikely to require the same quantity of plans etc. and advice should be sought from the Area Planning Office.
- 4.3 All applications must be up-to-date and accompanied by information presented at an appropriate scale. This will usually include the provision of Ordnance Survey map based information on an A3 base, particularly for small, medium and large scale developments.

Community consultation

- 4.4 The applicant should engage with members of the public including Community Councils to inform them of the proposed wind energy development and provide evidence of the methods used e.g. public meetings, exhibitions, surveys, leaflets. On-site domestic scale applications should demonstrate that they have notified those who would be affected by the proposal, i.e. close neighbours. Applicants should also demonstrate that they have consulted local recreational groups, such as orienteering clubs, ramblers and hang-gliding clubs, where necessary.

Information requirements

- 4.5 Depending on the scale, type, and location of the proposed wind energy development, applicants may be required to submit supporting information. Due to the complexity of Environmental Impact Assessments (EIA), further additional information may be required during its evaluation. (Further information on EIA is available in paragraph 4.22 and Appendix 2).
- 4.6 Data collected as part of any survey should be submitted as part of the planning application to ensure that it is in the public domain and subject to peer review.

4.7 Ecological and hydrological impacts

- 4.7.1 Where there is a potential for impact applicants should provide a robust analysis on potential natural heritage impacts, including:
- a habitat survey, including the classification and evaluation of the natural habitat, ecology and agricultural context, even outwith the site boundary (e.g. the number of species present in and around the site during different times of the year, breeding and/or feeding grounds), including details of any proposed or potential changes to surface vegetation;
 - hydrological impacts and the potential effects drainage from turbines and other ancillary equipment;
 - bird surveys;
 - the zone of influence the proposal will have on the area;
 - carbon emissions from peat disturbance;
 - soil quality, e.g. prime agricultural land;
 - the evaluation of impacts; and
 - the scope for mitigation of those impacts identified.
- 4.7.2 Reference should be made to the North East Scotland Biological Records Centre (NESBReC), Scottish Natural Heritage (SNH) and the Natural Heritage Team of Aberdeenshire Council as a source of information on natural heritage issues (see Appendix 1 for contact details).
- 4.7.3 Where an EIA is required the environmental information required should follow scoping discussions with the Planning Authority, SNH and others (e.g. Royal Society for the Protection of Birds (RSPB)).
- 4.7.4 Figures 3 and 4 below shows the ecological designations in Aberdeenshire. When selecting possible locations for a wind farm, applicants should consider Table 2 above and policies 19 and 26 in the Aberdeen and Aberdeenshire Structure Plan, and policies Env\1 to 4 and Inf\7 in the Finalised Aberdeenshire Local Plan.

What is needed for assessment of impact on natural heritage?

Key

- SSSI's
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Ramsar
- Cairngorm National Park
- National Nature Reserves (NNR)

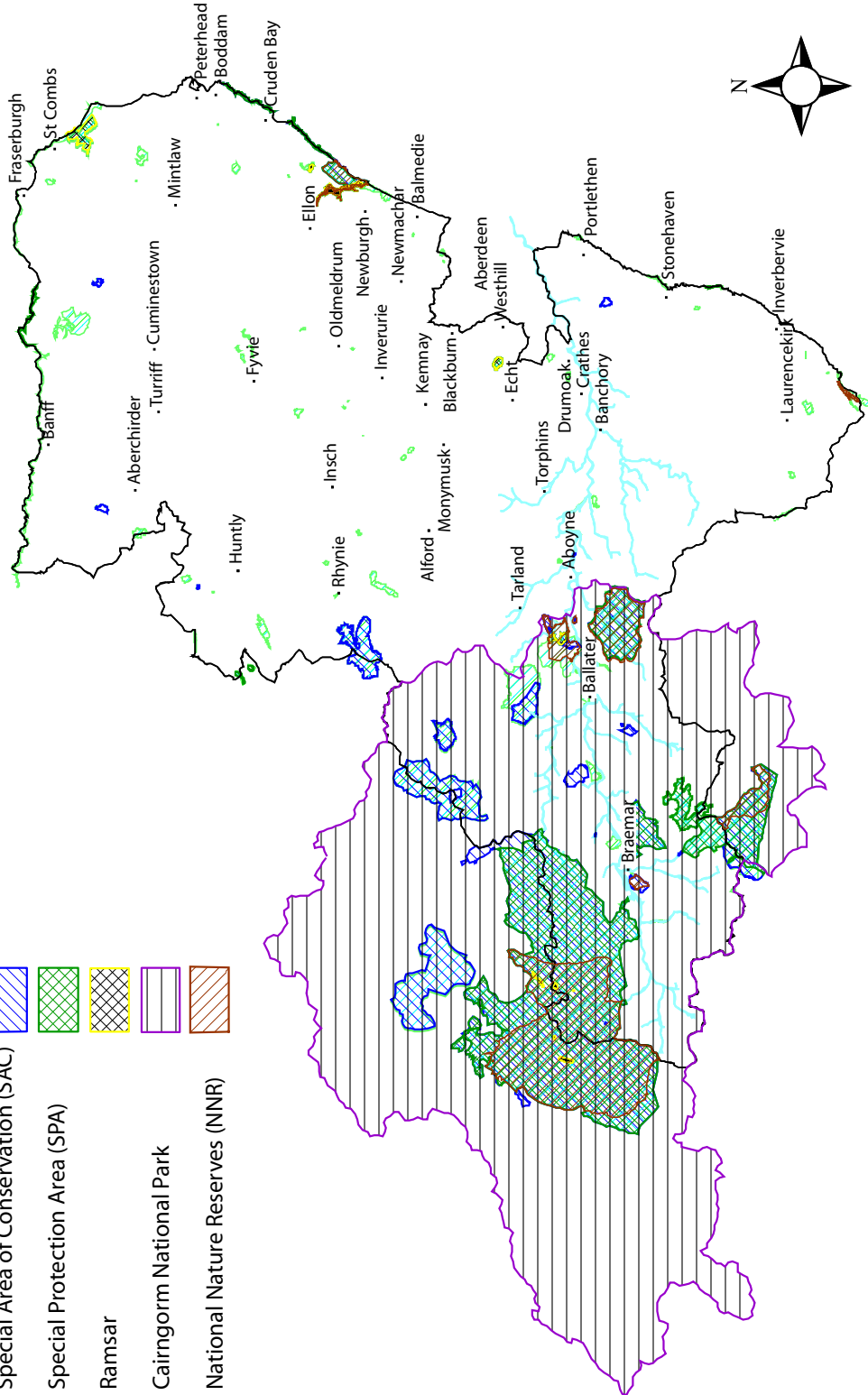


Figure 3 International and national natural heritage designations: Sites of Special Scientific Interest (SSSI), Special Areas of Conservation, Special Protection Areas, Ramsar sites, National Park, and National Nature Reserves.

Figure 4 Local natural heritage designations: Sites of Environmentally Sensitive Areas / Sites of Interest to Natural Science.

