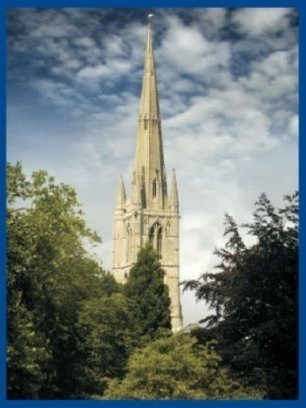


Local Plan for South Kesteven

Draft Wind Energy Supplementary Planning Document

Consultation October 2012

South Kesteven District Council
STAMFORD • GRANTHAM • BOURNE • THE DEEPINGS

This draft Wind Energy has been published for the purposes of public consultation.

The consultation document is available for inspection at the following locations:

- District Council offices in Grantham, Bourne, Stamford and the Deepings
- Public libraries in the District

It is also available on the Council's website at www.southkesteven.gov.uk

Comments should be made in writing by either e-mail to planningpolicy@southkesteven.gov.uk or in writing to:

Planning Policy & Partnerships
South Kesteven District Council
Council Offices
St Peters Hill
Grantham
NG31 6PZ

All comments should be received no later than **4.30pm on the DATE TO BE ADDED 2012**

Contents

1. Introduction

What is the purpose of the SPD?

1.1 This Supplementary Planning Document (SPD) provides guidance on:

- Key planning issues associated with wind energy developments at all stages of the wind turbine development process including pre-application activities (EIA scoping, pre-application consultation), construction, operation and decommissioning.
- Criteria that will be applied when determining applications for wind energy developments.
- Good siting and design of wind energy schemes including guidance on how potential impacts could be minimised.
- Information developers shall provide when submitting an application for a wind energy development

1.2 The SPD is a material consideration in the determination of wind energy planning applications in the area. It supports the positive implementation of Policies EN1: Protection and Enhancement of the Character of the District and EN3: Renewable Energy, as set out in the South Kesteven Core Strategy (July 2010).

1.3 The guidance covers large, medium and small scale wind energy developments (definitions of the different scales of wind energy developments are provided in **Chapter 2**). Developments above 50MW are determined by the National Infrastructure Directorate on behalf of the Secretary of State. The Council are a consultee on applications determined under this process and this SPD will be used as the basis for determining the Council's formal response to such proposals. Micro-scale turbines (i.e. typically below 2.5kW) which are sited on buildings, or within their proximity, are not specifically covered in this SPD as they do not require planning permission, as long as specified limits and conditions are met[1].

1.4 This guidance does not identify specific locations where wind energy developments will be acceptable. It does however offer guidance on the key considerations that shall be taken into account when siting wind energy developments.

Who is the SPD for?

1.5 The SPD has been prepared for:

- **planning officers** and **elected members** - to provide a consistent framework for determining applications for wind energy development within the district.
- **developers** of wind energy schemes - to provide guidance on the key impacts that need to be considered and how potential impacts could be minimised.
- members of the **public** - who have an interest in or may wish to comment on proposed wind energy applications.

[1] *See The Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2011 - http://www.legislation.gov.uk/uksi/2011/2056/made*

How was the SPD prepared?

1.6 Consultation was central to its preparation as it provided a means of identifying and capturing existing knowledge on the range of issues covered. It also gave stakeholders an opportunity to comment on the draft guidance.

1.7 The consultation involved two key phases:[This section will be updated once the consultation is completed]

- **informal consultation** with a range of key stakeholders on the proposed scope of the SPD (This ran from the 21st May to the 15th June 2012). Key stakeholders including Parish Councils, council officers, government bodies (e.g. Natural England, Environment Agency, English Heritage), environmental groups (e.g. as RSPB, Wildlife Trusts) were contacted by e-mail and/or letter and asked to comment on the proposed scope of the SPD and to identify any relevant information which could be used to inform its contents. The responses to the informal consultation and how the comments received were taken into account in drafting this SPD have been published and are available as a separate Statement of Consultation.

- **formal consultation** on the Draft SPD [to be updated once the consultation is completed – This will refer to statement of consultation – how consultees comments were taken on board etc]

1.8 The SPD draws on documentation already available and information sources provided by the stakeholders as part of the consultation process. Account is also taken of good practice examples and comparable SPD's prepared elsewhere in the UK. It is not the intention of the guidance to replicate existing information/guidance. Readers are therefore directed to other sources of national, regional and local policy guidance or information which provides further advice on the key issues raised.

What does the SPD contain?

1.9 The remainder of the SPD is structured as follows:

Chapter 2: The role of wind energy

Chapter 3: Key issues and guidelines for siting and good design

Chapter 4: The application process

2. The Role of Wind Energy

Introduction

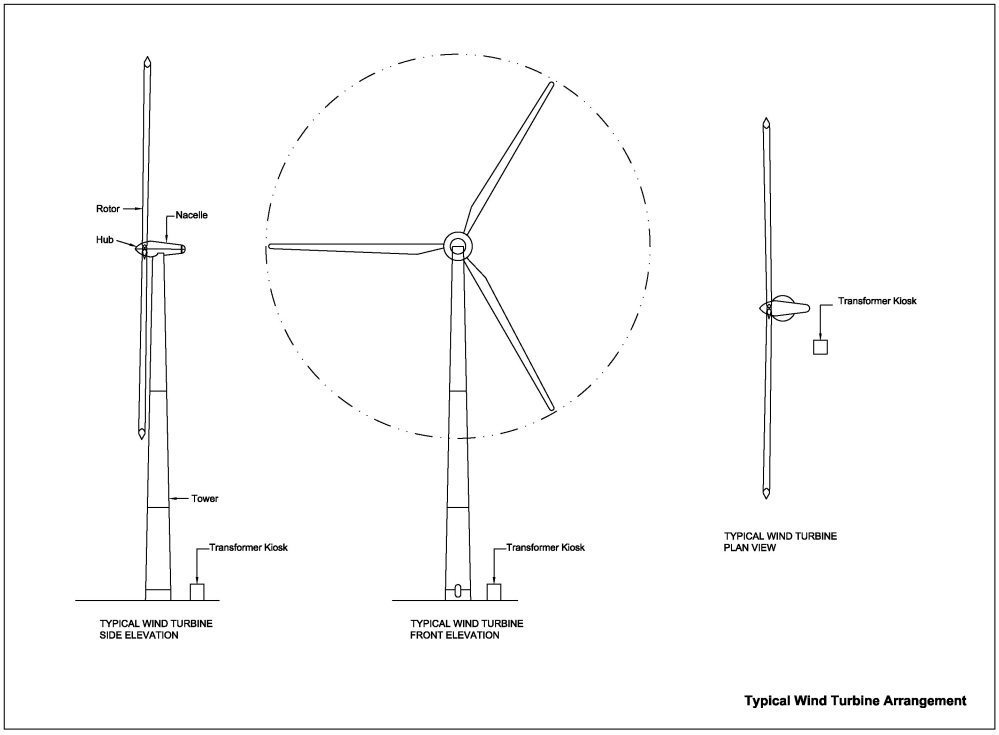
1.10 This chapter describes the role of wind energy in meeting European and national carbon reduction targets. It also provides an overview of national and local planning policies that form the framework for the consideration of wind energy planning applications within South Kesteven. The chapter starts with a description of the nature and types of wind energy.

What is wind energy?

1.11 Wind turbines use energy from the wind to generate electricity. The amount of energy derived from a wind turbine depends on wind speed and the swept area of the blade (the greater the swept area, the more power the turbine will generate). Wind turbines are generally given planning permission for 25 years[2], although re-powering (replacing with a new generation of turbines) can take place during this period or after this period has elapsed, subject to planning consent.

1.12 A turbine consists of the tower (which may be a pole, lattice or solid tubular tower), hub, blades, nacelle (housing the generator and gear box and forming the axis around which the blades turn) and a transformer which is typically located either within or adjacent to the base of the tower (see **Figure 2.1**). Connection from the sub-station to the electricity distribution network (i.e. the grid) may be required depending on the size of the turbine and its intended purpose.

Figure 2.1: Typical Wind Turbine Components



1.13 Turbines are rated according to their maximum electrical output in kilowatts (kW) or megawatts (MW). There are no universally accepted categories to describe the scale of individual wind turbines but installations tend to fall within four size bands. At the ***micro***-scale, turbines range from 5W battery charging models up to around 2.5kW rooftop devices which provide a proportion of a

[2] This is because turbines typically last for around 20-25 years.

building's electricity demand. ***Small*** scale turbines generally range up to around 50kW and ***medium*** scale turbines up to around 1MW. Most ***large*** **(commercial)** onshore wind turbines are currently being produced in the 1-3MW range. The following table outlines the typical scales of turbine and their potential output (in terms of installed capacity) and height (to the tip of the turbine blades in meters). Please note that there can be considerable variations in turbine heights and outputs depending on the make and manufacture of the machine used. **Table 2.1** shall therefore only be used as an approximate guide.

Table 2.1: Typical scales of individual wind turbines

Typical scales of wind turbines	Typical Turbine Output (in kW or W)	Approximate Turbine Height (to blade tip) in meters
Micro	(less than 2.5kW)	building or mast mounted (typically less than 10m)
Small	(1.5 - 50kW)	up to approximately 50m
Medium	(50kW – 1MW)	50-100m
Large	1-3MW	typically over100m

1.14 Medium and large scale turbines are usually connected to the national grid. Small or micro scale turbines are most commonly deployed as single machines supplying specific buildings or developments (e.g. farm buildings, schools, small businesses, etc), although they can also be connected to the grid.

1.15 Wind turbines can be deployed singly, in small clusters, (2 – 5 turbines) or in larger groups as wind farms (typically 5 or more turbines). **For the purpose of this report, large scale wind energy developments are defined as comprising one or more large scale wind turbines. Likewise medium scale wind energy developments are defined as comprising one or more medium scale wind turbines and small scale – one or more small scale wind turbines.**

1.16 As moving structures, wind energy developments differ from other tall structures in the landscape. There are two main types of turbine – horizontal axis and vertical axis. The vast majority of machines are currently designed using a horizontal axis three-blade rotor system mounted on a steel mast (see Figure 2a below). Two blade horizontal turbines are also available (Figure 2b) as well as vertical axis machines (Figure 3b) – although the latter two tend to be less common.

Figure 2a: Three blade horizontal axis turbine

Figure 2b: Two blade horizontal axis turbine

Figure 2c: Vertical axis turbine

1.17 In addition to the wind turbines themselves, the infrastructure required for **large scale** wind energy developments typically includes:

- **Road access** to the site and **on-site tracks** able to accommodate Heavy Goods Vehicles (HGVs) carrying long, heavy and wide loads (for the turbine blades and construction cranes).
- A **temporary construction compound** and **lay down area** for the major components – i.e. for the towers and blades.
- A **concrete foundation pad** for each turbine.
- An **area of hard standing** next to each turbine to act as a base for cranes during turbine erection, which is generally removed after construction.
- **Underground cables** connecting the turbines (buried in trenches) to the sub-station.
- One or more **anemometer mast** to monitor wind direction and speed.
- A **control building** and a **substation** (which are sometimes located in the same building).

1.18 The substation will also need to be connected to the nearest suitable point on the national grid. The District Network Operator (DNO) (Western Power Distribution) is responsible for establishing the connection between the substation and the grid and this forms part of a separate consenting process. This connection could be routed via overhead cables on poles/steel pylons or more typically by underground cabling. Where planning permission is required from South Kesteven District Council for transmission lines, then a planning application for these must be submitted at the same time as the application for the wind turbines. If planning permission is not required from the District Council, details should be submitted for information. Further information on this is provided in **Chapter 4.**

1.19 **Small/medium scale** wind energy developments typically require:

- **Road access** to the site. On-site tracks may or may not be required depending on the size of the turbine(s).
- A **concrete foundation pad** for each turbine.
- A **temporary area of hard standing** next to each turbine (if cranes are needed to erect the turbine).
- A **substation and underground cables** if connected to the grid / or a **battery storage system** if off-grid.
- An **anemometer mast** (although this may not be required for smaller turbines).

Contribution to carbon reduction

1.20 Climate change and energy security are key priorities of the UK Government. The use of fossil fuels is a major contributor to greenhouse gas emissions and a cause of global climate change. The Government is therefore seeking to move towards a low carbon economy by minimising the demand for energy, increasing energy efficiency and supporting and promoting the development of renewable energy.