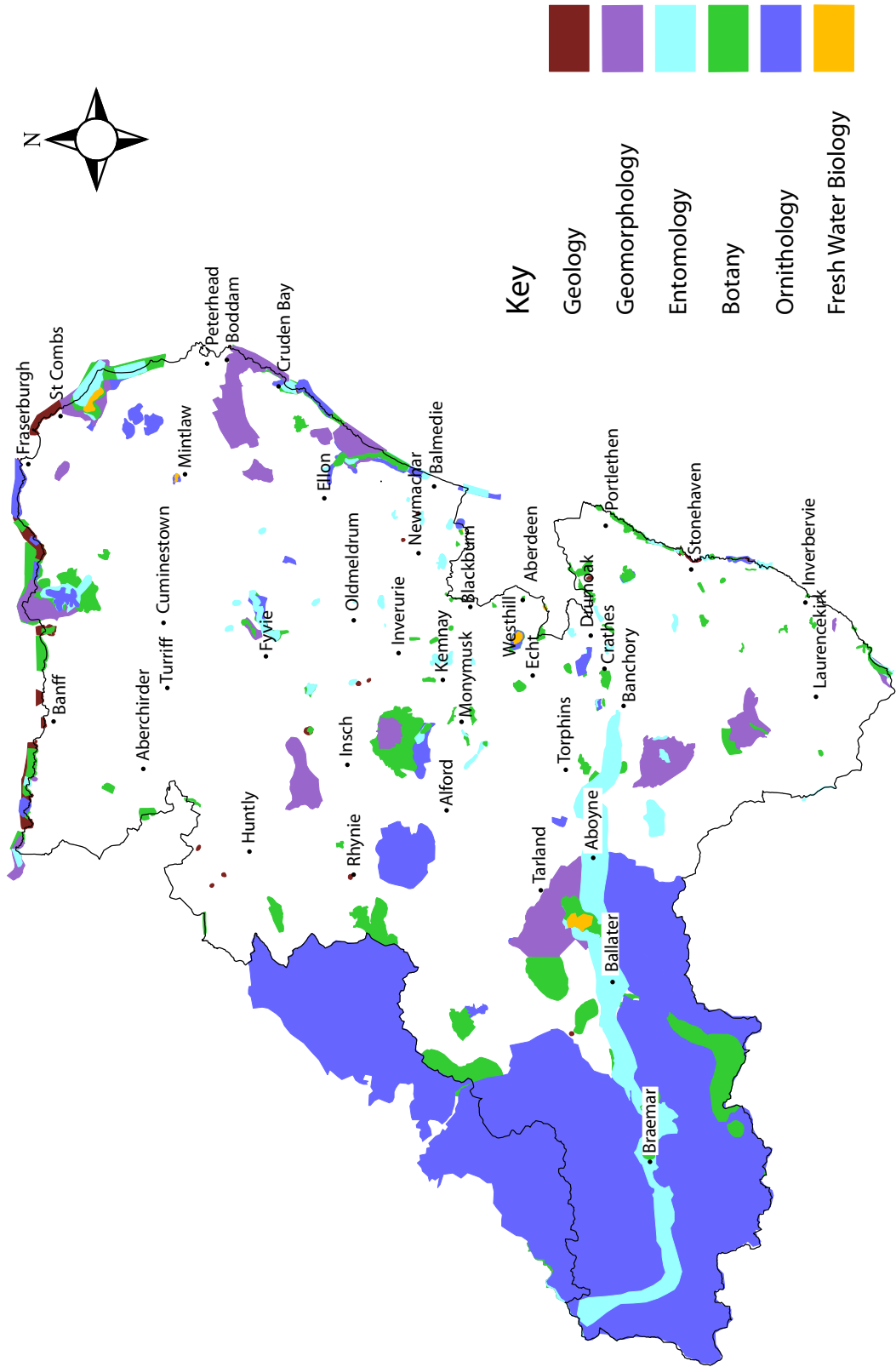
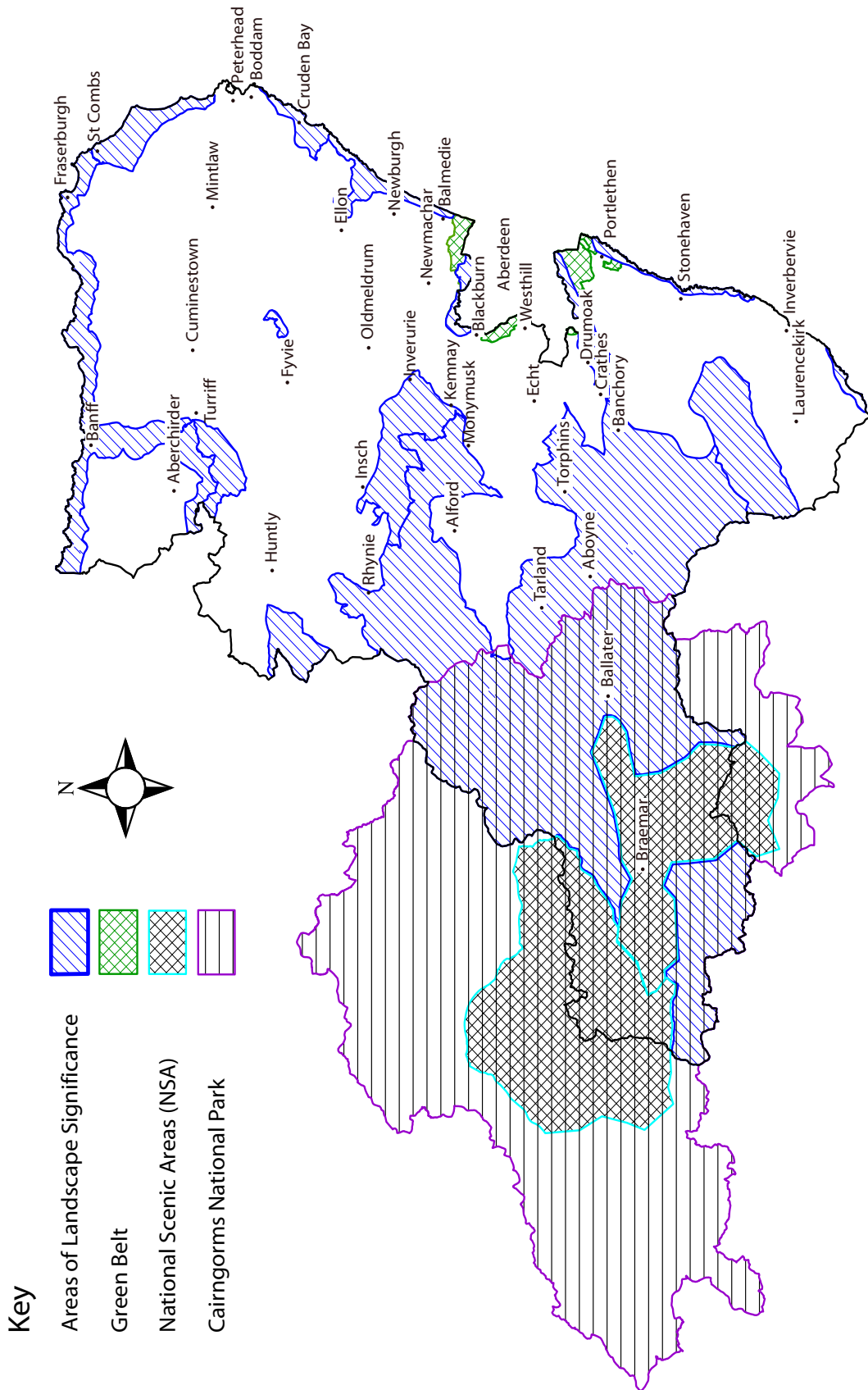


Figure 5 Landscape designations: Areas of Landscape Significance, Cairngorms National Park, National Scenic Areas and Green Belt.



4.8 Landscape impacts

4.8.1 A landscape impact assessment may be required if the proposed development is:

- a development of one or more large or medium sized turbines (greater than 40m to hub or 65m to tip in a rural environment);
- a development which is small, medium or large scale (4 or more turbines or greater than 6MW); or
- sited in a sensitive area (e.g. designated area, or within 1000m of an inhabited building) and comprises of more than one turbine.

How should visual aspects be considered?

4.8.2 The following factors should be used when carrying out any assessment of the landscape:

- existing landscape or other natural heritage designations (see figure 5);
- the appropriate Landscape Character Assessment for the area;
- the scale of the landscape (e.g. is it appropriate for all types of development proposed or just certain numbers/types of turbine(s));
- built and cultural heritage buildings and structures; and
- local landscape designations currently being prepared by the council, and will be available as supplementary planning guidance in 2006.

4.8.3 The above list is not exclusive, and the applicant may be requested to provide further information. Where an Environmental Impact Assessment (EIA) is required, the landscape impact assessment should be incorporated into this document.

4.9 Visual impact

4.9.1 An assessment of visual impact should be carried out for all applications or other methodology accepted by SNH. Where a landscape (or townscape) impact assessment is required, it should be carried out in accordance with The Guidelines for Visual Impact Assessment (SNH, 2002).

4.9.2 A visual impact assessment should include the following, unless otherwise stated:

- viewpoint analysis from key viewpoints, to be agreed with the Council and Scottish Natural Heritage prior to any assessment and Historic Scotland where necessary;
- built and cultural heritage buildings and structures in the area;
- the layout, design, number, size, output, colour of the turbines;
- details of ancillary developments, e.g. sub station, temporary buildings, cables, over head power lines and poles, access tracks, and landscaping;
- evaluation of the visual impacts;

- scope for mitigation of visual impacts; and/or
- details of borrow pits.

4.9.3 Where a landscape or townscape impact assessment is required, a visual impact assessment should include the following:

- the classification and evaluation of the landscape or townscape context;
- determination of the zone of theoretical visibility (ZTV) of the proposal;
- a zone of visual influence map showing where the turbines (including blade tips) could be seen from; and/or
- computer generated wireline diagrams and photo montages. Videomontages may be submitted along with any wireline diagrams or photomontages.

4.9.4 Representative viewpoints of the proposals should cover both long and short range visibility and landscape types and townscape landmarks (i.e. buildings, parks, etc). Consideration should also be given to alternative siting and colouring of individual turbines.

4.9.5 A visual impact assessment will not normally be required for a single turbine – a normal set of planning drawings is adequate for small systems, however, depending on the scale and location (e.g. in an urban setting) of the proposed development, a visual impact assessment may be required.

4.9.6 Developers should consult with the Cairngorms National Park Authority where a proposed wind energy development will be sited on or adjacent to the National Park boundary or will be visible from the Park.

4.10 People and settlements

When siting wind turbine(s), consideration must be given to minimising adverse impacts on the amenity of regularly occupied buildings on the grounds which they occupy. An assessment of potential shadow flicker and shadow throw throughout the year should be provided of all dwellings within a 1000 metre radius of the proposed location of each wind turbine. 'Shadow flicker', resulting from intermittent shadow cast by rotating turbine blades inside a building, and 'shadow throw', the shadow cast by the turbine(s) during the day, should be taken into account in the siting of the development.

4.10.1 A noise impact assessment will be required if a proposed wind energy development will be mounted on a tower and is located:

- within a settlement;
- within 400m of an inhabited dwelling house; or

- an initial assessment identifies a potentially significant adverse effect on other dwelling within 1000m.

4.10.2 A noise assessment is not necessary for small systems – turbine manufacturer’s information on noise outputs of the particular model should be used.

4.10.3 The level of detail in a noise impact assessment will depend on the scale of the proposal and the separation distance between wind turbines and noise sensitive properties. The majority of such an assessment should be related to the scale of the proposal and it would be unreasonable to ask for the same level of detail for small proposals as for major wind farms. Any assessment will need to take account of the particular character and sensitivities of the area, including prevailing winds and landform, and both the individual and cumulative effects of noise sources – mechanical and aerodynamic. Topography can have an effect on noise. Certain types of terrain can echo and amplify noise, and this should be taken into consideration by the consultants carrying out the noise assessment. Therefore, any assessment should at least include the following:

- characterisation of noise sensitive neighbours, e.g. a dwelling house;
- background noise surveys;
- information on wind speeds and direction;
- topography;
- predicted noise levels at the nearest sensitive neighbours;
- assessments of the mechanical and aerodynamic noise from the turbines proposed; and
- proposed mitigation measures to protect the local amenity.

Is a noise assessment needed?

4.11 Built heritage

4.11.1 A full assessment will be required of any known potential (i.e. undiscovered sites) impacts on scheduled ancient monuments, archaeological sites, listed buildings or conservation areas, in terms of their setting, noise, visual impacts, loss of artefacts, and traffic impact. Advice on this should be sought from Historic Scotland and Aberdeenshire Council’s Archaeology Service and Built and Cultural Heritage Team.

4.11.2 Where a proposal is within the grounds of, or is visible from a built or cultural heritage site, area or features (i.e. listed buildings, schedule ancient monuments, other archaeological sites that appear on the Sites and Monuments Record, or historic gardens or designed landscapes), consideration must be given to the following:

- the likely impact the location or siting of wind turbines may have on the setting or visual amenity;

What about listed buildings and monuments?

- the likely impact the design of the turbine(s) may have on a designated site, including the scale, shape, line, form and mass of the development, and the materials, colour, texture and reflectivity of the external finishes. The use of local materials may be considered appropriate under certain circumstances;
- the potential impact of physical disturbance by construction damage by the turbines or ancillary development (including access tracks, drainage, parking areas);
- the use of local design, materials and construction techniques to construct enclosures, such as fencing, banks or walls, avoiding rigid geometric shapes; and
- the use of mitigation measures, such as landscaping works, which should be integral to the design, and should not be used to screen the proposal as a result of poor quality siting and design.

4.12 Townscape impacts

4.12.1 The authority may ask for a townscape impact assessment if the proposed development is:

- a development of one or more large or medium sized turbines (more than 20m to hub or 32m to tip).
- a development which is small scale (4 –10 turbines or greater between 6MW and 15MW of installed capacity).
- located within a town centre or conservation area; or
- visible from a popular tourist attraction on land or water (e.g. park, coastal area, cultural or built heritage).

4.12.2 The following factors should be used when carrying out any assessment of the townscape:

- the scale of the townscape (e.g. is it appropriate for all type of development proposed or just certain numbers/types of turbine(s);
- the quality of the townscape (e.g. the physical state or condition of the townscape; how coherent or harmonious the townscape is; its intactness from a visual perspective, such as it's character or a particular combination of different land uses);
- the value of the townscape (e.g. listed buildings and archaeological sites, conservation areas, or because of popular local use); and/or
- any existing discordant features (e.g. existing features in the townscape which deter from the harmony of the townscape setting).

4.13 Tourism and countryside access

- 4.13.1 If there are any potential implications on tourist and recreation areas or tourism and countryside access, the following information should be provided:
- details of any effects on footpaths, cycleways, bridleways, Nordic ski trails, public paths or Core Paths near to a proposal, which may be affected;
 - details of any visitor information/notice board to be provided on the site; and
 - visual and noise assessments from popular recreational routes and viewpoints taken from important visitor attractions within 1km of a wind energy development in proximity of the turbines and viewpoints taken etc.

4.14 Public safety

- 4.14.1 Depending on the scale of the proposal a risk assessment of the proposed development should be submitted, taking particular account of proximity of any surrounding development, and risk of injury to humans through catastrophic equipment failure or ice throw. It would be unreasonable to ask for same level of detail for small proposals as for major wind farms. Therefore, an informal risk assessment may be requested to ensure that the developer has considered this impact in order for mitigation measures to be proposed.

- 4.14.2 A risk assessment may also include an assessment of any road, rail and path safety as well as capacity implications for the proposal, including possible effects of visual disturbance caused by the turbines themselves, e.g. identifying and assessing possible driver distraction points.

4.15 Aircraft, aerodromes and technical site: safeguard zones and electro-magnetic interference

- 4.15.1 Applicants should demonstrate that they have consulted with the owner and/or operator of any aerodrome (licensed or unlicensed) within 30km of Aberdeen Airport, or within 2km for any other civilian aerodromes (licensed or unlicensed), and with the Ministry of Defence (Defence Estates), before submitting a planning application. Applicants should send details to the Civil Aviation Authority (CAA) and the British Aviation Authority (BAA) where a BAA aerodrome may be affected. The applicant should provide details of possible adverse effects, and appropriate measures to alleviate adverse effects on civil and military aircraft and airport radar equipment. Further information is available in the Wind Energy and Aviation Interim Guidelines (DTI, 2002) which sets out the pre-application consultation process which has been agreed between the wind energy and aviation industries.

- 4.15.2 Technical sites that require consideration fall into three categories:

- sites engaged in or supporting airspace and air traffic management (both civil and military), including radar's and navigation aids;
- sites engaged in or supporting the air defence of the UK, including radar's; and

- meteorological (Met) Office weather radar's.

Further information can be found in Appendix 1.

4.15.3 Consultation should be undertaken with the British Aviation Authority (who will consult with National Air Traffic Services directly) the Civil Aviation Authority, the Defence Estates, and with the operators of airfields or airstrips either licensed or unlicensed to assess any possible impact on aerodromes and technical sites. Addresses for these contacts can be found in Chapter 5.

4.15.4 It is also advised that organisers of outdoor pursuits such as gliding (paragliding or hang-gliding) and microlights should be consulted.

4.16 Electro-magnetic interference (communications systems) and television reception

4.16.1 The applicant should demonstrate that they have consulted with the Office of Communication (who now act as the central point of contact for any television and radio broadcasting, telecommunication and wireless communication issues), the Ministry of Defence, British Aviation Authority Safeguarding Team, Civil Aviation Authority, the emergency services and utility companies and the local authority before submitting a planning application. The applicant should provide details of possible adverse effects, and appropriate measures to alleviate any adverse effects on broadcast communications and signals.

4.16.2 It will not be acceptable to say that mitigation measures will be carried out without demonstrating how this will be done. A letter or plan showing what work needs to be carried out prior to the development will be required from the operator(s). Where effects can be predicted it is accepted that mitigation can often involve technical or operational fixes which can be the subject of ongoing study by both parties.

What if there is another development nearby?

4.17 Cumulative effects

4.17.1 The 'cumulative effect' will have to be considered if a submitted planning application involves:

- any viewpoint or sensitive receptor affected by two or more wind farm Zone of Theoretical Visibilities (ZTV);
- more than one small scale, medium scale or large scale wind energy development(s)* within a 15km radius of the application site;
- more than one turbine or a cluster wind energy development(s)* within a 7km radius of the application site;
- extending a wind farm or erecting additional individual turbines where another already exists; or
- any combination of the above.

4.17.2 Table 8 sets out examples of the type of cumulative impacts that are most commonly associated with wind energy developments.

4.17.3 Any expansion of a wind farm development should not be seen as a separate wind farm. Where an expansion to a wind energy development is proposed, the classification of the proposal (e.g. small scale etc) should be amended accordingly (see paragraph 2.5).

* wind energy developments that have already been constructed, granted or are seeking planning permission, or are in the public domain as a result of developer publicity, or a scoping opinion has been formally requested (providing information is available on the proposed location and scale of the development).

Table 8 Examples of cumulative impacts (see also Appendix 2 in Part 2: Guidance for Assessing Wind Energy Developments)

Topic	Type of impact (examples)	Study Area
Landscape	Landscape character	Landscape character area
Visual	Static	Overlapping zones of theoretical visibility
	Sequential (including perceptive)	
	Deforestation	
Hydrology and hydrogeology	Flood risk	Catchment area
	Pollution (e.g. oil and fuel storage, and use of concrete)	Sub-catchments
Ecology (including birds and bats)	Direct loss	Protected species at international/local levels
	Indirect loss	
	Carbon sinks	
	Habitat enhancement	
Traffic and transport	Congestion (e.g. slow moving vehicles/transportation) from multiple developments	Depends on applicants proposed access route(s)
Aviation and defence	Radar clutter	Radar lines of sight
	Impact on low-flying training areas	MoD tactical training area
Recreation and amenity	Sequential impact on long distance walking and cycling routes	Depends on routing and wind farm zones of visual influence
Built & cultural heritage	Setting of built and/or cultural heritage building or structure	Overlapping zones of visual influence

Note: Although a cumulative impact assessment is a temporal assessment of all impacts past, present and reasonable foreseeable future, such impacts may extend beyond the study area.

A. Ornithological impacts

4.17.4 In order to determine whether there will be a cumulative effect on birds, the target species will usually be birds of high conservation interest and/or species considered to be vulnerable to wind farms by virtue of their behaviour or ecology. An assessment will be required, in order to determine the percentage of the bird population affected, if:

- a wind energy development is to be built near to one or more existing wind energy developments;
- more than one wind energy development is proposed;
- a wind farm extension is proposed; or
- a combination of the above is proposed.

4.17.5 Broadly there are seven stages to assess the cumulative effects on birds:

- define the species to be considered;
- decide the timing of surveys;
- identify the search area;
- decide the method of assessment;
- review the findings of existing studies;
- draw conclusions on cumulative effects within the study area; and
- post construction monitoring from other sites.

Where possible, use should be made of any post-construction monitoring studies.

4.17.6 A cumulative assessment can apply at a number of levels, for example:

- an individual pair, or birds occupying a single breeding site;
- the qualifying interest of a Special Protection Area;
- a regional or local population; and/or
- a national population.

B. Visual impacts

4.17.7 SNH have published best practice guidelines (as part of “The Guidelines for Visual Impact Assessment”) on the assessment of cumulative impact, which should be followed. The guidance indicates that thresholds should be used to identify adverse cumulative impact and whether wind farms in a particular area would be unacceptable. Where the applicant chooses a different methodology to assess cumulative visual impact, this must be accepted by SNH. A reputable Landscape Architect should undertake such assessments.

4.17.8 A static and sequential cumulative visual assessment should include the following elements:

- A Base Plan showing the 'footprint' or overlapping ZTV of each wind energy development in a particular area (e.g. those in the public domain). The ZTV area for the applicant's and other wind energy development(s) will be determined by the planning authority and/or SNH, and will depend on, for example, the height of the turbines (see SNH Guidelines, 2003). The cumulative ZTV should therefore combine the ZTVs of the other projects, which will show the locations of cumulative visual impact and total number of turbines seen by particular recipients.
- In accordance with The Guidelines for Visual Impact Assessment (SNH, 2002) the sensitivity of each viewpoint should be identified, and the magnitude of change to landscape character from that viewpoint assessed (see also paragraph 4.17.9 below). Both these criteria should then be combined in accordance with guidelines, and a final assessment of overall cumulative visual impact of development from the particular viewpoint indicated.
- Information should be produced in the form of computer models and/or photomontages of how the multiple developments will appear from a particular viewpoint.
- The developer should then indicate the factor of dominance of multiple wind energy development from a particular viewpoint. Is it a particular view featuring a landscape with some wind farms, or a landscape of wind farms.

4.17.9 The main issues that should be considered within an appraisal of visual cumulative impact are:

- the degree of acceptable landscape change in a particular landscape character area;
- identification of the threshold beyond which wind farms in a particular area become unacceptable;
- the need to maintain integrity and quality of a landscape;
- the need to maintain landscape character; and
- incompatibility in detail design between wind farms in the same vicinity, including development size, turbine height and layout.

4.17.10 A cumulative landscape assessment should include a base plan, showing where other wind farms ZTVs overlap, and using the key viewpoints identified for the cumulative visual impact assessment, assess whether the proposal will have an adverse impact on the landscape. However, in order to justify a threshold based on natural heritage factors, there needs to be clarity over natural heritage objectives.

4.17.11 Computer models and photomontages should include existing features such as pylons, communications masts and any other structures or features which can be used to create a comparison of scale. From the information provided a professional judgement will still require to be carried out in order to come to a conclusion as to whether or not a scheme is acceptable in relation to its neighbours in its given landscape character area.

C. Other impacts

4.17.12 Other cumulative impacts, such as noise and aviation can be assessed using best practice identified by the applicant and agreed with by the planning authority and/or relevant body.