1.21 In 2007, European Union (EU) leaders agreed to adopt a binding target requiring 20% of the EU's energy (electricity, heat and transport) to come from renewable energy sources by 2020. The UK signed up to the EU Renewable Energy Directive (formally agreed in April 2009) and agreed to legally binding targets to generate 15% of all our energy (electricity, transport and heat) from

renewable sources by 2020. The UK Renewable Energy Strategy (2009)[3] sets out the path for the UK to meet this target and states that 30% of electricity will need to come from renewable source by 2020. Onshore wind and offshore wind are expected to provide about 64% of all the electricity from renewable sources by 2020; about 29% from onshore and 35% from offshore. Therefore between a quarter and a third of the entire renewables element is anticipated to come from onshore wind.

1.22 In July 2011, the Department of Energy and Climate Change (DECC) issued the UK Renewable Energy Roadmap. This sets out a shared approach to unlocking the UK's renewable energy potential and is the latest expression of Government policy on renewable energy. The Roadmap outlines a delivery plan to achieve the UK's renewable energy target over the next decade, based upon potential deployment levels and current constraints. The goal is to ensure that 15% of UK energy demand is met from renewable sources by 2020, but the ambition extends beyond 2020 with scope to meet 30-45% renewable energy in the UK by 2030. The document sets out actions which are intended to "accelerate renewable energy in the UK". It states that the UK's total energy consumption from renewable energy was 3.3% in 2010 and that there will need to be more than a fourfold increase in our renewable energy consumption by 2020 if 15% of our energy needs are to be met from renewable sources.

The Planning Policy Context

National Planning Policy

1.23 National planning policy, as set out in the National Planning Policy Framework (NPPF) (March 2012), makes it clear that local authorities must take a positive approach towards renewable and low carbon developments. One of the core principles that underpins the NPPF is that: *"planning should support the transition to a low carbon future in a changing climate, ...and encourage the use of renewable resources."*

1.24 Specifically, the framework states that, in order to help increase the use and supply of renewable energy, "*local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources*."

1.25 It also states that local planning authorities should "*have a positive strategy to promote energy from renewable and low carbon sources"* and "*design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts)".* Local planning authorities should also consider identifying suitable areas for renewable sources, support community-led renewable initiatives and help identify opportunities where development can draw energy supply from decentralised renewable energy systems.[Para 97]

1.26 Significantly, when determining planning applications local planning authorities shouldn't require "*applicants for energy development to demonstrate the overall need for renewable or low carbon energy*". The fundamental need for renewables and wind energy is therefore clearly determined and enshrined in Government policy. The NPPF goes on to urge local authorities to "*recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions*" and to "*approve the application if its impacts are (or can be made) acceptable*." [Para 98]. This makes it clear that applicants do not need to justify the use of wind energy turbines or their power output and that small scale schemes should not be refused solely on the basis of their low or modest output.

[3] http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx

1.27 With regard to wind energy, the NPPF states (in footnote 17) that in determining planning applications for such development, "*planning authorities should follow the approach set out in the National Policy Statement for Renewable Energy Infrastructure (read with the relevant sections of the Overarching National Policy Statement for Energy Infrastructure, including that on aviation impacts)".*

1.28 The National Planning Policy Statement for Renewable Energy (EN-3) Infrastructure, taken together with the Overarching National Policy Statement for Energy (EN-1), provides the primary basis for decisions by the National Infrastructure Directorate (on behalf of the Secretary of State) on applications for renewable energy schemes greater than 50MW. NPS EN-1 sets out the clear necessity to increase the transition to a low carbon economy through the installation of renewables technologies and recognises that an increase in renewable electricity is essential to enable the UK to meet its commitments under the EU Renewable Energy Directive. Reference to the relevant sections of these Policy Statements is included in **Chapter 3** in the discussion of topic-specific issues associated with wind energy schemes.

Local Planning Policy

1.29 Policies EN1 and EN3 of the South Kesteven Core Strategy (July 2010)[4] provide the local policy framework within which decision of applications for wind energy schemes will be made. These policies are set out in the boxes below.

POLICY EN1: PROTECTION AND ENHANCEMENT OF THE CHARACTER OF THE DISTRICT

South Kesteven's Landscape Character Areas are identified on the map [following paragraph 4.1.10 of the Core Strategy]. Development must be appropriate to the character and significant natural, historic and cultural attributes and features of the landscape within which it is situated, and contribute to its conservation, enhancement or restoration.

All development proposals and site allocations will be assessed in relation to:
1. statutory, national and local designations of landscape features, including natural and historic assets
2. local distinctiveness and sense of place
3. historic character, patterns and attributes of the landscape
4. the layout and scale of buildings and designed spaces
5. the quality and character of the built fabric and their settings
6. the condition of the landscape
7. biodiversity and ecological networks within the landscape
8. public access to and community value of the landscape
9. remoteness and tranquillity
10. visual intrusion
11. noise and light pollution
12. Conservation Area Appraisals and Village Design Statements, where these have been adopted by the Council
13. impact on controlled waters
14. protection of existing open space (including allotments and public open space, and open spaces important to the character, setting and separation of built up areas).

[4] *Local Development Framework for South Kesteven, Core Strategy (July 2010)* South Kesteven District Council

EN3 RENEWABLE ENERGY GENERATION

The District Council will grant planning permission for proposals to generate energy from renewable sources, subject to the proposals according with the other Core Strategy policies, national guidance and complying with the following criteria:·

The proposal can be connected efficiently to existing national grid infrastructure, unless it can be demonstrated that energy generation would be used on-site to meet the needs of a specific end user.

The proposal should make provision for:

- the mitigation of the real emissions/impacts arising from the installation of the renewable energy generation
- the removal of the facilities and reinstatement of the site, should the facilities cease to be operational.

Other Guidance

South Kesteven Landscape Character Assessment

1.30 In 2007, the Council published a Landscape Character Assessment (LCA) for the District. The assessment process involved a desk based study and field assessment to identify the key characteristics and distinct features within the landscape. The LCA identifies a total of seven district landscape character areas, each of which displays distinct characteristics of topography, agricultural usage, field systems and settlement patterns, as well as historic building styles. The areas include:

1. Kesteven Uplands
2. Trent and Belvoir Vale
3. Southern Lincolnshire Edge
4. Harlaxton/Denton Bowl
5. Grantham Scarps and Valleys
6. Fen Margin
7. The Fens

1.31 The LCA provides detailed descriptions of the character of these areas. The Council's landscape Policy EN1 in the Core Strategy was informed by the character areas identified in the LCA. The LCA is designed to highlight sensitive areas that may need protection and where there are opportunities for improving the landscape. The LCA currently includes a broad brush assessment of the sensitivity of seven character areas to wind energy developments. On adoption of the SPD, the Council intends to rescind those sections of the LCA that refer to the sensitivity of the landscape to wind energy developments.

Lincolnshire Statement of Intent

1.32 Lincolnshire County Council adopted a Position Statement on Wind Farms in May 2010 (Executive 4 May 2010, Decision reference 01722). The statement has since been updated[5] in May 2012 on the recommendation of Lincolnshire's Environmental Scrutiny Committee which was concerned about the proliferation wind energy developments in the County. The position statement states that wind farms will only be acceptable if they meet more stringent conditions on landscape and visual impact, residential amenity and impact on the historic and natural environment.

5 http://www.lincolnshire.gov.uk/residents/environment-and-planning/planning-and-development/wind-farms?tab=downloads

1.33 The Lincolnshire County Council Position statement does not form part of the development plan and therefore is not a material consideration in the determination of a planning application in South Kesteven. Instead, it provides clarification of the County's opinion and how it will respond to consultations on planning applications. The Council will consult Lincolnshire County Council on applications in its capacity as highway authority and in respect of its responsibility for footpaths and other countryside matters. For developments over 50MW the County Council is a statutory consultee and it will be consulted by the National Infrastructure Directorate (on behalf of the Secretary of State).

3. Key Considerations for Siting and Design

Introduction

1.34 In order to determine the acceptability or otherwise of a proposed wind energy development, it is necessary to have a clear understanding of the full range of potential impacts (positive and negative) that the development and its associated infrastructure can have. This chapter outlines the key planning issues associated with wind energy and provides guidance for the siting and design developments within South Kesteven. The topics covered are:

1. Landscape and visual amenity
2. Ecology and ornithology
3. Historic environment
4. Hydrology
5. Traffic and transport
6. Noise and vibration
7. Socio-economics
8. Shadow Flicker
9. Aviation
10. Telecommunications

1.35 For each topic area information is provided on:

A. **Key planning considerations** –in relation to the topic area. This section only outlines those issues that are a material planning consideration; the effect on local house prices for example is not a material consideration. .

B. **South Kesteven Context –**the key features within South Kesteven of relevance to the topic area.

C. **Guidance** –that shall be followed by wind energy developers when selecting sites and designing wind energy developments. This includes measures to help mitigate adverse impacts and to secure benefits.

D. **Sources of further information** – pointers to more information / guidance on the specific topic area.

1.36 Where appropriate, a distinction is drawn between large and medium/ small scale wind turbine developments. As noted in **Chapter 2**, large scale wind energy developments are defined as comprising one or more large scale wind turbines (typically over 100m to turbine blade tip), medium scale wind energy developments are defined as comprising one or more medium scale wind turbines (typically between 50-100m to blade tip) and small scale – one or more small scale wind turbines (typically up to 50m to blade tip).

3.4 All planning applications for wind energy development will be considered on their individual merits against the considerations set out in this SPD. However, there may be occasions where there are overriding reasons to deviate from some elements of the guidance in making a decision on a development proposal.

Landscape and Visual Amenity

A. Key Planning Considerations

3.5 Wind turbines are substantial vertical structures that will inevitably be visible within the landscape. In contrast to pylons and other stationary structures, turbine blades are moving features in the landscape. The construction and operation of wind energy development may affect the landscape and visual amenity in the following ways:

- impact on the site as a result of the loss of existing landscape features and the presence of new features including earthworks, access tracks, turbines, anemometer (wind mast), substation, cabling and fencing;
- impact on landscape character, both direct and indirect impact on the landscape character of the site and direct and indirect impacts on the character of the surrounding landscapes as a result of change in views;
- impact on historic landscapes or features and their setting;
- impact on landscape quality, for example as a result in change to special qualities of designated or valued landscapes;
- impact on views as a result of the introduction of tall moving structures and construction activities (including impact on public viewpoints and private residential visual amenity);
- cumulative impacts of one wind energy development in combination with other existing or proposed wind energy developments on landscape character, landscape quality and views (including combined visibility from a single viewpoint and sequential visibility from roads, footpaths and railway links).

B. South Kesteven Context

Landscape Character

3.6 The landscape of South Kesteven is predominantly rural, with areas of open farmland and small towns and villages. There is much valuable Grade 1, Grade 2 and Grade 3A arable farmland and this is a significant characteristic of the District. The landscape towards the centre and north of the District is gently undulating, whilst the Fenland landscape to the east is generally flat. As outlined in **Chapter 2**, the South Kesteven Landscape Character Assessment (2007) describes the variations in landscape character in detail.

Designated Landscapes

3.7 The Lincolnshire Wolds AONB is the closest nationally designated landscape to the District, lying 35km away at the closest distance. There are in addition eight Registered Parks and Gardens of Special Historic Interest:

- Belton House.[6]
- Grimsthorpe Castle.
- Harlaxton Manor II*.
- Stoke Rochford Hall II*.

[6] South Kesteven DC in conjunction with the National Trust commissioned a setting study to define and describe the setting boundary of Belton House and Park. The Study identifies the surrounding landscape which forms the setting for the House and Park and provides an assessment of the sensitivity of the setting to various types of development. Applications are strongly advised to consult the study prior to the formulation and submission of any development proposals which could impact upon the setting of the House and Park.

- Belvoir Castle II (The registered park includes part of Woolsthorpe by Belvoir).
- Caythorpe Court II.
- Eaton Park II.
- Marston Hall II.

3.8 There are also Registered Parks and Gardens on the edge of the District such as Burghley House.

C. Guidance

Landscape and Visual Impact Assessment (LVIA)

3.9 Landscape and visual impact assessment (LVIA) is a key part of assessing the impact of proposed wind energy developments. LVIA shall be used to select sites, develop and refine the design of schemes and to identify measures to reduce adverse impacts. LVIA shall be undertaken in accordance with best practice guidelines published by the Landscape Institute and consider the potential key impacts listed above. The level of detail will be dependent upon the sensitivity of the site and the nature of the development and its potential effects but will need to consider impacts on landscape features, landscape character, landscape quality (with reference to landscape designations) and visual amenity as well as cumulative impacts. The LVIA will usually include a zone of theoretical visibility (ZTV) for both hub and tip heights, maps to show the location of viewpoints, maps to show the development in relation to landscape character areas and landscape designations, and photographs, wirelines and photomontages to illustrate changes in views.