4.18 Establishment of the wind regime

4.18.1 Where there is concern about the siting of a wind turbine (e.g. its height or location in the built environment), the applicant must demonstrate that the proposal is viable i.e. that there is enough wind speed after a period of four to twelve months monitoring the site where this can be reasonably predicted. For all domestic scale applications or where the development will not be connected to the national grid, consideration should be given to the use of alternative renewable energy technologies.

4.18.2 Wind turbines are technically feasible in areas with a mean annual wind speed of less than 7m/s, and commercially viable wind energy projects are being developed on sites with annual mean wind speeds as low as 5m/s at 45m above ground level.

4.18.3 The total wind energy resource, as shown in the figures overleaf were derived from computer estimates of annual mean wind speeds at 45m above ground level supplied by ETSU (now known as Future Energy Solutions). The area has been divided into square kilometres, and uses Met Office and topographical data to calculate the average annual wind speeds.

4.18.4 The feasible resource as shown in figure 6 was estimated by removing roads, urban areas, forests and inland water from the available area.

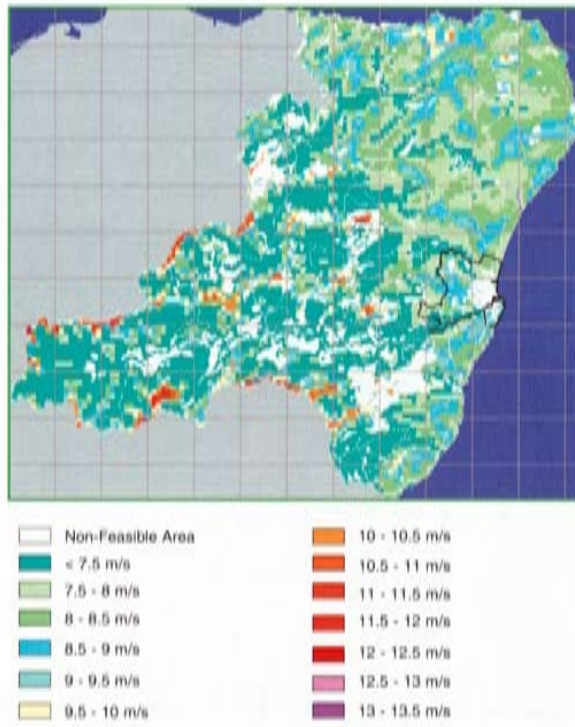


Figure 6 Feasible 45m wind resource

Source: ALTNER Report (1999)

4.18.5 The practical resource, as shown in figure 7 was estimated by removing areas designated on amenity and ecological grounds, and by removing all areas more than 10km from the 33 kV network.

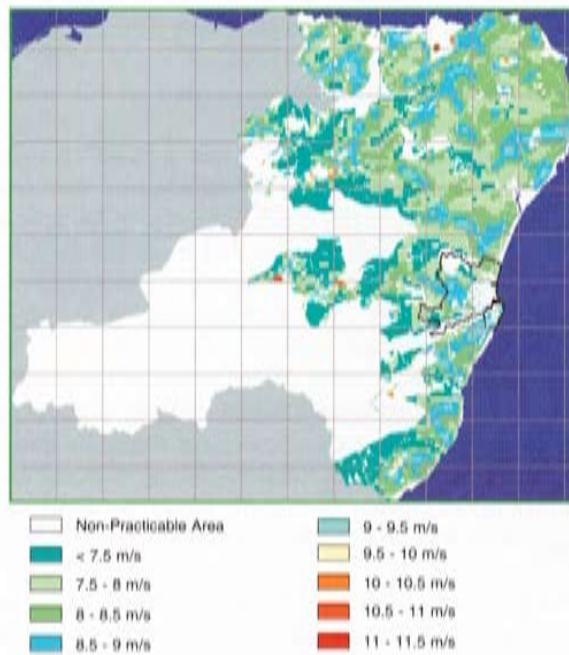


Figure 7 Practicable 45m wind resource

Source: ALTNER Report (1999)

4.19 Grid network

- 4.19.1 Applicants are required to submit details of the proposed power connection, either to the national grid or to a private end user(s) including the design, location and height of all new electricity infrastructure as far as is known at the time recognising that the connection may be subject to a separate section 37 application if concerning an overhead line, which may itself be under the remit of the local Distribution Network Operator.
- 4.19.2 Planning applications for proposed power connection, either to the national grid or to a private end user(s) should include:
- the design, location and height of all new electricity pylons/underground cables;
 - details of any substation(s), both on and off-site, including height, design, location and colour;
 - details of any fencing proposed to enclose the substation(s); and
 - details on the potential impact (if any) to designated natural, built or cultural heritage sites .
- 4.19.3 Prior to submitting a planning application, applicants are strongly advised to gain confirmation from Scottish and Southern Energy/National Grid Company whether their project is viable.

4.20 Other issues

4.20.1 Local employment

Details should be provided of the local employment and/or business opportunities that may arise as a result of the wind energy development particularly in relation to civil engineering works, haulage and other non-specialist works.

4.20.2 Associated community benefits

A wind farm developer/owner may wish to play an active role in the community. Developers or landowners are encouraged to engage directly with communities rather than with Aberdeenshire Council on this issue, although some guidance is provided by a number of draft publications currently being prepared by the council's Planning Gain Co-ordinator (see chapter 5 for contact details). The absence or presence of any contribution to local communities is not an issue which will be considered by the authority in its determination of whether planning permission should be required.

4.20.3 Developer contributions

Details should be provided on the form of developer contributions required as a result of the proposed wind energy development. The need for developer contributions will be assessed in relation to the impact of the proposed development in the locality, such as visual and road infrastructure impacts (i.e. need for new footpaths or road widening). Developers will be expected to alleviate such impacts through means agreed with by the council's Planning Gain Co-ordinator preferably at the pre-application stage.

4.20.4 Forestry design & management plan

If a wind energy development will result in the felling and reshaping of an existing woodland, a forest design plan, including felling and restructuring proposals should be supplied as part of the application. The forest design plan should be carried out and presented in accordance with Forestry Commission guidelines.

4.20.5 Borrow pits

Where materials for construction are to be sourced from local or onsite borrow pit(s), consideration should be given to the likely visual impact, proposed mitigation measures, and how the land will be reinstated/made good. Where waste is to be disposed of in a borrow pit, the potential requirement for waste management licences or licensing exemptions should be discussed with SEPA at an early stage.

4.21 Decommissioning statement

4.21.1 Six months prior to the decommissioning of a wind energy development, a Decommissioning Method Statement should be prepared and agreed with the Council, which will include the following, although this list is not exclusive:

- the length of time it will take to remove all the turbines and associated tracks, cables, and buildings;
- transport and traffic requirements i.e. vehicle movements, road widening or other traffic measures;
- remedial works e.g. soil covering and reseeded; and
- the impacts on the wider environment e.g. natural habitats, recreational users, residential areas (in particular noise impacts).

4.21.2 Sufficient funds, such as a bank bond should be available to ensure the decommissioning of the site, and estimated costs should be made available to the planning authority.

What about the long term future of the site?

4.22 Environmental impact assessment

A. Screening opinion

4.22.1 The planning authority must screen every planning application for Schedule 2 development, in order to determine whether or not an EIA is required (SEDD Circular 15/1999), and whether a development is likely to have significant effects on the environment as stated in Schedule 3, which sets out three broad 'selection criteria' listed below:

- the characteristics of the development (e.g. its size);
- the environmental sensitivity of the location (e.g. the quality and absorption capacity of the natural environment); and
- the characteristics of the potential impact (e.g. its magnitude and duration).

Will an environmental impact assessment be required?

4.22.2 To assist in this process, the guidance sets out below when an Environmental Impact Assessment (EIA) may be required:

- a development of one or more medium or large sized turbines (more than 30m to hub or 48m to tip in a rural environment);
- a development which is small, medium or large scale (4 or more turbines or greater than 6MW);
- the development will be located within a settlement and the turbine will be mounted on a tower;
- the development will be located within or impacting upon a site designated for cultural, built or natural heritage reasons, and the turbine will be mounted on a tower;
- the development will be sited in a sensitive area (e.g. dwellings in the countryside) and compromises of more than one turbine; or
- the development will be within 1000m of an inhabited dwelling.

B. Scoping

4.22.3 Where an EIA is required, the developer should consult with the planning authority at an early stage on the precise requirements for carrying out a scoping opinion (see Table 9 below and Appendix 2). Schedule 4 in the 1999 Regulations set out a list of information, which should be included in an Environmental Statement. Due to the complexity of the EIA, further additional information may be required during its evaluation.

4.22.4 Where an Environmental Impact Assessment is required the environmental information required should follow scoping discussions with the Planning Authority, SNH and others.

4.22.5 With any Environmental Statement prepared, a non-technical summary must also be provided. Further information on preparing an Environmental Statement is available in PAN 58.

Table 9 Minimum information requirements for a scoping opinion

Topic heading	Minimal Information requirements
Sustainable development	Materials, location of the proposed development, energy consumption during construction, local jobs created/sustained, transport of materials.
Landscape	Landscape designations, impact assessment, visual impact assessment, Zone of Visual Influence/zone of theoretical visibility, viewpoint analysis, photo-montages as appropriate.
Natural environment	Natural heritage designations, habitat and vegetation surveys, species surveys, mitigation measures and assessment of impact on natural heritage.
Landform	Changes to landform and impacts on geomorphology and groundwater, changes in patterns of erosion and sedimentation.
Built environment	Impact on local properties, other built heritage including listed buildings and their setting, archaeological sites and landscapes and their setting, historic land uses, conservation areas, designed landscapes, and historic gardens affected.
Hydrology and run-off	Hydro-geology , private water supplies, lochs and water courses - details of current and proposed drainage patterns and impacts this may have on water flows and water quality; the impact of tracks and cables crossing watercourses; pollution; erosion; sedimentation; discolouration; and mitigation measures.
Infrastructure	Road access and tracks, construction traffic, and road safety.
Noise pollution	During the construction and operation period.
Tourism and countryside access	Effect on footpaths/cycleways/bridleways, visual assessments from tourist routes/viewpoints.
Proximity to settlements	Details on the location of settlements within 400m of the application site.
Cumulative impacts	Cumulative impact assessment (e.g. a cumulative impact assessments on landscape, visual, ecological, hydrological, traffic, aviation, recreation, and built and cultural heritage).
Baseline monitoring, which should continue after commissioning	Noise and ecological impact.
Decommissioning	Site reclamation and security of funds to implement the decommissioning.
Alternative sites	Details of alternative sites considered
Borrow pits	Details of borrow pits (if required).
Pollution	Pollution from vehicles and mitigation measures

5 Contact List (as of March 2006)

Aberdeenshire Council	Telephone	Address
Nick Ananin: Environment Planner (Natural Heritage - Central)	01467 628254	Planning & Environmental Services Gordon House Blackhall Road Inverurie AB51 3WA
Peter Fraser: Environment Planner (Landscape)	01467 628395	
Colin Miller: Access Officer	01467 628481	
Emma Williams / Judith Cox: Environment Planner (Ecologist)	01467 628002	
Mary MacLeod: Environment Planner (Natural Heritage - South)	01569 768293	Planning & Environmental Services Viewmount Arduthie Road Stonehaven AB39 2DQ
Eleanor Munro: Environment Planner (Natural Heritage - North)	01261 813219	Planning & Environmental Services Town House Low Street Banff AB45 1AU
Stuart Robertson: Planning Gain Co-ordinator	01330 825518	Law and Administration Banchory Area Office The Square Banchory
Stuart Carrie: Development Control Manager	01569 768265	Planning & Environmental Services Viewmount Arduthie Road Stonehaven AB39 2DQ
Alison Hogge: Policy Planner	01224 665168	Planning & Environmental Services Woodhill House Westburn Road Aberdeen AB16 5GB
Charles Lindsay: Principal Environmental Health Officer	01467 628140	Planning & Environmental Services Gordon House Blackhall Road Inverurie AB51 3WA
Ewan Wallace: Transportation Manager	01224 665228	Transportation & Infrastructure Woodhill House Westburn Road Aberdeen AB16 5GB
Brian H Watt: Team Leader - Built and Cultural Heritage	01569 768290	Planning & Environmental Services Viewmount Arduthie Road Stonehaven AB39 2DQ
Ian Shepard: Principal Archaeologist	01224 664723	Planning & Environmental Services Woodhill House Westburn Road Aberdeen AB16 5GB

Aviation		
Colin Cragg: Senior Planning Manager	01293 507746	British Aviation Authority Group Airport Planning and Environ- ment First Point Buckingham Gate Gatwick Airport Gatwick West Sussex RH6 0NT Colin_Cragg@baa.com
BAA Safeguarding Team - General Enquiries	(T) 01293 503879 / 504854 (F) 01293 507750 safeguarding@baa.com9	
Aberdeen Airport	01224 727177	National Air Traffic Services Ltd Room 207 Control Tower Building Aberdeen Airport Dyce Aberdeen AB21 7DU
Forestry Commission		
John Risby: The Conservator	01466 794542	Grampian Conservancy Ordiquill Portsoy Road Huntly AB54 5SJ grampian.cons@forestry.gsi.gov.uk
Historic Scotland		
	0131 6688600	Head Office Longmore House Salisbury Place Edinburgh EH9 1SH
Ministry of Defence		
Julian Chafer: Head of Safeguarding	0121 3112022	Kingston Road Sutton Coldfield West Midlands B75 7RL
North East Scotland Biological Records Centre		
Nick Littlewood: Manager	01224 273633	NESBReC University of Aberdeen 23 St Machar Drive Aberdeen AB24 3RY nesbrec@aberdeenshire.gov.uk

Office of Communication		
	0845 456 3000 or 020 7981 3040	Ofcom Contact Centre Riverside House 2a Southwark Bridge Road London SE1 9HA windfarmenquiries@ofcom.org.uk
John Blake: Cable & Wireless	John.Blake@cwmsg.cwplc.com	

Scottish Natural Heritage		
Ron MacDonald: Area Manager	01224 642863	16/17 Rubislaw Terrace Aberdeen AB1 1XE www.snh.gov.uk

Ornithological impacts		
Royal Society for the Protection of Birds	01224 624824	Royal Society for the Protection of Birds East Scotland Regional Office 10 Albyn Terrace Aberdeen AB10 1YP
British Trust for Ornithology	01786 466560	British Trust for Ornithology BTO Scotland School of Biological and Environmental Sciences Cottrell Building University of Stirling FK9 4LA

Water		
Hydrologist		Scottish Environment Protection Agency Aberdeen Office Greyhope House Greyhope Road Torry Aberdeen AB11 9RD

Cairngorms National Park Authority		
Planning Office	01339 753601	Cairngorms National Park Authority Planning Department Albert Memorial Hall Station Square Ballater Aberdeenshire AB53 5QB planning@cairngorms.co.uk

6 Further Information

Policy

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University of Newcastle (2002) Visual Assessment of Windfarms Best Practice, Scottish Natural Heritage Commissioned report, F01AA303A.

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Glossary:

Amenity - The physical and social features of settlements and countryside which contribute to creating a comfortable and desirable living environment. Developments that are not 'good neighbours' have a negative impact on amenity, e.g. noisy or unsightly developments.

Ancillary - Supporting the main purpose of a development, such as access tracks, anometer(s), buildings, cables, poles, borrow pits, substations, grid connections, transformers, and forest felling.

Archaeological Site - This is a site or structure important in terms of archaeology, architectural history or history. They differ from Conservation Areas and Listed Buildings in that they are usually much older and included on sites and monuments record held by Aberdeenshire Council. Most have been recorded by the Council or through the Royal Commission on Ancient and Historic Monuments of Scotland. An archaeological site can date from the last war to 9,000 years old. See Aberdeenshire Local Plan Policy Env\19.

Biodiversity Action Plan - A document for use by all kinds of organisations to help sustain biodiversity. One is produced for the whole of the UK others are more local, e.g. North-East Scotland Local Biodiversity Action Plan.

Brownfield Sites - Normally sites within settlements which have previously been developed or used for some purpose which has ceased. Their redevelopment may encompass re-use of existing buildings by conversion; demolition and new build; clearance of derelict land and infill and various other forms of intensification. They exclude private and public gardens, sports and recreational grounds, woodlands and amenity open spaces.

Character - A combination of features which distinguish an area. A proposal would be 'out of character' if it would introduce features not in keeping with those which make up an area's existing character.

Conservation Area - Areas of special architectural or historic interest, the character or appearance of which it is desirable to protect or enhance. See Aberdeenshire Local Plan Policy Env\17.

Developer Contributions - Contributions, normally subject to an agreement between a developer and the Council, by which the developer provides services or infrastructure related to the development proposed. See Aberdeenshire Local Plan Policy Gen\3.

Discordant features - Existing features in the landscape that deter from the harmony of the landscape.

District Wildlife Sites - Sites of local importance for wildlife, which have been identified by the planning authority in conjunction with voluntary nature conservation organisations.

Diversification - The creation of alternative income generating opportunities.

Domestic scale wind turbine - A small wind turbine with no tower. It can be mounted directly onto a building, and is small enough to not be visually intrusive or noisy.

Environmental Impact Assessment - A process by which information about the effects of a proposed development is collected, assessed and used by experts in reaching a decision on whether it should go ahead.

Four Tier Policy Areas - A list of sites divided into 4 categories based mainly on their value to the environment. The top category contains sites of international importance; the next - sites of national importance; the third - sites of local importance; and the bottom - all other sites. The list varies slightly depending on the type of development it relates to. It can be seen in Appendix 12 of the Aberdeenshire Local Plan.

General Development Order - The part of the Town and Country Planning (Scotland) Act 1997 which sets out how planning applications should be made and dealt with and also what types of development are permitted.

Green Belt - An area where strict planning controls are applied to protect the rural character of the landscape surrounding Aberdeen with the intention of:

- (i) maintaining the identity of communities within Aberdeen and the surrounding settlements by clearly defining their boundaries and preventing coalescence;
- (ii) maintaining the landscape setting of the City; and
- (iii) providing countryside for recreational purposes.

Habitat - The environment in which a species lives at any stage in its life cycle.

Historic Gardens and Designed Landscapes - Areas that have been set out and planted in the past (mostly within the last 200-300 years) and which are still recognisable as representatives of a particular style, period of quality. They are listed in the Inventory of Gardens and Designed Landscapes. See Aberdeenshire Local Plan Policy Env\20.

Historic Scotland - The body responsible for safeguarding of Scotland's built heritage. This includes giving legal protection to monuments and buildings and giving grants and advice to help sustain Scotland's built heritage.

Hydrology - the movement of water in relation to land.

Important Public Views - Views, which the public can appreciate from a generally accessible vantage point.

Inhabited building - any building regularly occupied by people (excluding holiday homes).

Landscape Character - The distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another.

Landscape Character Types -

Agricultural heartland - Intensive mixed farming on large fertile fields with scattered woodland areas, and towns and villages, linked by a network of main roads and lanes. There are many variations of an agricultural heartland due to the differences in relief, which influence patterns of field, woods and settlements. It is the most densely populated area, which will continue to grow, and their agricultural productivity generally precludes large scale forestry projects, although small scale plantations are quite common.

Farmed Moorland Edge - Is essentially a transition landscape between the Moorland Plateaux and the Agricultural Heartland and occurs as a narrow buffer between the two. It is generally a small scale, remote upland farming landscape characterised by an intricate pattern of fields and woods and a tightly undulating relief.

Coasts - May consist of huge expanses of beach and sand dunes or have high headlands that give way to sheer cliffs, pitted by waves to create jagged reefs. These areas are often cultivated up to the outermost boundaries of the land.

Plateaux- A high mountain area and can consist of bare, boulder-strewn mountain summits, generally over 800m in height. Plateaux landscapes are unsettled and this together with the huge scale of their landform contribute to the sense of them possessing a wildland quality.

The Moorland Plateaux are typically covered by either heather moorland or coniferous woodland which forms vast cloaks over the hills and ridges; plantation woodland is totally dominant in some areas and will become so where new plantings become established. May include local areas of rough upland not associated with mountains at elevation less than 300m above sea level.

Straths and Valleys - A strath contains a major river system of the areas and are relatively low lying compared with other landscape types

which border them. For example the Dee, Don, Bogie, and Deveron. The straths have long been cultivated and the landscape has been consequently shaped by man. The straths often comprise a diverse mix of farmland, woodlands, forests and settlements, creating a variety of landscape patterns on the valley floors and lower hill slopes and providing a distinctive visual contrast with other less man influenced landscape types adjacent to them.

Uplands and Glens - May comprise of vast ranges of rolling hills generally between 400-700m in height and may partially surround a high mountain plateau. These hills have smooth, rounded summits and evenly graded slopes, predominantly covered with heather, moor or rough grassland. This landscape type has little human settlement, which can give the uplands and glens a remote character.