3.10 Any visualisations shall be undertaken in accordance with the Landscape Institute's Advice Note 01/11 and Scottish Natural Heritage's 'Visual Representation of Wind Farms, Good Practice Guidance' (2006). The visual representation guidance is currently under review and the updated guidance should be used when published.

3.11 For smaller wind energy proposals that do not require an EIA, a landscape and visual assessment/ appraisal shall still be undertaken but the level of information required shall reflect the sensitivity of the site and the potential effects of the scheme (including cumulative impact with any other turbines). Visualisations will be required for non-EIA wind energy proposals, unless it can be demonstrated that the scheme will not have an impact on landscape and visual amenity.

LVIA is required as part of an EIA for large wind energy developments. The required study area for the LVIA may vary depending on the size of development proposed (see Scottish Natural Heritage's 'Visual Representation of Wind Farms Good Practice Guidance' as a guide). The LVIA shall cover all the points in paragraph 3.5 above. Information on landscape and visual impacts shall also be provided for non-EIA development, including visualisations/photomontages based on photography with 75mm lens. South Kesteven District Council welcomes pre-application discussions with developers to agree the scope of LVIA required.

Site selection

3.12 Careful site selection is the most effective way of minimising landscape and visual impacts. LVIA shall inform the layout and design of a wind energy development. Reference shall be made to the local landscape character to understand its potential sensitivities to wind energy development. The following siting principles shall be followed:

- when siting multiple turbines, aim to locate turbines on the most level part of a site or following contours to avoid a confusing variation of turbine heights;

- when siting multiple turbines ensure turbines do not span across marked changes in character on the ground, such as changes in topography (this may be less of an issue where changes in character are less readable on the ground);
- it is generally less distracting to see whole turbines (or a substantial part of a turbine) rather than blade tips only – this may be a particular consideration for views from sensitive viewpoints or those frequented by a larger number of viewers;
- siting of turbines shall not prevent the understanding and appreciation of historic landmark features such as hilltop monuments or church spires and towers, which are such a key feature of the Lincolnshire landscape
- consider siting turbines in less remote areas or on brownfield sites e.g. locations in close proximity to main road corridors, business parks, and railways, as well as reclaimed, industrial and man-made landscapes;
- avoid overbearing or overwhelming visual impacts on residential properties or settlements;
- for large-scale wind energy development, avoid selecting sites on distinctive skylines such as well-known or distinctive hill ranges that are valued for their skyline form (e.g. Grantham Scarp), or skylines with important cultural or historic landmark features such as church spires or towers;
- ensure the size of single turbine schemes associated with buildings reflects the scale of the buildings. For example, a small scale turbine is more appropriate for farm buildings, while larger turbines may be appropriate adjacent to industrial buildings, larger businesses or larger community buildings.
- significant impacts on key views from important viewpoints (including views which are integral to the character of conservation areas), popular tourist and scenic routes (including the public rights of way network, cycle and multi-use routes, and other recreational trails with permissive access), and settlements shall be minimized as far as possible.

Site selection shall have regard to the local landscape character. The LVIA or landscape and visual assessment/ appraisal shall show how the location fits with local landscape character and addresses the points outlined in paragraph 3.10 above.

Layout and design of turbines

3.13 Alternative options shall be investigated to find the optimum layout and design of a wind energy development. All the elements of a typical wind farm need to be considered (see paragraph 2.8). The following layout and turbine design principles shall be considered and informed by the LVIA:

- when developing multiple turbines, ensure cluster size is in proportion with, and does not overwhelm, the scale of hills, ridges, woodlands and field size;
- ensure wind turbines respect the hierarchy of elements in the landscape and do not compete with, or create clutter when seen together with, other man-made landscape elements such as pylons or historic landmark features;
- in urban fringe or industrial contexts, ensure developments sit comfortably alongside existing buildings or structures, both in terms of scale and composition;
- ensure the layout and design of the development (i.e. turbine height, spacing etc.) relates other wind energy developments in the same landscape character area to minimise cumulative impacts (this is more important the closer sites are together);

- the proportion of the rotor diameter to tower height shall be balanced - short blades on a tall tower or long blades on a short tower may look unbalanced. Aim for a ratio of approximately 1:1 for tower height: blade diameter;
- simple, pale grey coloured turbines will be most suitable for larger turbines (to reduce contrast with the sky and match existing turbines). However, in some cases darker colours are suitable for very small turbines to help them blend into their setting;
- use of coloured advertising banners on turbines must be avoided, particularly in rural areas

Layout and design of ancillary features

- minimise damage to hedges, flower rich verges, trees, historic bridges and gateposts as a result of road widening – repair and replace any features lost;
- minimise the length of new tracks introduced into the landscape, using existing routes wherever possible;
- ensure any new tracks follow contours, avoiding steep slopes or wet ground where possible, and following field boundaries or woodland edges where possible – in some cases this may result in slightly longer lengths of track being required;
- ensure that road widening and strengthening works for construction purposes are removed and land is re-vegetated after construction, so as to retain the rural appearance of rural areas;
- ensure the surface of maintenance tracks blend into the surrounding landscape
- where possible, house transformers within the turbine towers to reduce their visual impacts;
- ensure substations and control buildings are carefully sited and generally avoid high or exposed locations – use existing buildings where possible, or existing and locally occurring vegetation to screen new buildings;
- ensure any ancillary features match the local vernacular (e.g. using locally occurring materials on substations, control buildings, and transformer cabins if not housed within the turbines);
- ensure on-site cables are buried underground to minimise impacts on landscape character and visual amenity - grid connections shall be underground wherever possible;
- if lighting is required on turbines for aviation purposes, use infra-red lighting where possible to minimise visual impacts at night.

The layout and design of turbines and ancillary features shall address the points outlined in paragraph 3.12 above.

Residential Visual Amenity

3.14 The term 'residential visual amenity' refers to people's living conditions, specifically their enjoyment of views from their house or garden. As outlined in the National Policy Statement for Renewable Energy Infrastructure (EN-3) (para 2.7.6), residential amenity is also affected by noise, which is addressed later in this chapter.

3.15 There is no published guidance, for England, on how impacts on residential visual amenity should be assessed. From a review of recent public inquiries[7] which have considered residential visual amenity, it has emerged that no individual has the right to a particular view per se and that the visual effect of a wind farm has to be 'unacceptably overbearing', 'oppressive' or 'unpleasantly

[7] Including Land at Chase Farm, Baumber (APP?D2510/A/10/2121089); Land at Masters Pit, Wareham (APP/B1225/A/11/2162905); Land between Anderby and Langham (APP/D2510/A/10/2130539); Newlands Farm (APP/E0915/A/12/2168121)

overwhelming and unavoidably present in main views' for there to be a material harm to residential visual amenity.

3.16 The following factors affect the impact of wind turbines on residential visual amenity:

- size and proximity: how large the turbines are and how far they are from the property in question is always a key factor;
- screening: where turbines are screened by vegetation or other buildings their impact might be lessened (but also might be increased if for example turbine tips only are visible);
- orientation: direct views are considered more likely to cause harm than oblique ones (orientation can include the orientation of the windows of the house, the location and orientation of external amenity areas and the orientation of the approach to the house);
- number and spread of turbines: where the turbines occupy a significant proportion of the view, this increases the impact.

3.17 The size of the study area for the residential visual amenity study will depend on the size of the wind energy development, the scale of the turbines proposed and the siting of the wind energy development in relation to properties, but the Council propose that a distance of at least 2km from a large or medium scale turbine development shall be used to 'capture' those properties where a potential impact on visual amenity could be so great as to materially affect living conditions.

3.18 One recognised approach to the issue of impact of turbines upon residential amenity is to define prescribed minimum separation distances between turbines and homes. No such minimum separation distances are currently laid down in English planning law or guidance but this does not prevent such distances being incorporated into Local Plans or SPDs provided that such measures are reasonable and justified and have been subject to full public consultation . Minimum separation distances have the advantage of identifying potentially unsatisfactory developments at an early stage. They can apply equally to visual impacts upon other receptors including other occupied premises other than homes, heritage assets such as listed buildings and public footpaths. Each of these receptors can have their own prescribed minimum distances from turbines of different height or power ranges. Separation distances can also embrace other impacts especially noise, or each impact can have its own separation distance.

3.19 A number of local authorities have proposed minimum separation distances in their Local Plans or in SPDs[8]. Some of these are in draft Plans which have not yet been independently examined or are potentially the subject of legal challenge. In addition, Members Bills have been introduced into Parliament with the aim of establishing national minimum separation distances.

3.20 The Council does not intend, at this time, to introduce or use minimum separation distances. However, this will be kept under review and the Council may seek to introduce these at a later date.

A residential visual amenity assessment, covering a study area of at least 2km from any turbine, shall be undertaken for large and medium scale wind energy developments (i.e. above 50m to blade tip), or for any scheme where impacts on residential visual amenity is seen by the Council to be an issue.

[8] Including Wiltshire County Council and Milton Keynes (See Appendix 1)

Cumulative impacts

3.21 When designing a wind energy development it is important to consider how the scheme fits with other existing, consented and proposed schemes (within and outside South Kesteven) to minimise cumulative impacts. Cumulative impact assessment shall be undertaken in accordance with Scottish Natural Heritage's Guidance '*Assessing the Cumulative Impact of Onshore Wind Energy Development'* (2012).

3.22 The following principles must be followed:

- multiple developments shall not obscure distinctive landforms and shall be in scale with ridges and hills;
- if two or more wind energy developments are clearly visible in the same view and appear in the same landscape character area, they should appear of similar scale and design (including the proportion of rotor diameter to tower height), unless the existing design is considered inappropriate – the closer they are to each other the more important this is;
- consider views from settlements and avoid surrounding' a settlement with wind turbines at close quarters leading to an overbearing or overwhelming presence of turbines;

A cumulative impact assessment, taking accounts of the points in paragraph 3.18 above, shall be undertaken. This shall consider wind energy developments that are under construction, consented or the subject of a valid planning application, or formally notified at the scoping stage. The study area for the cumulative assessment shall be proportionate to the size of the development and enable the assessment to focus on significant cumulative effects as required by the EIA Regulations – but may need to be up to 30km or 35km from the proposal for large scale developments.

D. Sources of further information

- Countryside Agency and SNH (2002) Landscape Character Assessment Guidance for England and Scotland, CAX 84.
- Countryside Agency and Scottish Natural Heritage (2004) Landscape Character Assessment Topic Paper 6 – Techniques and Criteria for Judging Capacity and Sensitivity.
- Landscape Institute (2011) Advice Note 01/11 Photography and photomontage in landscape and visual impact assessment.
- Landscape Institute and the Institute of Environmental Assessment (2002) Guidelines for Landscape and Visual Impact Assessment, 2nd Edition.
- Natural England's National Character Area map and descriptions [http://www.naturalengland.org.uk/ourwork/landscape/englands/character/areas/default.aspx].
- Natural England (2010) Making Space for Renewable Energy: Natural England's Approach to Assessing On-Shore Wind Energy Development (Catalogue Code: NE254);
- Scottish Natural Heritage (March 2012) Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Development.
- Scottish Natural Heritage (2009) Siting and Designing Windfarms in the Landscape, Version 1.
- Scottish Natural Heritage (March 2006) Visual Representation of Wind Farms, Good Practice Guidance. Prepared by Horner & Maclennan / Envision.
- 'Windfarm Visualisation: Perspective or Perception?', Alan Macdonald, RIBA (2012)

Ecology and Ornithology (Birds)

A. Key Planning Considerations

3.23 Wind energy developments support the objective to reduce greenhouse gases and minimise the effects of climate change and potential changes to biodiversity globally and in the UK. They also have the potential to enhance or adversely affect biodiversity and nature conservation interests locally. The main ecological issues resulting from wind turbines, either individually or as larger groups, are associated with the site infrastructure – i.e. the access roads, construction compounds and the operation of the turbines themselves. Small turbines are less likely to result in significant impacts on ecology or birds if they have been well sited. The construction and operation of wind energy developments may affect the ecological and ornithological interests in the following ways:

- loss of habitat and/or loss of plant or animal species during the construction phase;
- disturbance of habitats and/ or species from construction and maintenance operations and the presence of turbines;
- mortality to bats/ birds as a result of collision with turbine blades;
- indirect impacts on ecological receptors e.g. the impacts of altered hydrological regimes on habitats, increased pollution risk associated with accidental spillage of fuels and oils and dust emissions;
- opportunities for habitat management and enhancement.

B. South Kesteven Context

3.24 South Kesteven includes significant areas of important and sensitive habitats, including calcareous grassland, ancient woodland, fens and reedbeds, which in turn support a range of scarce plant and animal species. South Kesteven Core Strategy Policy EN1 "Protection and enhancement of the character of the District" aims to ensure that development "does not compromise the variety and distinctiveness of the existing biodiversity".

Designated Areas

3.25 There are a number of sites of nature conservation importance within South Kesteven District, including 31 Sites of Special Scientific Interest (SSSIs) and two Special Areas of Conservation (SACs) areas (Baston Fen and Grimsthorpe Park). Protection from inappropriate development for these features is provided by national guidance and local plan policies. Proposals for wind energy development will need to demonstrate that they would not adversely affect the conservation value/ integrity of a designated site, or habitats of any species protected under the Wildlife and Countryside Act 1981, the Conservation (Natural Habitats etc) Regulations 1994 or the Protection of Badgers Act 1992.

C. Guidance

Ecological Impact Assessment (EcIA)

3.26 An ecological impact assessment shall be completed for all large and medium scale wind energy developments. Small wind energy developments may also require an ecological assessment, depending on their proximity to designated sites, sensitive habitats, or features which may support protected species such as birds or bats, which are protected under the Wildlife & Countryside Act 1981.

3.27 Developers shall undertake an ecological impact assessment (EcIA) in accordance with best practice guidelines published by the Institute of Ecology and Environmental Management[9] and consider the potential key impacts listed above. Assessment of all scales of wind energy development shall consider impacts related to both the construction and operational stages of the development.

3.28 The Institute of Ecology and Environmental Management (IEEM) *Guidelines for Ecological Impact Assessment in the United Kingdom* (IEEM, 2006) (referred to as the IEEM guidelines) shall form the basis of the ecological impact assessment. These guidelines set out a process of identifying the value of ecological receptors and then characterising the impacts that are predicted. In accordance with the IEEM guidelines, the initial action for any assessment of impacts is to determine which features shall be subject to detailed assessment. Ecological receptors of sufficient value, that impacts upon them may be significant in terms of either legislation or policy shall be identified and be the subject of more detailed assessment.

3.29 Consultation shall be conducted with Natural England and the RSPB to inform the scope of the Ecological Impact Assessment. The Lincolnshire Environmental Records Centre shall also be contacted to provide information on presence and siting of protected species within the vicinity of the proposed development. It may also be appropriate to contact local interest groups, such as the Lincolnshire Wildlife Trust and Lincolnshire Bird Group.

An ecological impact assessment in accordance with the IEEM guidelines shall be undertaken for large and medium scale wind energy developments. Small wind energy proposals may also require an ecological assessment to ensure there are no sensitive features affected. Natural England, RSPB and the South Kesteven Development Management Team shall be consulted on the scope of the assessments required.

Biodiversity

3.30 For sites of international nature conservation value – namely Baston Fen and Grimsthorpe Park SACs, wind energy schemes within their vicinity will need to demonstrate that they will not adversely affect their 'integrity' and 'qualifying features'. In accordance with the Habitats Regulations, an assessment may need to be carried out to determine if it would have a likely significant effect, alone or in combination with other plans or projects. Further guidance on the Habitat Regulation Assessment process is provided in **Chapter 4.**

3.31 For national sites, wind energy schemes will need to demonstrate that they will not have an adverse effect on a SSSI. Strict measures would be taken to ensure that harmful effects on SSSIs are avoided or mitigated against.

3.32 In addition to international and national site designations there are a number of plant and animal species within South Kesteven (such as water voles, great crested newts, badgers etc) that are subject to special protection under the Habitats Regulations, the Wildlife and Countryside Act or their own legislation. Wind energy schemes will need to demonstrate that these are protected from adverse effects through the adoption of appropriate avoidance and mitigation measures.

3.33 It is also important for developers to consider the effects of development on non-designated sites and species. Government policy seeks to protect priority habitats and species identified in the UK Biodiversity Action Plan and any additionally identified in the Lincolnshire Biodiversity Action Plan. Many of these habitats and species extend outside protected sites, and consideration must be given to potential impacts when developing any scheme.

[9] http://www.ieem.net/ecia/

3.34 Areas where uncultivated peat wetlands or moorlands are present are particularly sensitive to wind energy development and associated infrastructure including access routes, turbine installation, and drainage works associated with the construction process. Ancient woodlands and semi-natural grassland which are also present in South Kesteven and are sensitive habitats are unlikely to be suitable for wind energy development.

3.35 The ecological impact of a small wind turbine is generally expected to be minimal where care has been taken in siting and design.

Developers shall assess the effects of potential schemes, alone or cumulatively, on biodiversity sites, habitats and species and identify measures to avoid or mitigate harm to them and secure their conservation and enhancement. Where a scheme, alone and in combination with other plans and projects, could have an impact on an internationally designated sites, developers must carry out an assessment of the likely significant effect of the scheme in accordance with the Habitats Regulations – see Chapter 4.

Birds

3.36 The issue of birds and wind turbine developments has been debated for more than a decade. Impacts can occur if turbines are located in a migration path, or where there are high concentrations of particular species such as areas where birds feed. Whilst most birds can be expected to take action to avoid obstacles, different species react in different ways. Scottish Natural Heritage and the British Wind Energy Association (now Renewable UK) (2006) (updated by Percival (2007)) produced detailed guidance on survey methods for assessing the potential impacts on birds from onshore wind farms. This guidance outlines how to determine: the potential loss of habitat as a result of infrastructure, displacement of birds due to disturbance to feeding and breeding grounds, and the potential risk of mortality due to collision with turbine blades. Such risks need to be assessed for any wind energy development where there is the potential for a significant impact to occur. Consultation shall be undertaken with the RSPB and Natural England to determine the nature and scope of any bird surveys required. All required bird surveys shall be undertaken in accordance with guidance outlined above and care should be taken to ensure surveys are undertaken at appropriate times of the year to capture all impacts i.e. an area may be a breeding ground for one bird species but also a winter feeding ground for another.

3.37 In relation to small scale wind energy developments, householders and installers shall be aware that all bird nests are fully protected from damage, destruction or interference whilst in use of being built under The Wildlife & Countryside Act 1981 and it is not possible to move a nest or attempt to move a nesting bird to another site during the breeding season. With respect to migration routes, Renewables UK recommend that for small wind turbines of over 15m in height, details shall be requested of migration routes from the relevant statutory body (Natural England).

3.38 The RSPB has issued guidance on the specific sensitivities of endangered or rare bird species to wind farm development. The report also maps the most sensitive areas of the UK in terms of potential impacts of wind turbines on bird species[10].

3.39 Consideration should be given to the use of locally based specialists to undertake the required surveys.

An assessment of potential impacts on bird populations is likely to be required for all developments where a potential impact may occur. Consultation shall be undertaken with

[10] J. A. Bright, R. H. W. Langston, S. Anthony on behalf of the Natural England and the Royal Society for the Protection of Birds (2009) Mapped and written guidance in relation to birds and onshore wind energy development in England - RSPB Research Report No 35

Natural England and the RSPB to determine the scope of assessment required. All assessments shall be undertaken in accordance with the Guidance prepared by Scottish Natural Heritage.

Bats

3.40 All bats are protected species and a bat survey will be required if the proposed development (of any scale) is in an area where bat activity is likely. Work will need to be carried out to establish roosts, flight lines, feeding areas, hibernation or swarming sites in the vicinity of a proposal.

3.41 A bat survey may also be required where turbines are proposed within 50m of a feature which may be used for commuting, foraging or roosting bats, such as hedgerows, woodland, rivers and water bodies. Bat surveys shall be completed with reference to the Bat Conservation Trust's guidance "Good practice guidelines for surveying onshore wind farms". For single turbine schemes (of all scales), Natural England's Technical Information Note TIN051 and TIN059 shall be used to inform the assessment. The cumulative impacts on bats (and birds) must also be assessed in relation to other proposed, approved or operational wind energy schemes.

3.42 Consideration should be given to the use of locally based specialists to undertake the required surveys.

Bat surveys will be required for all wind energy developments where bat activity is likely. The assessment shall follow the guidance provided by the Bat Conservation Trust and Natural England. The cumulative impacts on bats (and birds) must also be assessed in relation to other proposed, approved or operational wind energy schemes.

Minimising and mitigating impacts

3.43 Careful siting and design is the most appropriate means of minimising adverse impacts of wind energy development on biodiversity. This shall be informed by local ecological survey data as well as consultation with the Council and key consultees, as listed above. The following principles shall be applied when siting and designing wind energy developments, in order to reduce the likelihood and significance of any ecological impacts:

- wind energy developments shall be located on less sensitive habitats and shall not be directly adjacent to sites which are designated for populations of bird species, or features that are likely to support bird or bat populations, such as woodlands, hedgerows, rivers and water bodies;
- wind turbines shall be sited at least 50m away from linear features in accordance with Natural England guidance;
- construction impacts shall be minimised through the micro-siting of development away from sensitive habitats and species using buffer protection zones, restoration of habitat edges adjacent to infrastructure, exclusion fencing and translocation programmes at construction areas;
- species-specific measures may also be applied during construction to mitigate impacts, such as covering excavation works, provision of escape ramps for mammals, implementing speed limits onsite, protecting watercourses and maintaining hydrological regimes;
- impacts on birds and bats shall be minimised by ensuring any vegetation and ground clearance works are undertaken outside of the breeding season (March-August);
- turbines shall be located within the development site avoiding areas of high flight activity, minimising the potential for 'bird strike';

- opportunities for habitat enhancement shall be identified where possible through the preparation of a habitat management plan;

Careful siting and design is the most effective way of minimising the impact of wind energy developments on ecology. The Council will require applicants to demonstrate how the development has been designed and sited to minimise impacts on ecology, and adherence to the other measures listed in paragraph 3.38 where appropriate.

D. Sources of further information

- Wind Farm Development and Nature Conservation (2001) WWF, English Nature, RSPB and the BWEA.
- Institute of Ecology and Environmental Management (IEEM) (2006) Guidelines for Ecological Impact Assessment in the United Kingdom.
- Scottish Natural Heritage and the British Wind Energy Association (2006) Survey methods for use in assessing the impacts of onshore windfarms on bird populations.
- J. A. Bright, R. H. W. Langston, S. Anthony on behalf of the Natural England and the Royal Society for the Protection of Birds (2009) Mapped and written guidance in relation to birds and onshore wind energy development in England - RSPB Research Report No 35.
- Natural England's Technical Information Note TIN051 and TIN059.
- Renewables UK (2011) Small Wind: Planning Guidance – A Good Practice Guide.

Historic environment

A. Key Planning Considerations

3.44 Heritage assets are a finite resource that, once damaged or destroyed, cannot be replaced. How assets are understood and appreciated within the landscape plays an important role in informing the understanding of their significance – and their potential sensitivity to development. Significance refers to '*the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic.*'[11]. The National Planning Policy Framework (NPPF) requires applicants for planning permission to provide a description of the significance of any heritage assets affected, including any contribution made by their setting. This should be proportionate to the assets' importance and sufficient to understand the potential impact of the proposal on their significance. The NPPF highlights the priority given to the conservation of designated assets, which increases in proportion to their importance. Any harm or loss of significance therefore requires a clear and convincing justification.

3.45 The 'setting' of a heritage asset can be understood as the surroundings in which it is experienced. It has no fixed extent, and can change as the asset itself and its surroundings evolve. While all heritage assets can be considered to have a setting, it does not always make a positive contribution to the significance of the asset, and may currently include elements that detract from the understanding or appreciation of that significance. All landscapes in Britain have been shaped by human activities and are therefore historic to at least some degree. However, the extent to which the often multiple layers of history can be 'read' in the landscape varies significantly, and the sense of time-depth is an important aspect of the character of many parts of the District.