Landscape Character Assessments

- These are studies, which have been undertaken by, or for, Scottish Natural Heritage to define the elements, which make up the landscape character of an area.

Landscape Quality - Condition of the landscape, based on judgements about its physical state and intactness, from visual, functional and ecological perspectives.

Landscape Value - Relative value attached to different landscapes. A landscape may be valued by different communities of interest for many different reasons.

Listed Building - A building, which is included in a list compiled by Historic Scotland as being of architectural or historic interest. See Aberdeenshire Local Plan Policy Env\18.

Local Nature Reserve - Areas of locally important nature conservation and amenity value, which give access to the public. See Aberdeenshire Local Plan Policy Env\3.

Local Plan - A statutory document prepared and adopted by each planning authority (in the case of the North East, Aberdeen or Aberdeenshire Council) providing specific planning policies and proposals for the development of land as the basis for development control. Local Plans conform with and apply the policies and general proposals of the Structure Plan.

National Nature Reserve - These are areas of national or international importance for nature conservation and include some of the most important natural and semi-natural habitats in Great Britain. See Aberdeenshire Local Plan Policy Env\2.

Natural Planning Policy Guidance (NPPG)

- A series of governmental publications that provide statements of Scottish Executive policy on nationally important land use and other planning matters, supported where appropriate by a locational framework.

Natural Scenic Area - These are nationally important areas of outstanding natural beauty, representing some of the best examples of Scotland's grandest landscapes, particularly lochs and mountains. See Aberdeenshire Local Plan Policy Env\5.

Nature Conservation Sites - The term used to describe all sites of nature conservation value which have a specific named designation.

Natura 2000 - The title for the framework of areas designed to conserve national habitats and species of plants and animals which are rare, endangered or vulnerable in the European Community.

NEST - (North East Scotland Together) - the Approved Structure Plan.

Planning Advice Note (PAN) - A series of governmental notes on planning issues that provide advice on good practice and other relevant information.

Planning Application - An application made to the Council for the development of land or property.

Popular viewpoints - Relating to historic buildings and other heritage landmarks, main viewpoints within the valleys.

Precautionary Principle - The principal that no action should be taken where there is doubt about possible impacts, but the damage caused by that impact could be great.

Prime Quality Agricultural Land - Land of Classes 1, 2 and 3.1 in the Land Capability for Agriculture as defined by the Macaulay Land Use Research Institute. See Aberdeenshire Local Plan Policy ENV\11.

Priority habitat or species - Habitat or species which is threatened or suffering rapid decline.

Public Open Space - Open areas with any mixture of amenity, recreation (formal and informal), habitat and shelter value which the public can access. See Aberdeenshire Local Plan Policy HOU\13.

Public path - Under the Land Reform Act 2003, all footpaths, bridal ways and cycle paths.

Receptor - A listed building or other heritage landmarks popular with visitors, a resident, outdoor worker, tourist / recreational user (walker, horse rider, cyclist, hill walker). It is defined by the zone of visual influence - the distance from each viewpoint in the EIA.

Regionally important harbours - Harbours that benefit the local economy and the surrounding areas e.g. Fishing ports.

Regularly occupied building(s) - any building frequented by people, and includes all functional buildings no matter the particular use or uses, including the grounds that they occupy.

Ridge - A long narrow hilltop.

Scottish Executive - National Government in Scotland.

Scottish Natural Heritage (SNH) - Public body with a remit to secure the conservation and enhancement of Scotland's unique and precious natural heritage, i.e. wildlife, habitats and landscapes.

Sequential Test - A process which gives priority to locating new retail development in defined town centres, followed by edge of centre and then out of centre. See Aberdeenshire Local Plan Policy Emp/6.

Settlement - A place defined by a settlement boundary on the Local Plan proposals maps on the basis that it contains services, facilities, or places of employment which could be sustained by new development or could contribute to this.

Site of Interest to Natural Science (SINS)
- An area identified by the Council as being of local importance and representative of a particular type of biological or geological interest. See Aberdeenshire Local Plan Policy Env\3.

Site of Special Scientific Interests (SSSI)
- These are areas of land or water which, in the opinion of Scottish Natural Heritage, are of special interest by reason of their flora, fauna, geological or physiographical features. See Aberdeenshire Local Plan Policy Env\2.

Special Area of Conservation (SAC)
- Areas designated by the Scottish Executive in accordance with the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats and species of community interest are either maintained at, or restored to, a favourable conservation status. See Aberdeenshire Local Plan Policy Env\1.

Special Protection Area (SPA) - Areas classified by the Scottish Executive in accordance

with the EC Birds Directive for the purpose of protecting the habitats of rare, threatened or migratory bird species. See Aberdeenshire Local Plan Policy Env\1.

Structure Plan - Guides the physical growth of communities for the next 10-15 years, establishing a broad framework for development and the way in which the use of land should evolve. It is approved by the Scottish Executive.

Town and Country Planning (Scotland) Act 1997 - The Act of Parliament for the planning system in Scotland.

Vernacular Building - A building which forms a distinctive part of the town or country scene by reason of its traditional design, use of materials and building techniques. Such buildings are often agricultural in nature and over 100 years old.

Wind energy development - A wind farm or an individual wind turbine with or without a tower/hub.

Wind energy development extension
- Where a proposed wind energy development will use the same access roads, sub station etc, as an existing wind energy development; and/or is for the same end user (e.g. where the electricity generated is not put on the national grid, but to one or more end users directly).

Appendix 1 Aviation, electro-magnetic and other interference

1.1 In Aberdeenshire, there are several civil aerodromes and technical sites, one MoD safeguarded aerodrome and at least seven military technical sites including a weather radar station (see figure 8). These are described in more detail below:

- 30km Safeguarded zone for Aberdeen Airport (outlined in red);

Appendix 1 continued

- civil technical sites: Hill of Troop radio (east of Macduff), and Moray Radar (south-west of Fraserburgh);
 - military aerodrome: RAF Buchan near Boddam; and
 - military technical sites at Hill of Dudwick, (a weather radar station); RAF Buchan (74km Consultation Zone for the ground base radar system); Mormand Hill AD (south of Fraserburgh); Windyheads Hill (east of Macduff); Roseheart; Hill of Foundland, south-east of Huntly; and Whistleberry (east of Arbothnott).
- 1.2 Weather radar stations are used to monitor weather conditions to assist forecasting and present a particular issue. There are 12 such stations in the UK, and one of these stations is located in Aberdeenshire at Hill of Dudwick. Weather radar is designed to look at a thin layer of atmosphere close to the ground surface, and are situated on high ground. Wind turbines can have a significant effect on weather radar readings as they only look at a narrow band of airspace, between 0 and 1 degrees of elevation. Therefore, the interim guidelines suggest the easiest way to avoid any interference to weather radar is to “ensure that the maximum height of the turbines (above mean sea level) is below the height of the radar.” The interim guidelines also state that if terrain between the turbine and radar station mask the turbines, “they will have no impact on the operation of the radar.”
- 1.3 The potential impact a wind energy development may have on a civil or military technical site is assessed when a wind turbine or farm is proposed near an aerodrome that has an aerodrome approach radar; a National Air Traffic Services en route radar (Aberdeen Airport); or a military air defence radar.
- 1.4 Both the tower and blades of a wind turbine may be detected if they are in line of sight of the radar, and as well as airfields, the airways structure (aircraft flight paths) must also be taken into account. This is because locating a wind farm below the route of an airway may be acceptable “provided that it is not in the line of sight of any air traffic radar and therefore cannot be the cause of clutter” DTI (2002).
- 1.5 Ground-based air defence radars are likely to be affected by any wind turbines that are sited in their field of view. However, as these radar systems are more complex and capable than air traffic control radars, they may be able to process out electronically the effects that might be caused by wind turbines. However, research is not complete in this area.
- 1.6 According to the Interim Guidelines, which were published by the DTI in 2002, it is not easy to summarise the ideal positioning of wind turbines in relation to a generic ‘airfield’, as they vary in size, equipment and use. The interim guidelines give an example that siting a wind farm five miles in direct line from the end of an airfield runway will almost certainly be unacceptable. However, it goes further to say that areas to the side of the runway, at similar distances may be tolerable.
- 1.7 Wind turbines can reflect signals from the rotor blades, which can cause receivers to pick up both direct and reflected signals. Developers should consult with the Office of Communication and ensure that their development either avoids interfering with broadcast communications and signals through appropriate siting, or mitigates possible interference.

Key

Safeguarding zones (see key below)