3.46 Wind turbines, as tall structures of unmistakeably modern character, have the potential to affect substantial change in the historic character of the landscape and create adverse effects on the setting of heritage assets. Similarly, the construction of turbines and ancillary infrastructure has the potential to physically damage heritage assets, most notably buried archaeological sites. Wind energy development may affect the historic environment in the following ways:

- direct physical impacts on assets, including buried archaeology, as a result of construction activity;
- impacts on setting of historic assets, leading to adverse effects on their significance including:
  - interruption of short and long distance views of historic assets;
  - interruption of key (generally visual) relationships between historic assets that have a functional or symbolic link;
  - changes in the perceived scale and visual dominance of historic assets – for example historic church spires and towers;
  - reduction in the ability to appreciate and understand historic assets in the landscape (for example, reducing the legibility of the routes of Roman roads and importance of the limestone ridges as axes of communication and settlement);
- impacts on the historic character of the development site through loss of landscape features, such as field boundaries;

[11] National Planning Policy Framework Glossary Definition

- impacts on the wider historic character of the landscape, reducing the legibility of 'time-depth' in the landscape (for example, views of the historic field, drain and settlement patterns in the Fens from the limestone ridges of the Southern Cliff);
- impacts on key views to, or from, important assets that aid the understanding and appreciation of assets, or where they make an important contribution to the wider character and quality of the view; and,
- cumulative impacts: the effects of one wind energy development in combination with other existing or proposed developments of the same type on the setting of assets, the historic character of the landscape or key views.

B. South Kesteven Context

Historic landscape character

3.47 The rural landscape of South Kesteven retains a strongly historic character, particularly in proximity to the District's towns and villages. The limestone-built villages of the Southern Cliff demonstrate the continuity of settlement in the area and the origins of the present landscape structure. Field patterns, particularly in the Trent Valley and around Grantham, retain an element of medieval character fossilised in later enclosures, while on the higher ground the regular pattern of later Parliamentary enclosures creates an equally distinctive – if more recent – historic character. To the east of the limestone scarp, the flat, sweeping fen landscape creates a striking historic and topographic counterpoint. There is much evidence of Iron Age and Roman and Medieval settlement and field patterns and the many phases of drainage, principally relating to 18th and 19th century activity, are clearly legible in the current landscape.

3.48 Historic assets play an important role in defining a sense of place, providing landmarks and structuring elements in the landscape. Church spires are particularly important, rising above the gently rolling or flat topography, for example in the Trent/ Belvoir Vales – such as Claypole Church and in the fen-edge settlements – for example, the Church of St. Andrew, Billingborough. Similarly, the relatively large number of designed landscapes makes an important contribution to historic character. Some, such as Belton House and Grimsthorpe Castle, are laid out with a series of designed views that may be particularly sensitive to visual intrusion.

3.49 Further information on the historic landscape character of South Kesteven is contained in the Lincolnshire Historic Landscape Characterisation Project [12] and in the Lincolnshire Historic Environment Record (HER)

Heritage assets

3.50 South Kesteven contains a comparatively large number of designated heritage assets, comprising:

- 92 Scheduled Monuments;
- 77 Grade I, 196 Grade II* and 1696 Grade II Listed Buildings;
- 2 Grade I, 2 Grade II* and 5 Grade II Registered Parks and Gardens13;
- 48 Conservation Areas.

[12] http://www.lincolnshire.gov.uk/residents/environment-and-planning/conservation/archaeology/lincolnshire-historic-landscape-characterisation-project/

[13] Figures from English Heritage GIS asset datasets, downloaded August 2012 (adjusted for multi-part assets)

3.51 In addition, the District has a wide range of undesignated archaeological sites, historic buildings and smaller-scale designed landscapes that make an important contribution to the understanding and appreciation of the area's history, character and sense of place. Information on undesignated assets can be obtained from the Lincolnshire Historic Environment Record (HER).

Consultation and consents

3.52 Development likely to have physical impacts on a Scheduled Monument will require Scheduled Monument Consent from English Heritage. This is only granted in wholly exceptional cases. Developers shall seek advice on the historic environment of the area, its significance and sensitivity at the earliest opportunity. This is vital to ensure that assessments of likely impacts on the historic environment are appropriately informed, conducted to an agreed scope and are managed efficiently. Advice shall be sought from:

- Lincolnshire County Council Historic Environment Record;
- The Heritage Trust of Lincolnshire (planning archaeology advisers to South Kesteven Council);
- English Heritage;
- Local history and heritage societies (South Kesteven District Council are able to provide details of these)

C. Guidance

Assessing impacts on the historic environment

3.53 Any assessment of impact on heritage assets – whether physical or related to effects on setting – must be guided by and focussed on the affected assets' heritage significance. Guidance on understanding the values that combine to contribute to heritage significance, and shall inform assessments, can be found in the English Heritage *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (2008)*.

<u>Physical impacts</u>

3. 54 Physical impacts on historic assets will usually be confined to the extent of the developed area, but can affect wider areas e.g. through the effect of interrupting drainage upon an archaeological site. The flexibility available in siting of turbines and ancillary structures and the routeing of access tracks provides opportunities to avoid damage and shall be optimised wherever possible. The depth of turbine foundations is also a key consideration.

There will be a presumption in favour of preserving heritage assets intact and in situ.

3.55 In line with the NPPF, the ability to record evidence of our past will not be a factor in deciding whether loss or damage to assets will be permitted.

3.56 Developers will be expected to provide detailed assessment of all assets within the proposed site in line with current best practice. Pre-application consultation with the Council's Development Management team and the Heritage Trust of Lincolnshire (the Council's historic environment adviser) is essential in ensuring an appropriate scope of works is agreed. This helps to provide certainty for developers, and ensures applications are submitted with appropriate levels of detail to inform decision-making.

Developers shall provide detailed assessment of all assets within and close to the proposed site, including all historic assets whose settings might be affected by the development, in line with current best practice. Pre-application consultation with the planning authority is essential in ensuring an appropriate scope of works is agreed.

3.57 Information on relevant standards and requirements can be obtained from:

- PPS5 Practice Guide[14].
- Institute for Archaeologists (IfA) Codes, Standards and Guidelines
- English Heritage 'The Setting of Heritage Assets'

3.58 The Council will generally expect assets with theoretical visibility[15] of the proposed development within 5km to be assessed for potential impacts on their setting – although a flexible approach will be adopted in line with the proposed scale and likely visibility of schemes. For large scale wind energy developments, an outer study area of 10km radius shall be examined for significant assets with particular sensitivity to visual impacts – such as designed landscapes with key structured views.

3.59 The sensitivity of assets' setting to *specific* wind energy proposals may be different to that for other types of development. Care shall therefore be exercised in applying the findings of generic or previous assessments. Similarly, impacts on setting will generally be reversible – if long term – therefore ensuring that sites are restored with regard to historic character after they are decommissioned is critical.

3.60 Developers shall integrate any assessment of visual impacts on the setting of heritage assets with the process of landscape and visual impact assessment (LVIA). This will enable developers to efficiently select viewpoints (in consultation with the planning authority, their historic environment advisers and, where appropriate, English Heritage).

The Council will expect assets with theoretical visibility to or from the proposed development within 5km to be assessed for potential impacts, and within 10km radius for large scale wind energy developments.

Impacts on historic landscape character

3.61 Developers shall consult the Lincolnshire Historic Landscape Characterisation and the Historic Environment Record to ensure their proposals are informed by, and seek to conserve, the key characteristics of the District's landscapes.

3.62 Detailed analysis of the historic character of the development site and wider environs (e.g. within the 5km study area) will be helpful in deciding a whether turbine development should proceed and, if so, in informing the detailed design of the development, including the number, scale and disposition of the turbines. This will help to conserve key views and relationships that contribute to the appreciation and perception of the District's landscape history.

Developers should consult the Lincolnshire Historic Landscape Characterisation and the Lincolnshire Historic Environment Record to ensure their proposals are informed by, and seek to conserve, the key characteristics of the District's landscapes.

Site selection

3.63 Careful site selection is the most effective means of avoiding and mitigating potential effects on the historic environment. Wind farm design, and environmental assessment, shall be an iterative process, responding to sensitivities as they are identified.

[15] A 'Zone of Theoretical Visibility' (ZTV) model, based on a bare ground digital terrain model will be produced during the early stages of the LVIA process. This can be used to select sites likely to experience potential visual impacts on setting.

3.64 As noted above, the Historic Landscape Characterisation – along with designation and HER information – shall be key sources in understanding the baseline historic character and likely sensitivity of a likely site or area of search. The following siting principles shall be followed:

- avoid historic settlements, particularly in areas of open landscape character where views – and settings – are likely to be extensive;
- identify and avoid assets and historic landscapes with largely unaltered or intact settings;
- avoid areas with numerous heritage assets and high archaeological potential to reduce the likelihood of physical impacts;
- avoid areas with intricate and small-scale historic landscapes (such as well-preserved field patterns), and where historic features are the only scale reference;
- avoid undeveloped skylines visible from key historic assets and key long distance views into historic assets
- avoid designed views from parks, gardens, designed landscapes and historic buildings – particularly those where visibility/extensive views were necessary to their function;
- use historic features as a scale reference when selecting turbine heights to reduce visual dominance in views;
- consider the potential for cumulative and in-combination effects on the settings of heritage assets;

Careful site selection is the most effective means of avoiding and mitigating potential effects on the historic environment. Wind farm design shall be an iterative process, responding to sensitivities as they are identified. The siting principles outlined in paragraph 3.58 above shall be adhered to.

Layout and design of turbines

3.65 Alternative options shall be investigated to determine the optimal layout and design of a wind energy development. While technical considerations will necessarily influence preferred turbine and infrastructure locations, developers shall have regard to on-site and near-site heritage assets prioritising the avoidance of physical impacts. Turbines shall be placed to minimise interaction with assets' settings.

3.66 The recommendations made in the Landscape and Visual Amenity section of this guidance also apply to avoiding effects on the historic environment. In addition, the following principles shall be considered:

- site turbines to avoid physical impacts on heritage assets;
- preserve lines of sight that are important to the significance of heritage assets in proximity to the proposed development;
- ensure that turbine height relates to the hierarchy of elements in the landscape to ensure that visual prominence/dominance of historic features is maintained in key views;
- where the landscape has a particular structure created by historic features (e.g. linear field patterns), ensure that turbine layouts respect this to maintain the legibility of the underlying historic landscape;
- assessments and visualisations shall consider seasonal variations in visibility and visual impacts (e.g. from historic buildings screened by vegetation in summer only)

When considering the layout and design of turbines, alternative options shall be investigated to determine the optimal layout and the layout and design of the wind energy development taking into account the principles listed in paragraph 3.60 above.

Layout and design of ancillary features

3.67 The recommendations made in the Landscape and Visual Amenity section of this guidance also apply to avoiding effects on the historic environment. In addition, the following principles shall be considered for large and medium scale wind energy developments:

- ensure that access tracks respect, and follow, the grain of historic field patterns and other land divisions;
- route cables and tracks to avoid physical impacts on archaeological sites and reduce visibility from historic assets;
- consider the potential for temporary effects on setting and views relating to the location of construction compounds, roads and plant – where possible, the screening effect of existing vegetation shall be maximised;
- where possible, control buildings shall make use of local vernacular styles, proportions and palette of materials. However, in certain locations this may produce undesirable effects (e.g. where buildings are sparsely distributed or are technically unsuitable in form or character).

When considering the layout and design of ancillary features, developers shall take into account the principles listed in paragraph 3.61 above.

Cumulative impacts

3.68 When designing a wind energy development it is important to consider how the scheme fits with other schemes **under construction, consented or the subject of a valid planning application**[16] (within and outside South Kesteven) to minimise cumulative impacts on the setting of heritage assets. The principles outlined in the Landscape and Visual Amenity chapter of this guidance are also relevant to the historic environment. In addition, developers shall consider:

- identifying other wind energy developments in the area, and assessing the potential for cumulative impacts on heritage assets and historic landscapes/character as part of the site selection process;
- views from historic towns, villages and assets and seek to avoid 'surrounding' or 'dominating' them with turbines at close quarters;
- the potential for clustering wind energy development in areas with lower historic environment sensitivity, where other constraints allow; or, continuing the existing pattern of development (e.g. associated with buildings) where this is considered appropriate.

It is expected that cumulative assessment of effects on the historic environment would be undertaken in parallel with that required for landscape and visual effects. However, it is unlikely that significant cumulative effects will be generated beyond 5-10km.

D. Sources of further information

- PPS5 Practice Guide17.
- Institute for Archaeologists (IfA) Codes, Standards and Guidelines.
- English Heritage (2005) Wind Energy and the Historic Environment.