Mod Hill of Dudwick

Aberdeen Airport conservation requirements :-

All non domestic development exceeding two storeys in height

All developments exceeding 10 m in height

All developments exceeding 15 m in height

All developments exceeding 45 m in height

All developments exceeding 90 m in height

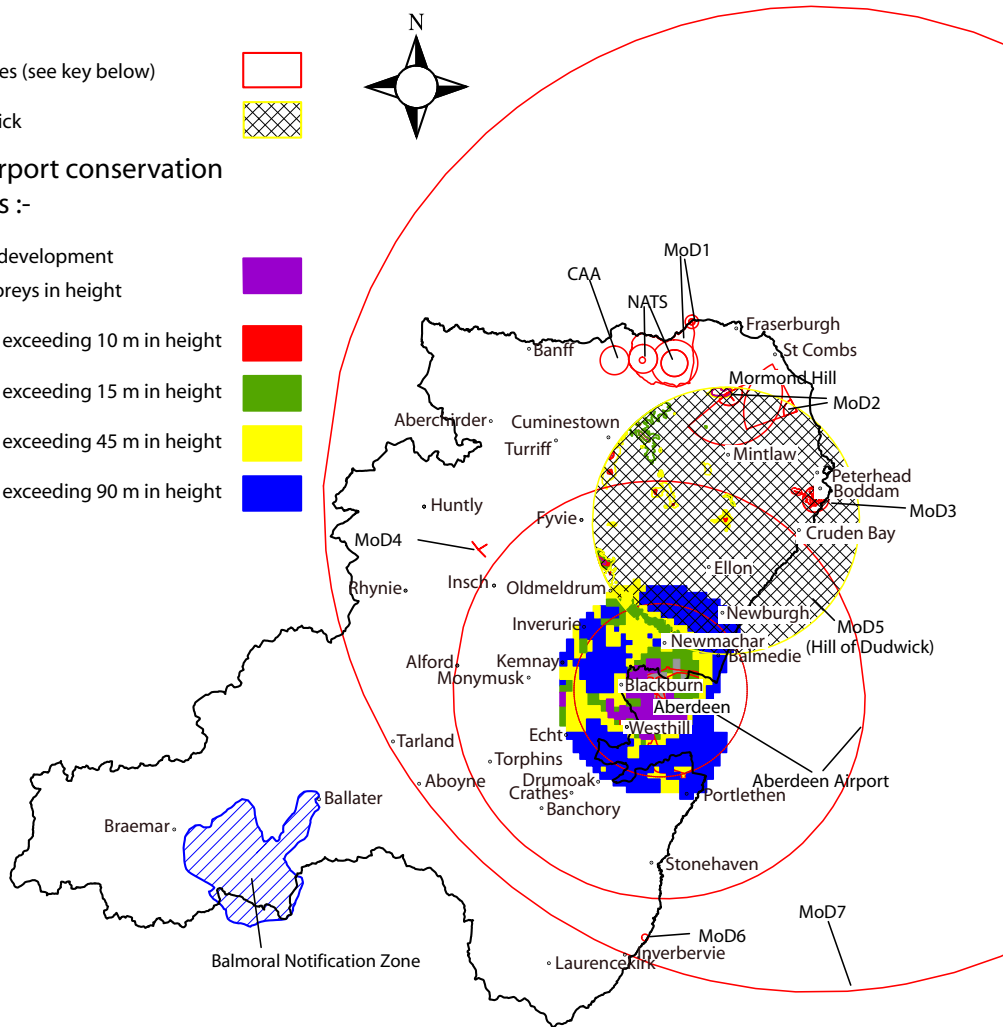


Figure 8 Safeguarding Zones: Aberdeen Airport and Ministry of Defence (MoD) sites

KEY - Safeguarding zone name/number	Consultation distance and description
Aberdeen Airport	30km – Any Wind farm development.
CAA (Hill of Troop Radio)	2150 – All development.
NATS (Windyhead Radio and Moray Radar – outer)	2150 – All developmentAll buildings, structures and works exceeding 15.2m in height.
MoD1 (Rosehearty Technical Site – Outer)	1000m - Any overhead power lines above 100Kv.
MoD2 (Mormond Hill MoD) and Mormond Hill Radio station and St Fergus Radio – operators unknown)	MoD: erection of buildings, structures of works exceeding 15.2m (50ft) (inner) and 45.7m (150ft) (outer). Radio stations: within 2km - structures greater than 13m (42ft) in height and within 8km - structures greater than 21m (70ft) in height.
MoD3 (RAF Buchan – Longahven Hill and other radars)	455m – Any building or structureThe erection of buildings, structures and works exceeding 45.7m in height (150ft).
MoD4	Any structure or building over 455m above sea level.
MoD5 (Hill of Dudwick, Technical Site)	Any Building or Structure exceeding 45.7 metres in height above ground level.
MoD6 (Whistleberry)	500m.
MoD7 (RAF Boddam)	74km - Any Wind farm development.
Balmoral Notification Zone	Consult Balmoral Estate & Grampian Police.

Appendix 2 Environmental impacts of wind farms - scoping checklist (SNH)

- 2.1 The following section comprises an outline scoping checklist of issues (derived from SNH guidelines 2001), which should be considered within an Environmental Impact Assessment (EIA) or similar study. It is important to appreciate, however, that some of these issues may not be particularly relevant to a specific development proposal; and also, that further issues not included may need consideration for a particular case.

1. Environmental impact assesment (EIA)

- Has a full EIA taken place?
- Is information within the EA presented clearly? Are there clear descriptions of the project and its likely impacts using illustrative techniques, which convey the information effectively?

2. Wind farm proposal

2a) Siting

- What are the key features of the site and how does the wind farm directly relate to these?

2b) Wind farm components

Turbine Type and Numbers

- How many wind turbines are being proposed?
- Are they in one or several groups?
- What energy capacity are the turbines?
- What is the make and the model of the turbine? What does it look like? Are all the turbines identical? If the make or model cannot be confirmed, what range is being considered?
- How high are the turbines to the nacelle and to the tip of the blades?

- Are there any other features in the landscape against which the wind farms will be able to be directly scaled?

Towers and Nacelle

- What type of tower is proposed?
- How will the nacelle appear upon this?
- Is there a weak visual link that will result in the turbine appearing top heavy or precarious in position?

Blades

- How many blades will the proposed turbines have? Will this be consistent within the development and within an area?
- At what wind speeds will the turbines cut in and out?
- For this site, when will they mostly run?
- Are there any prevailing wind variations on site which will result in carrying movement and orientation of turbine blades?

Colour and surface finish

- What colour is proposed for the turbines?
- What key colours are characteristic of the landscape? – Especially other human features and the vegetation?
- What colours in the landscape are portrayed as positive?
- How will the wind farm relate to these colours?
- What are the prevailing weather conditions? How will the visibility and image of wind farm colour vary between cloudy, sunny, stormy, and snow conditions?

Foundations and transformers

- How deep and wide are the turbine foundations proposed?
- Will works be limited in extent in site and a limit of works line marked on the ground?
- How many lorries, and of what size, will be necessary to deliver the amount of concrete necessary to construct the foundations?
- Where will the turbine transformers be housed within or adjacent to a turbine? If the latter, how will these transformers relate to the overall turbine form?

Method statements

- Has a method statement been produced? Is it both exact enough to be enforceable, yet flexible enough to enable agreement by all concerned on alternative procedures if evidence on-site reveals more preferable methods?

2c) Associated development

- What additional development is being proposed associated with the wind farm? Access tracks? Powerlines? Substation? Storage compound? Visitor centre? Fences? Woodland?
- How will these be sited and designed in relation to the wind farm?
- Has a method statement been produced? Is this both exact enough to be enforceable, yet flexible enough to enable agreement by all concerned on alternative procedures if evidence on-site reveals more preferable methods?

Access tracks

- Does the proposed development include creation of new access tracks? If so, have other options for access been explored, for example access from the sea or via helicopter and can this be demonstrated?
- If access tracks are proposed, where will these be routed and how will they be designed, constructed and

managed? Has the design process explored alternatives for these and considered the most up-to-date information available to ensure the best possible solution?

- How wide will the track be along straight stretches and around corners? What has determined this width? Is there any possibility of reducing this through possibly allowing lower tonnage or lorry lengths?
- Is there the possibility of reinstating tracks fully or partially after initial construction?
- Will the proposed route incorporate zigzags up a hillside? If so, are there any other route options possible?
- How will the road be drained?
- Will there be cuttings and embankments? How will these be stabilised and revegetated?
- From where will the access tracks be seen? Will they be seen as separate or together with the wind energy development?
- How will the access tracks relate to the key characteristics of the landscape? Are there other tracks or dominant linear elements in the landscape or will the access tracks be seen as incongruous?
- Over what habitats will access tracks impact?
- Are drainage works proposed and will this water control possibly impact on flora and fauna?
- Are tracks being proposed which will cross deep peat? Will these be floating tracks? If not, why not?
- What is the likelihood that erosion of tracks will occur and in what conditions – any times of heavy rain and thaw, or only in exceptional circumstances not predictable?

- How has the route and design of the track, culverts, bridges and drains minimised the risk of erosion?
- How will the vegetation be quickly reinstated to reduce the risk?
- What is the risk of ground being eroded from the road and deposited further down, burying the vegetation? How can this risk be reduced?

Restoration and re-colonisation

- How will vegetation be re-established on disturbed ground? Over what extent and what timescale will this occur?
- How will this re-establishment be monitored and maintained? If this is not successful for any reason, what contingency plan exists?
- What is the most appropriate method of re-instatement for the site? – hydro-seeding or using turfs? What would be an appropriate seed mix for the area?
- Will newly re-established vegetation be subject to intensive sheep or deer grazing? How will this be prevented to enable climax species to succeed?

Substation

- Where is a substation proposed? Is this location to be near the National Grid or the wind or energy development?
- Will the building appear fitting to the landscape – i.e. sited in an area typically utilised for buildings?
- How will the building be sited and designed? Will the building's function be clearly evident? Or will it look more like an agricultural outbuilding or a house?
- Will the building have a yard area of hard standing? Will it be floodlit at night, fenced, or with formally maintained grounds?

Electricity connections

- Are underground or overhead powerlines being proposed to link the windfarm development to the substation, and then to the National Grid?
- Where are these to be routed and over what habitats will they pass?
- Is it absolutely impossible to locate all powerlines underground?
- If above ground, what options exist for different routes and powerline supports?
- Above or below ground, has a method statement been produced to ensure sensitive construction?

Fencing

- Are fences proposed as part of the wind energy proposal? If so, is this for reasons of security, restricting stock or boundary delineation? Are these requirements clearly evident as being necessary? Or might they be a condition of the land sale/lease from the landowner with no direct relation to the operation of the development?
- Will the route of the fence contrast in line to the existing landscape character and the shape and layout of the development proposed?
- Will the fences proposed cross areas sensitive to bird impacts?
- Are the fences crossing any traditional access routes? If so, will stiles or gates be provided?

3. Landscape character

- Referring to the Landscape Character Assessment (LCA), what landscape character types will be affected by the proposed development?
- What are the key landscape characteristics of these? How might a windfarm development affect these?

- What are the key forces for change and guidance for these? Are wind farms discussed specifically, or can general pointers on such developments be gained from the overall discussion?
- Referring to the LCA, both in the introduction and landscape character type descriptions, how is the landscape valued?
- Are qualities of remoteness or wild land listed as key characteristics of the landscape in which the wind farm is being proposed and from where it will be seen?
- Are there other built features near to the proposed windfarm?
- Is the wind farm being proposed in a designated area?
- For what characteristics or qualities is the landscape designated?
- Would a wind farm affect the integrity of this designation?
- Will this depend on siting and design? If so, how?

Experience of landscape

- What are the key landscape characteristics affecting how this landscape is experienced? For example access, land use, landform.
- Who will mainly experience the wind farm? residents? visitors? workers etc?
- How will they come across the wind farm e.g., on foot, in a vehicle? Will it come as a surprise or are there other similar developments?

Nature of visibility

- How will the wind farm appear in relation to the key visual elements of the landscape e.g., the skyline, the coastline, hill shapes and roads?
- How will the wind-farm be typically seen whilst moving through the landscape or from isolated spots,

appearing by surprise, or intermittently revealed, or within a wide area?

4. Wind farm design and its relation to landscape character

- What image does the landscape, for which the windfarm is proposed, convey?
- What kind of image will the proposed wind farm possess in direct relation to this? Overall, will this be perceived as being negative or positive by most people?
- What kind of symbolism may this image portray in this landscape?
- Will the windfarm appear to change, maintain or reinforce the character of the landscape?
- How long will the windfarm be operational and what is the likely timescale for planning permission?
- What reinstatement measures are proposed for after the windfarm is decommissioned? Will associated structures such as access tracks and substations be removed and is it likely that site conditions, such as vegetation, can be reinstated?

Rationale

- What are the key characteristics of the landscape?
- How does each element of the wind farm development directly relate to these? For each element, what is the rationale for its siting and nature?
- How are these characteristics typically experienced and which are obvious in the key views of the wind farm?
- What is the relationship between turbines? Are they concentrated or widely distributed? Will they collectively appear as a distinct group separate from their surroundings?

Landscape value

- For what is the landscape valued?
- Will the introduction of a wind farm, irrespective of its location and design, affect these values? And will these be partial, erosive or complete?
- Does the landscape contain valued characteristics to which a wind farm would relate?

Simplicity of image

- Will the wind farm be seen in relation to varying characteristics?
- Will the wind farm appear as separate groups?
- Is the entire wind farm seen from most viewpoints?
- Is there a number of windfarms in the area?
- Will the wind farm have a consistent relationship with the landscape?
- What design principles will be applied to the siting of the wind farm?
- Will the wind farm appear separated from nearby landscape features?
- Will the wind farm appear visually stable upon the landform?
- Will there be consistency of wind turbine type, layout and spacing?
- Will the wind farm appear as a single, cohesive feature?

Relationship with existing developments

- Are there any residences or settlements close to the proposed windfarm?
- Will the windfarm appear to impinge upon the space surrounding these?
- Is there any woodland close by? How will the windfarm relate to this as it is restructures and/or managed over time?

- How will the wind farm be seen from roads? Off to the side or in the direction of view?
- Do roads form a key feature of the landscape to which the wind farm should relate?

Cumulative landscape and visual Impacts of wind farms

- Within the proposed wind farm, will there be distinct groups of turbines? How will these directly relate to each other to create a single cohesive image?
- Are there existing wind farms in the landscape? Or are there likely to be further wind farms in the area in the future? How will these relate to each other? Will they be of similar image? Will they have similar relationship to the landscape and will they be experienced in a similar way?
- Will the development of numerous wind farms change the character of locality, landscape character type, or entire area?
- Will wind farms, as a consequence, appear to become a key characteristic of a distinct area, and perhaps a dominant one?

Landscape and visual impact assessment of windfarm developments

- Has a landscape and visual impact assessment been carried out for the proposed development?
- Has this been completed by a qualified landscape architect?
- Has the method of this broadly followed that advocated within the GLVIA?
- Is the landscape and visual impact assessment clear, and does it explain its method and terminology? Is it impartial and does it draw upon

advice and opinions of other people, in combination with presenting professionals views?

- Have alternative solutions been considered and presented? Is the final choice of siting and design fully justified in relation to the other opinions?
- Have all the stages of the development been adequately considered, from construction through operation, maintenance and monitoring to decommissioning and restoration?
- Is the sensitivity of all landscape characteristics considered in relation to the magnitude of separate impacts of the development in order to determine the significance of both landscape and visual impacts both in relation to the various components and different landscape characteristics, and the development as a whole?

Zone of visual influence (ZVI)/zone of theoretical visibility (ZTV)

- Has a ZVI been produced for the proposed wind farm?
- Over what distance does the ZVI/ZTV extend? (this should usually extend to at least 25km).
- What resolution is the ZVI/ZTV? That is, over what area is a change of visibility extent indicated? (1km square is common, although quite a crude measure).
- Does the ZVI/ZTV indicate visibility of turbine blade tips or nacelles?
- If a ZVI/ZTV has been produced, does it indicate visibility of the entire wind farm or just one turbine? Complete turbines or just towers? Associated elements such as tracks, buildings, powerlines and anemometers too? Trees and built structures? In regards to the latter, what height is assumed for these?

- From the ZVI/ZTV, will the wind farm be visible from e.g. popular viewpoints, or areas of different landscape character?
- Have the key viewpoints been cross-checked in the field?

Viewpoint analysis

- For the proposed wind farm, have general visual impacts throughout the development area been assessed?
- What viewpoints represent this?
- How were these viewpoints chosen?
- Do they represent key views of the development from all the different landscape types in the vicinity?
- Do they illustrate changing views along a key route?

Computer generated wireless diagrams

- Have wireline diagrams been produced for the various wind farm designs and layouts during the assessment process?

Photomontages

- Are there photomontages of the proposed development?
- Do these represent the key viewpoints of the development from different directions and landscape types? Do they also illustrate viewpoints which, although less prominent, are important in relation to the experience of the surrounding landscape character types?
- Do they represent clear visibility conditions?
- Are the photomontages used as a tool to explore and illustrate alternative wind farm designs or sites?
- Are the photomontages annotated to explain what the eye typically focuses upon and what the key features are?

- Do they show associated features such as roads, powerlines and substations?

Video Montage

- Has a video montage been produced or considered by the developers for the proposed development?
- What range of viewpoints does this represent?
- Does this illustrate changing views when travelling through the landscape at speed (as in a car) or slowly (as on foot)?
- Is the movement of various turbine blades representative of how they will operate in reality?

5. The impacts of wind farms on nature conservation

5a) Impacts on birds

- What are the key species in the area which may be affected by a wind farm?
- What are the characteristics of these birds?
- At what height do the species fly through the site? Do they fly as individuals or flocks? Are the wind turbines on flight paths or near feeding, roosting or nesting grounds?

Collision

- How will the turbines relate to the main flight paths of the birds?
- Are the birds able to manoeuvre quickly over short distances so that they can react quickly to avoid turbines?
- Are bird scaring techniques proposed? Is the use of these based on directly applicable evidence of their value?
- May potential bird collision be reduced or compensated by a change in land management around the site?

- If there is a high risk of collision, would shut down of the wind farm at certain times of the day or year significantly reduce the risk?

Construction and operation disturbance

- What bird species on site are likely to be partially affected during the construction phase?
- Has the potential risk to birds by the proposed wind farm been reduced as far as possible by avoiding critical habits and topographical features?
- How is this risk affected by the prevailing climate conditions?
- How will the proposed affect bird populations?

Cumulative impact and evidence of impact of windfarm on birds

- Is the impact of the windfarm taken with other existing or proposed windfarms in the neighbourhood likely to form a barrier or other feature affecting bird flight patterns?
- On what evidence is any assessment of predicted impact on bird based? Is this comprehensive and widely accepted by experts? Does it consider impact on bird behaviour as well as collision or mortality, and how are these assessed?
- On what controls and baseline data is this research based?

Assessing windfarm Impact on Birds on Environmental Statements

- Within the ES, have the important bird species present on site been listed and the risk to each assessed?
- Is a Potential Environmental Impact Matrix included?

- Is monitoring proposed? If so, by whom will it be done, how often, and how will problems identified be resolved?
- 5b) Impact on insects
- Will the windfarm be located in the path of any key flight paths of insects?
- 5c) Direct habitat impacts of turbine construction
- What impacts will the proposed wind farm have on the site hydrology, rock, soil, vegetation and peatland?
 - How wide and deep will the turbine foundations for a proposed wind farm be?
 - By avoiding the most sensitive ground conditions, will the preferred layout of turbines on landscape and visual grounds be compromised? How can this be reconciled to result in the best overall solution on balance?
 - Has a waste management plan been prepared for the proposed wind farm construction and operation?
 - What controls will be put in place to ensure against or limit leaching of minerals from concrete used on site?
 - What controls will be put in place to prevent any pollution occurring at the storage compound? Have procedures to tackle any pollution which may arise been considered and agreed?
- Decommissioning
- What is proposed for the wind farm development at decommissioning?
 - How will turbines be removed and how will the site be restored?
 - Is it planned for all features of the development to be removed, including powerlines, substations and tracks? If not, what will be the impacts of these without the obvious visual justification of the wind farm?

6. The impact of wind farms on land use, wild land, access and recreation

6a) Indirect impacts of wind farms on land use

- How will the wind farm affect land use in the surrounding area? Is this assured through any agreement or condition? What is the duration of these?
- If access tracks are proposed as part of the wind farm development, for what other activities might these be used? Could these have a detrimental impact in the landscape?
- What effect could the construction of infrastructure by local firms have in an area?

Visitor facilities

- Are visitor facilities proposed as part of the wind farm development? If so, what kind of provision will this involve and how will it be maintained? Is this appropriate to the character of the landscape?
- If facilities are not provided, is visitor pressure likely to have impacts in the landscape, e.g. parking on grass verges and walking over agricultural ground to reach the wind farm?

6b) Wild land

- Is the proposed development in an area recognised for its wild land qualities? Will this impact on the wild land directly or indirectly, eg by views or when moving through an area to reach some wild land?
- Would this be considered core wild land (suggested by Highland Council to be more than 5km from a road or track)?
- If not in an actual area of defined wild land, will the proposed development nevertheless impact in an area which possesses some wild land qualities?

- For what and how is the area of wild land most appreciated and valued? Will these characteristics be directly affected by the proposed development?
- Is the area of wild land frequently visited and/or popular for recreation?
- Over what extent of wild land will the proposed development impact? Is this localised or extensive?
- Could the proposed development lead to cumulative impacts upon the wild land with other land uses, for example, forestry?

6c) Recreation

- In determining whether the wind farm will impact on recreation, for what is the landscape valued, how is it experienced and will this be affected by a windfarm? Also, have organisations such as the ramblers and mountaineering clubs been consulted as well as local people?
- Will the wind farm be visible from popular recreation routes or areas?
- Has the likely impact of the wind farm development on both views and the experience of these routes been considered?
- If access tracks are proposed, are they likely to result in greater access to the area for recreation be restricted by any elements of the wind farm, for example fencing or warning signs?
- Will the wind farm be located near to any public rights of way or route commonly used by the public? How will the wind farm impact on experience of these for different users?
- Which users will be encouraged and which users discouraged from accessing the site, such as walkers, cyclists and horse riders?

- Could recreation routes be redirected around the wind farm? Or routed through it?
- If the existing recreation resource would be lost by the development of a wind farm, is the loss sufficient to justify an objection or proposal?



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