[16] Please note this does not refer to schemes at the screening or scoping stage of EIA.

[17] Although PPS5: Planning for the Historic Environment has been superseded by the NPPF, English Heritage and DCLG consider that the Practice Guide remains relevant

- English Heritage (2008) Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment.
- English Heritage (2011a) The Setting of Heritage Assets.
- English Heritage (2011b) Seeing the History in the View: a method for assessing heritage significance within views.
- Lord, J. and MacIntosh, A. Lincolnshire County Council & English Heritage (2011) The Historic Character of the County of Lincolnshire English Heritage Project Report No. 4661.
- Atkins Heritage (2010) *Belton House and Park Setting Study and Policy Development.*

Hydrology

A. Key planning considerations

3.69 The construction and decommissioning of wind turbines, either individually or as larger groups can have potential impacts on local watercourses, water bodies, groundwater and water supplies. Wind energy installations (particularly large and medium scale developments) have potential to impact the water environment in the following ways:

- increase run-off and flood risk at the site or nearby;
- generate pollution from construction and maintenance equipment;
- impede flow at watercourse crossings (e.g. where new access tracks are installed);
- change natural surface water drainage patterns;
- increase sedimentation of local water courses and drainage systems.
- interrupt the groundwater supplies to artesian wells and boreholes, which are the only source of water to many residents in the eastern part of the District

3.70 As with other types of development, wind turbines (particularly wind farms) create a development footprint that increases the potential of flood risk and surface water runoff. The installation of turbines and particularly access tracks can obstruct and divert the natural drainage routes. Large scale developments can also cause considerable disturbance to the soil at the site. These soils can then be carried into nearby watercourses, causing increased sedimentation, which in turn affect water quality and lead to ecological impacts (if appropriate mitigation is not put in place). Soil disturbance is also a concern where wind turbines are proposed on brownfield land, as there is a risk of releasing contamination from the soil into nearby water courses. The concrete foundations of large turbines, which are typically around 3.5metres in depth, can due to ground conditions exceed 10 metres in depth and potentially impede groundwater flows in areas where there are aquifer strata

3.71 The National Planning Policy Framework highlights the need to consider when determining an application for development whether flood risk will be increased elsewhere, and to apply the Sequential Test when identifying sites for development[18]. Wind energy development is not precluded from Flood Zones 1, 2 or 3; however the Environment Agency shall be consulted in relation to all wind energy developments.

B. South Kesteven Context

3.72 The main area of flood risk is the eastern parts of the District, where most of the low-lying fens are located in Flood Zone 3. There are two Main Rivers - the River Welland and the River Witham, as well as a number of secondary rivers which run through many of the market towns. In addition to the Environment Agency, local water provider Anglian Water shall be consulted on any major wind energy proposals.

C. Guidance

3.73 Major wind energy developments have the potential to cause impacts on the water environment through the effects listed above. However, individual small scale turbines are unlikely to cause any significant impacts. National Policy Statement for Energy (EN-1) states that for major energy developments "*the applicant shall undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the*

[18] Communities and Local Government (2012) National Planning Policy Framework

water environment". This assessment shall include a survey of water features, past land use and likely impacts of the wind turbines and associated infrastructure on groundwater recharge and water balance.

Impacts on watercourses

3.74 In addition to the Environment Agency, the local drainage Board (where relevant) and the local water company shall be consulted by the developer to inform the assessment of any hydrological effects of the wind energy installation. If the proposed development requires the culverting or diversion of a watercourse, 'Consent to Work in a Watercourse' will be required from the Environment Agency[19]. Wind energy proposals which are located in close proximity to a Main River or flood defences, or which require the installation of cables under a Main River will need to apply to the Environment Agency for a Flood Consent.

Flood zones

3.75 Consultation with the Environment Agency shall be undertaken to determine if a Flood Risk Assessment (FRA) is required. Whilst wind energy development is not excluded from land in Flood Zones 2 and 3, the more sensitive infrastructure associated with medium and large scale wind energy development, such as substations, shall be located in Flood Zone 1 where possible. Where this is not possible, it may be necessary to raise land to accommodate the substation, and the Environment Agency shall be consulted on these works.

Drainage

3.76 To minimise any effects on drainage/flow routes resulting from construction of the wind energy development, land raising e.g. to support access roads, shall be minimal. Where land raising is proposed, the developer shall incorporate appropriate mitigation measures in consultation with the Environment Agency and Internal Drainage Boards.

Contaminated land

3.77 Where wind energy development is proposed on a brownfield site, a Preliminary Risk Assessment to determine whether contaminated land is present shall be completed in consultation with the Environment Agency. Documents to which the applicant shall refer when dealing with potential for contaminated land are listed below.

Environmental Management Plan (EMP).

3.78 Increasingly in the UK the EIA process is being supplemented by the integration of an Environmental Management Plan (EMP). EMP specifically aims to manage the impacts during the construction phase of the development. The preparation of an Environmental Management Plan prior to construction/decommissioning can mitigate any potential risk to ground and surface water by including measures such as the use of silt traps, buffer zones from watercourses, attenuation ponds and other best practice pollution prevention practices.

Large scale wind energy developments have the potential to affect hydrology and local water resources. Developers shall undertake an assessment to determine the likelihood of hydrological effects, and the Environment Agency, Local Drainage Board (where appropriate) and Local Water Company shall be consulted to inform this assessment. For developments requiring an EIA, an Environmental Management Plan shall be prepared prior to the commencement of any works.

[19] Department of Trade and Industry (1996) Companion Guide to PPS22: Renewable Energy

D. Sources of further information

- DECC (2012) Overarching National Policy Statement for Energy (EN-1).
- Environment Agency website http://www.environment-agency.gov.uk/
- DEFRA/Environment Agency (2004) *CLR11: Model Procedures for the Management of Land Contamination*.
- Environment Agency (2010) *GPLC1: Guiding principles for land contamination.*

Traffic and transport

A. Key Planning Considerations

3.79 Wind energy developments may have significant road transport requirements, depending on the nature and scale of the project. The construction (and decommissioning) of large and medium scale wind energy developments may affect traffic and transport in the following ways:

- generation of potentially large numbers of vehicle movements, bringing construction materials, plant, turbine components and the workforce to site;
- abnormal loads necessitating temporary traffic signals or diversions;
- need for temporary upgrades to junctions, widening carriageways, strengthening of minor bridges and/or road surfacing to cope with long, wide and heavy loads;
- construction of on-site access tracks;
- temporary effects on pedestrian and cyclist amenity;
- temporary effects on local air quality and emissions.

3.80 In addition, developers shall consider:

- the potential for turbines to distract drivers if poorly located;
- minimum appropriate setback distances for turbines from the road network;
- removing temporary roadworks needed for construction and re-vegetating such areas in order to retain a rural character

3.81 Small scale wind energy developments will have very minor transport requirements during construction and no transport implications in operation.

B. South Kesteven Context

Road Network

3.82 Although largely rural, much of the District is well-served by A-class roads, including the A1 trunk road. However, in more remote areas, narrow historic lanes and tracks present potential transport issues in relation to wind energy development.

3.83 Lincolnshire County Council is the Highways Authority for South Kesteven, and shall be consulted with regard to traffic and transport assessment and necessary additional works. For developments potentially affecting, or necessitating abnormal loads on the A1 trunk road, the Highways Agency shall be consulted.

C. Guidance

3.84 The following section provides guidance on key traffic and transport issues for large and medium scale wind energy developments.

Assessing impacts on transport

3.85 Getting large scale wind turbine components and construction material to site effectively and with minimal impact requires careful route assessment, identification of likely 'pinch points' or obstructions and design of appropriate mitigation measures.

3.86 Assessments, covering construction, operation and decommissioning phases, shall typically include:

- Desk-based survey of:

- closest suitable sea-port, if turbines are to be delivered from overseas (to minimise road haulage distances, reduce impacts and cost);
- local road network to select potential route options;
- public transport services;
- available traffic, vehicle speed and accident data;
- junction capacity.

- Route survey for:

- developing a preferred option;
- obstructions (e.g. overhanging trees, overhead lines, soft or embanked verges and buildings/walls adjacent to the route), 'pinch points' that vehicles may have difficulty negotiating and road profile issues that could cause grounding of low loaders (e.g. hump-backed bridges or rolling sections of country lanes);
- structural weakness: bridges, culverts, 'floating' roads constructed on peat substrate, poorly-surfaced sections of road.

- 'Swept path' analysis of proposed route:

- computer modelling of junctions, corners and, where necessary, narrow sections of road to determine whether low-loaders delivering turbine components can safely negotiate the route. Models indicate the likely track taken by vehicle wheels, and the area 'swept' by the overhanging vehicle body, trailer bed and turbine components

- Traffic observations on likely route;

- Modelling likely impacts:

- construction traffic vehicle movements, timing and distribution;
- abnormal load – necessary traffic controls, diversions and disruption;
- cumulative impacts with other developments using the same route;
- community and economic effects

- Proposed mitigation:

- junction reinforcement / redesign;
- road widening;
- cutting back of overhanging / protruding vegetation;
- traffic management plan.

3.87 Although assessment and modelling processes are generally robust, developers, turbine suppliers and their appointed specialist hauliers generally undertake a 'dry run' to replicate the delivery of the largest components to ensure no further issues emerge. Where appropriate, the Council will require developers to make provision for such tests through planning conditions / obligations.

3.88 While it is acknowledged that some aspects of the construction phase, and attendant traffic and transport effects, may be subject to change (e.g. sources of aggregates and concrete, exact turbine dimensions), the Council will expect developers to provide assessments based on a

reasonable 'worst case' scenario. Planning conditions will be used to ensure that any gaps in the assessment are filled appropriately prior to the commencement of construction.

Guidance on Transport Assessment is available from the Department of Transport. Developers are advised to consult with the Highways Agency and Lincolnshire Council, as Highway Authority, at the earliest opportunity.

Site selection

3.89 Accessibility is an important factor in site selection. However, areas with the best wind resource are often in relatively remote locations and dependent on rural roads for access.

3.90 Developers shall consider the following principles in selecting sites:

- consider locations in close proximity to existing industrial and commercial development, close to main transport corridors. Accessibility is likely to be better, and may combine with lower levels of environmental sensitivity;
- where possible, use the shortest possible route on unclassified and fragile rural roads – reducing the need for upgrading and widening as far as possible;
- where possible, avoid settlements – particularly the narrow main streets of historic towns;
- avoid impacts on key local resources, public transport links and communities;
- undertake early consultation with the Highways Agency, Highways Authority and the police to understand the key sensitivities of the road network in the District;
- where possible, locations where motorists need to pay particular attention, such as sharp bends and complex junctions, shall be avoided. Information on existing 'accident black-spots' can be obtained from the Police service;
- avoid locations where turbines would appear suddenly in motorists' field of vision, as this could increase the potential for distraction.

The site selection process for large and medium scale wind energy developments shall address the points outlined in paragraph 3.84 above.

Minimum set back distance

3.91 The Highways Agency recommends a set-back distance from the nearest highway boundary of at least turbine height + 50m for commercial scale turbines. This will satisfactorily address concern relating to the following issues:

- structural collapse;
- icing and 'ice-throw' (turbines equipped with appropriate vibration and climate sensors prevent this issue – evidence of this technology in the proposed turbines shall be submitted).

3.92 The Highway Agency also recommends a minimum separation distance of the turbine height plus 10% for small scale turbines.

The recommended separation distances between turbines and highways proposed by the Highways Agency of the turbine height plus 50m for commercial scale turbines and the turbine height plus 10% for small scale turbines shall be adhered to by developers. It is

recommended that the same separation distances shall be applied to railway lines and overhead power lines.

Design and Restoration of construction road works

3.93 Care should be taken in the design of temporary road and access works for construction traffic to ensure that the character of rural areas is maintained – this means avoiding the use of concrete kerbs as far as possible and the use of 'bled edges'

3.94 The delivery of large turbine components to sites can require the widening and strengthening of local public roads, and accesses to sites and site roads. Such works in hard materials can have a detrimental impact upon the rural environment. These works should be removed and the land restored to its former state once the site is operational.

D. Sources of further information

- Department for Energy and Climate Change (2012) National Policy Statement for Renewable Energy Infrastructure (EN-3).
- Highways Agency (2012) Spatial Planning Advice Note SP 12/09: Planning applications for wind turbines sited near to trunk roads.
- Department for Transport & Department for Communities and Local Government (2007) Guidance on Transport Assessment.

Noise and vibration

A. Key planning considerations

3.95 The potential noise and vibration effects associated with wind energy installations include those associated with both construction and operation. The key considerations are as follows:

- impacts of construction and decommissioning noise, including construction plant and associated traffic;
- impacts of aerodynamic and mechanical noise from operational turbines;
- potential for cumulative noise as a result of multiple wind farms.

3.96 All construction activity, including that associated with renewable energy developments, will inevitably generate a certain amount of noise. Developers shall ensure that appropriate control measures are incorporated in their proposal to minimise disturbance to neighbouring land uses, for example by following good practice construction guidance. The nature of works and distances involved in the construction of a wind farm are unlikely to cause significant impacts relating to vibration. Occasional momentary vibration can arise when heavy vehicles pass dwellings at very short separation distances.

3.97 DEFRA has issued a report entitled Wind Farm Noise Statutory Nuisance Complaint Methodology (Contract no. NANR 277 prepared by Aecom). Although this is primarily a guide for people affected by wind turbines after they have been constructed, it is a useful reference source for the planning of wind turbine developments in order to avoid nuisance situations.

3.98 Once operational, there are two types of noise associated with wind turbines:

- **Aerodynamic noise**, which is produced by rotating blades moving through the air. This noise is usually only perceived at low wind speeds, as with higher wind speeds the noise of the wind often masks any noise emitted by the turbines. The noise impact of a wind energy installation is therefore determined by assessing the level of noise caused by the turbines, measured against the background noise which occurs at nearby residential dwellings or other receptors. One potential noise impact associated with aerodynamic noise is 'amplitude modulation'.

- **Amplitude modulation** is the modulation of the level of broadband noise emitted by a turbine at blade passing frequency. This normally gives rise to the characteristic 'swish' noise. Under certain conditions the nature of the noise changes to what is often referred to as excess amplitude modulation (EAM). EAM is generally recognised as being when the swish of the turbine blades changes to a more pronounced thumping or banging noise. EAM is highly intrusive and can be experienced at receptor locations over 1.5km from turbines. It should be considered as being additional to the normal turbine noise and its occurrence at any particular site cannot at present be predicted with a high degree of certainty although it tends to be associated with high wind shear (ref. below) conditions that occur typically during the night and large wind turbines.

- Another noise impact is **wind shear.** Wind shear (vertical shear) can be described as the change in wind speed with height caused by a combination of ground roughness and atmospheric stability. Wind speed differs with height and high wind shear is the condition when the wind speed at the upper heights is much higher than at lower ones. Low wind shear is when the wind speeds at the upper and lower heights are similar. In addition to the vertical shear there can also be a change in wind direction with height known as horizontal shear or

'twist'. Under high (vertical) wind shear conditions, the higher wind speeds at the heights where modern turbine rotors are positioned results in high power generation and hence high noise output. Meanwhile, due to the high wind shear conditions there are much lower wind speeds near ground level which means there is less background noise than expected to mask the noise. Additionally, the high differential wind speeds between the top and bottom of a turbine rotor and increased horizontal shear are implicated in the incidence of amplitude modulation. As a result turbine noise intrusion is most likely to occur under high wind shear conditions.

- **Mechanical noise,** which is emitted by the turbine gear box or generator. Modern turbines are designed to minimise mechanical noise, however the noise level can vary greatly between different machines.

3.99 Vibration is a separate consideration from noise. There is no doubt that large turbines can potentially cause vibration through the ground or through the walls of nearby buildings

C. Guidance

Noise impact assessment

3.100 Where there is potential for a wind energy development to result in noise or vibration impacts which affect residential properties, or other sensitive receptors, the applicant must undertake a noise impact assessment. In the UK, it is stated in National Policy Statement EN3 on Renewable Energy (2011) that the ETSU guidance Assessment and Rating of Noise from Wind Farms (ETSU-R**-97) (1996)** shall be used to assess the potential noise effects associated with large and medium scale wind turbines.

3.101 The Institute of Acoustics has launched a consultation on "Good Practice Guidance to the application of ETSU-R-97 for wind turbine noise assessment" following a request from the Department of Energy and Climate Change (DECC) to take forward the recommendation of the Government-commissioned Hayes McKenzie report on Analysis of How Noise Impacts are considered in the Determination of Wind Farm Planning Applications. The intention is to produce a final version of the Good Practice Guide for publication early in 2013, which will supplement the ETSU-R-97 document where used for wind turbine noise assessments.

3.102 In order to carry out a noise assessment in line with the ETSU Guidance, the following steps are required:

- specify the number and locations of the wind turbines;
- identify the locations of the nearest, or most noise sensitive, neighbours; developers shall ensure that permission is obtained from the selected sites and that residents are provided with a complete description of the wind monitoring process.
- measure the background noise levels as a function of site wind speed at the nearest neighbours, or a representative sample of the nearest neighbours. Developers shall ensure adequate wind shielding of the microphones and shall install weather stations alongside sound recording equipment, thereby minimising potential contamination of the data by rainfall. Developers shall ensure that background noise levels are taken across the year and not just limited to a one or two week period during one season only. Developers shall send the results to South Kesteven District Council as evidence of baseline data and ensure that residents are provided with copies prior to the equipment being dismantled.
- determine the day time and night time noise limits from the measured background noise levels at the nearest neighbours;

- specify the type and noise emission characteristics of the wind turbines;
- calculate noise emission levels due to the operation of the turbines on the proposed development as well as the contribution to cumulative noise emission levels from other nearby wind farms as a function of site wind speed at the nearest neighbours;
- compare the calculated wind farm noise emission levels with the derived noise limits and assess in the light of planning requirements.

3.103 For all large and medium scale wind developments (or smaller developments if requested by South Kesteven District Council) a noise assessment will be required, and in order to be considered acceptable, the predicted noise levels at receptor points (e.g. residential dwellings) shall be within the ETSU-R-97 recommended noise limits, once mitigation measures have been applied. Noise assessments by windfarm developers must consider wind sheer when estimating the likely noise impact on nearby residents. The level of noise considered acceptable is dependent on the background noise levels recorded in the vicinity of the receptors, e.g. residential dwellings. Developers shall provide the planning authority with all data taken as part of the wind monitoring. This will ensure transparency and provide the authority with a baseline upon which the assessments are undertaken.

3.104 Guidance on undertaking noise assessments for small scale wind turbines is contained in Guidance prepared by Renewables UK, *Small Wind Planning Guidance: A good Practice Guide* (November 2011).

Amplitude modulation and wind sheer

3.105 To date there is no nationally agreed guidance on the assessment of 'amplitude modulation', and the Institute of Acoustics states that it is not able to recommend methods of assessment or prediction of potential amplitude modulation due to the lack of available evidence (IOA, 2012). However, the IOA is in the process of consulting on a potential suitable approach to assessing Amplitude Modulation, which shall be referred to when available. Until this guidance is published, the ETSU guidance will remain the appropriate approach to noise assessment of wind energy proposals but developers shall demonstrate that neither Amplitude Modulation nor wind sheer will cause nuisance to residences and livestock

Vibration

3.106 The potential negative impact of vibration to nearby receptors shall be assessed and shown to be not unduly burdensome by developers by reference to comparable developments

Mitigation

3.107 Where construction noise has been identified as a likely concern, consideration shall be given to mitigation measures such as:

- restricting general hours of working to avoid sensitive periods such as evenings and weekends; locating temporary site compounds as far as practically possible from neighbouring residential dwellings and other 'sensitive receptors';
- fitting construction plant with appropriate noise control equipment, for example, silencers, mufflers and acoustic hoods;
- using site terrain and material stockpiles to screen work locations providing a site contact number for local residents to use in the event of any particular concerns.

3.108 Where operational noise is predicted to occur at nearby residential dwellings or other receptors, the most appropriate form of mitigation, if the development is still to proceed, is the iterative

design of the wind farm or relocation of the wind turbine(s) to achieve an acceptable noise impact on nearby residents and other receptors.

Wind turbines have potential to cause noise impacts at nearby properties and also vibration. Developers shall specify the precise details (make, model, drawings) of the turbines proposed. In order to determine whether noise impacts are acceptable in light of existing background noise levels, applicants are required to undertake a noise impact assessment in line with the ETSU Guidance, to support planning applications for large and medium scale wind energy developments (and also small developments if requested by South Kesteven District Council).

Due to the current uncertainties over the prediction of excess Amplitude Modulation noise components, the Council will seek to impose appropriate conditions to ensure adequate protection from Amplitude Modulation to nearby residents.

Potential negative impacts of vibration shall be assessed by developers by reference to comparable developments.

D. Sources of further information

- Department of Trade and Industry (1996) Assessment and Rating of Noise from Wind Farms (ETSU-R-97).
- Department of Energy and Climate Change (2011) National Policy Statement 3: Renewable Energy Infrastructure (EN-3) http://www.official-documents.gov.uk/document/other/9780108510793/9780108510793.pdf
- Communities and Local Government (2004) Planning for Renewable Energy: A Companion Guide to PPS22: http://www.communities.gov.uk/publications/planningandbuilding/planningrenewable
- Institute of Acoustics (2012) Discussion Document on "A Good Practice Guide to the applications of ETSU-R-97 for wind turbine noise assessment".

Socio-economics

A. Key planning considerations

3.109 Wind turbines have potential to create a range of positive and negative socio-economic effects, depending on the location, siting and design of the development. The main socio-economic considerations are outlined below.

Local economy and employment

3.110 The National Policy Statement for Renewable Energy Infrastructure (EN-3) highlights the positive contribution of wind energy installations to the local economy. Medium and large scale wind energy installations can contribute both in terms of offering a lucrative diversification option for farmers and landowners, and also through job creation, particularly during construction (operational turbines create very few , if any, local jobs and some are operated principally by the internet).

Recreation and Tourism

3.111 Potential impacts on recreation and tourism are a key consideration in the location and design of medium and large scale wind turbines. As wind energy installations tend to be located in rural areas, there is potential, to obstruct and restrict movement in the countryside. They can also affect views, and change the character of the landscape in which many rural recreation activities such as bird watching, angling and walking take place.

3.112 Medium and large scale wind energy installations have the potential to affect tourism in the local area, and can cause both positive and negative effects. Potential negative effects include restricting the use of the countryside, particularly during construction, and changing views from a popular tourism site nearby.

South Kesteven Context

3.113 South Kesteven has a population of approximately 133,800 (2011). Outside of the main town of Grantham, and three market towns, the district is largely rural in nature, with 40% of South Kesteven's population living in rural areas[20]. The majority of local employment-generating development is located in the four largest towns, and Objective 8 of the South Kesteven Core Strategy (2010) encourages appropriate employment and diversification schemes to assist the rural economy.

3.114 The District attracts valuable tourism, particularly to Stamford, Grimesthorpe Castle and Belvoir Castle, Belton House and along the Grantham Canal, as well as tourism related to golf and coarse fishing. The Core Strategy highlights the intention to promote tourism within rural areas of the District, in order to facilitate sustainable rural diversification. Tourism contributes £117 million per annum to South Kesteven's economy[21].

3.115 South Kesteven includes extensive areas of countryside which are popular destinations for walking, cycling horse riding and fishing. There is an extensive network of public rights of way and bridleways across the District, and National Cycle Network routes through Grantham and Stamford. There are a number of historic parks and gardens located around Grantham and Grimsthorpe, and an extensive network of accessible woodland between Grantham and Bourne[22].

[20] South Kesteven District Council (2010) *South Kesteven Core Strategy.*
[21] South Kesteven District Council website, accessed August 2012: http://www.southkesteven.gov.uk/
[22] South Kesteven District Council/Sheils Flynn (no date given) South Kesteven Green Infrastructure Strategy.

B. Guidance

Local economy and employment

3.116 For large wind energy development, the Council will require developers to undertake an assessment to accurately quantify the potential employment which will be created by the wind energy development. This shall include an assessment where possible of the potential for local job markets to benefit from the job creation associated with the development. Other economic activity associated with the proposal, e.g. procurement of resources and construction contracts and investment in the local area shall also be outlined in the assessment.

Recreation

3.117 To determine the potential impact on recreation in the locality, prospective wind energy developers must consult a range of recreational groups, through questionnaires and/or consultation workshops. These recreational users may include, but are not limited to: walkers, horse riders, mountain bikers, 4X4 off-road users, bird watchers and anglers. The feedback received from these user groups shall inform the design and layout of the proposed development to minimise any impact on existing use of the area. For small scale wind energy development, targeted consultation specific to the immediate locality of the proposed turbines(s) is considered appropriate.

3.118 There is no statutory minimum separation between a wind turbine and public right of way or bridleways. The PPS22 Companion guide recommends that the total height of the turbine (to blade tip) plus 10% is considered an acceptable separation distance from public rights of way. This is called the 'falling over' measurement. In the case of bridleways, guidance published by the British Horse Society (BHS) states that as a starting point when assessing a site and its potential layout a separation distance of four times the overall turbine height should be applied for National Trails and Ride UK routes, as these are likely to be used by equestrians unfamiliar with turbines, and a distance of three times overall height from all other routes, including roads, with a minimum distance of 200m. In addition, PPS22 Companion Guide recommends that turbines shall be a located at a distance that ensures that turbine blades do not overhang a public right of way or bridleway.

Tourism

3.119 For medium and large scale wind energy installations, any potential direct and indirect impact on tourism shall be identified and assessed by prospective wind energy developers. Where adverse impacts are identified, mitigation shall be proposed to minimise these impacts, and could include:

- amendments to the location/layout of the wind turbines to reduce impacts on views from tourist destinations (see Landscape section for more details);
- amendments to the location/layout of the wind turbines to avoid locations which attract significant tourism.

Developers shall complete an assessment of social and economic impacts for all large and medium scale wind energy proposals. Where recreational impacts are likely, the relevant user groups shall be consulted, and the developer shall indicate how the design and layout of turbines has been designed to minimise impacts on recreation and tourism. Wind turbines shall be located at a distance equivalent to at least the height of the turbine plus 10% from any rights of way. In the case of bridleways there should be a minimum separation distance of 200m, with the aim of achieving a distance of three times the overall height of any turbine.

C. Sources of further information

- Department of Energy and Climate Change (2011) National Policy Statement 3: Renewable Energy Infrastructure (EN-3) http://www.official-documents.gov.uk/document/other/9780108510793/9780108510793.pdf
- Communities and Local Government (2004) Planning for Renewable Energy: A Companion Guide to PPS22: http://www.communities.gov.uk/publications/planningandbuilding/planningrenewable

Shadow Flicker

A. Key planning considerations

3.120 In sunny conditions, rotating wind turbine blades can cast an intermittent shadow. When experienced through a narrow window opening, this can, under certain conditions, cause a phenomenon known as 'shadow flicker'. This can not only cause a nuisance to nearby residents but also in some cases has been known to aggravate medical problems e.g. migraine and epilepsy[23]. A definition and explanation of shadow flicker is given in the *Companion Guide to Planning Policy Statement 22* (ODPM, 2004). Paragraph 73 of the Technical Annex on Wind (Onshore) to the Companion Guide states that that:

3.121 "*Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as 'shadow flicker'. It only occurs inside buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the site. Although problems caused by shadow flicker are rare, for sites where existing development may be subject to this problem, applicants for planning permission for wind turbine installations should provide an analysis to quantify the effect. A single window in a single building is likely to be affected for a few minutes at certain times of the day during short periods of the year*".

3.122 As outlined in *National Policy Statement 3: Renewable Energy Infrastructure*, the likelihood of shadow flicker occurring will depend on a number of factors, including:

- the direction of the residence relative to the turbine(s);
- the distance from the turbine(s);
- the turbine hub-height and rotor diameter;
- the time of year;
- the proportion of daylight hours in which the turbines operate;
- the frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon); and
- the prevailing wind direction.

3.123 In Britain, the potential shadow flicker area is limited to within 130 degrees either side of north for each turbine (ODPM, 2004). In addition, shadow flicker effects have been proven to occur only within ten rotor diameters[24] of a turbine (ODPM, 2004, DECC 2011). Therefore, if a turbine has a rotor diameter of 80m, shadow flicker will not occur beyond 800m from the turbine.

3.124 Shadow flicker can be caused by small, medium and large scale wind turbines. Under the terms of the Feed-in Tariff eligibility, small wind systems must be certified under the Microgeneration Certification Scheme (MCS) and the installation must also be carried out by an installer who is MCS certified. MCS standard MIS 3003 defines in detail the correct method to assess shadow flicker for small scale wind energy installations and if there are neighbouring properties within the range in which shadow flicker could be an issue, the applicant shall provide evidence of the calculation to demonstrate compliance to the standard.

[23] A planning appeal at Flixborough, North Lincolnshire (APP/Y2003/A/09/2105130/NWF) was dismissed on the grounds of the serious adverse effect on the health and well being of nearby residents.

[24] Rotor diameter = the diameter of the swept area of the turbine blades.

B. Guidance

3.125 The potential for adverse shadow flicker effects can be avoided by ensuring that wind turbines are located at least 10 rotor diameters away from occupied buildings. Where wind turbines are proposed within 10 rotor diameters of an existing occupied building, a shadow flicker assessment shall be carried out by the applicant[25].

3.126 Where significant shadow flicker effects are predicted on properties within 10 rotor diameters of a turbine, mitigation measures that shall be considered include:

- changing the location of turbines within the selected site;
- screening affected properties through tree/ shrub planting or the use of blinds;
- shutting down the turbines during periods when shadow flicker is predicted to occur.

3.127 There are no guidelines or criteria regarding the acceptable frequency and duration of shadow flicker. Some countries have taken the approach of quantifying acceptable limits, for example, in Northern Ireland, Best Practice Guidance to PPS18: Renewable Energy (Department for the Environment, 2009) states that:

"Shadow flicker at neighbouring offices and dwellings within 500m shall not exceed 30 hours per year or 30 minutes per day."

3.128 However, a recent DECC study of shadow flicker evidence (DECC, 2011) examined the limits that have been set in countries including Germany, Denmark and the Netherlands and found that there is considerable variation. The study highlights the difficulties associated with quantifying acceptable levels of shadow flicker duration due to latitudinal variations affecting impacts and the potential for wind energy developments to be rejected on the basis of shadow flicker where mitigation measures could provide a complete solution to the issue. As such, for the purposes of this guidance, it was not considered appropriate to select and apply a quantifiable limit for what constitutes acceptable shadow flicker occurrence. The significance of impacts of proposed wind energy developments shall be considered on a case by case basis.

For large and medium scale developments wind turbines shall be located at least ten rotor diameters away from potentially affected properties. Where this is not possible, appropriate mitigation measures shall be put in place to reduce or eliminate the effects of shadow flicker to an acceptable level. For small scale developments whether this requirement will apply will be at the discretion of South Kesteven District Council.

D. Sources of further information

Further information on shadow flicker is provided within the following documents:

- Department of Energy and Climate Change (2011) National Policy Statement 3: Renewable Energy Infrastructure (EN-3) http://www.official-documents.gov.uk/document/other/9780108510793/9780108510793.pdf
- Communities and Local Government (2004) Planning for Renewable Energy: A Companion Guide to PPS22: http://www.communities.gov.uk/publications/planningandbuilding/planningrenewable

[25] See National Policy Statement 3, Renewable Energy Infrastructure

Aviation

A. Key planning considerations

3.129 Wind turbines have the potential to affect aviation through interference with ground-based air traffic control radar and aircraft landing systems, and through creating an additional collision risk for low flying aircraft. With respect to ground-based aircraft tracking radar, rotating wind turbine blades present a moving target to the radar beam which can either be mistaken for an aircraft or create 'clutter' which interferes with the radar's ability to track aircraft in the same sector. The proliferation of wind turbines can have a significant cumulative effect on the safety and efficiency of aircraft tracking. For ground-based radar to be affected, it must be in line of sight of the wind turbine blades.

B. South Kesteven Context

3.130 Whilst there are no commercial airports within South Kesteven, there are a number of RAF air bases in the District and nearby (e.g. RAF Barkston Heath). There is also a number of private aircraft landing areas. Discussions with the consultees listed below shall inform the location and design of wind installations.

C. Guidance

3.131 In line with Civil Aviation Authority (CAA) policy (see CAP 764 below), the CAA's Directorate of Airspace Policy (DAP), the Ministry of Defence (MoD Defence Estates), and the National Air Traffic Services (NATS) shall be consulted on wind turbine proposals at an early stage in the planning process; together with the owners/operators of all private landing areas. Consultation with these bodies shall be conducted using a standard Renewables UK (formerly BWEA) proforma (see below). This is submitted to the MoD which consults with its various departments, as well as with the CAA and NATS.

3.132 The majority of small wind energy developments may not affect radar/aviation assets or cause any physical obstruction to aircraft on account of their small scale. However it is best practice to consult the MOD, CAA and NATS if a proposed turbine is 11 metres to blade tip or taller, and has a rotor diameter of two metres or more.

3.133 Other tools that may assist in identifying potential aviation issues with a proposed development include the RESTATS Website and NATS website (see reference list below).

3.134 As stated in the UK Government's National Policy Statement on Energy (2011) *"Assessment of aviation or other defence interests should include potential impacts of the project upon the operation of communications, navigation and surveillance (CNS) infrastructure, flight patterns, other defence assets and aerodrome operational procedures. It should also assess the cumulative effects of the project with other relevant projects in relation to aviation and defence".*

3.135 Where significant impacts on aircraft or radar are identified, these may potentially be mitigated by alterations to the planned turbine height and/or the exact location and spacing of turbines on a site. Developers must submit clear evidence that CAA, MoD and NATS have been involved in the siting and design of proposed wind development.

Consultation shall be undertaken with the CAA, MOD, NATS and the owners/operators of private landing areas for all proposed wind turbines 11m to blade tip or taller. Developers shall seek to address any potential impacts on aviation interests prior to a planning application being submitted.

D. Sources of further information

Further information on these issues and the standard consultation pro-forma to be used are available as follows:

- Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1).
- Civil Aviation Authority (2012) CAP 764: CAA Policy and Guidelines on Wind Turbines, http://www.caa.co.uk/application.aspx?catid=33&pagetype=65&appid=11&mode=detail&id=2358
- Renewables UK (no date given) Wind Farm Developers Application Proforma: http://www.bwea.com/aviation/proforma.html
- RESTATS Website - https://restats.decc.gov.uk/cms/aviation-safeguarding-maps/
- NATS website - www.nats.co.uk/nats-services/issues/windfarms/self-assessment-maps/

Telecommunications

A. Key planning considerations

3.136 Wind turbines have the potential to interfere with telecommunications and broadcast links through physical obstruction or the reflection of signals. Key impacts which shall be considered include:

- Interference with the reception of terrestrial television and radio services at residences in the surrounding area.
- Interference with point-to-point transmission links operated by telecommunications service providers in the area.

Television interference

3.137 Interference with the reception of terrestrial television services can cause a pale shadow or shadows to appear to the right of the main picture on a viewer's television screen, known as 'ghosting'. However, digital signals are much better at coping with signal reflections, and digital television pictures do not suffer from this problem (OFCOM, 2009). The operation of the terrestrial television network is also dependent upon Rebroadcast Links, i.e. radio dish links that typically connect the main television transmitters with the outlying relay stations. If a dish link is broken by an intervening tall structure, like a wind turbine, then this could have an effect on the local operation of the television broadcast network.

Telecommunications interference

3.138 Interference with the telecommunications links can reduce signal availability in some areas, as a result of the wind turbines creating a physical barrier to fixed link signals. Turbines can also affect mobile phone signals especially when located near to transmitters/receivers (static installations). This can be a particular problem in rural areas where broadband services are critical to the infrastructure.

B. Guidance

Television

3.139 Scattering of signals mainly affects terrestrial TV and radio broadcasts. A wind turbine development can affect terrestrial television reception up to 5km from the wind farm. Terrestrial television transmissions for domestic reception within the UK are the joint responsibility of the BBC and OFCOM. The BBC can provide an online approximate assessment of populations that may suffer interference from a wind farm at a specified location (See BBC wind farm assessment tool). However in the case of large scale wind farm proposals it may also be appropriate to undertake an on-site assessment of potential impacts.

3.140 Small wind energy proposals are unlikely to cause significant effects on television signals. Renewables UK advises that any turbine under 15m in height, and those which do not have metal blades, will have no effect on either television reception.

Telecommunications

3.141 Interruption to telecommunications can be caused where turbines physically block fixed link signals and mobile phone signals. The developer must take steps to identify any line of signals that cross a potential site. Links crossing the site shall be identified by consultation with OFCOM and telecommunications providers, who will check whether any part of the wind farm site falls within 0.5 – 1.0km (depending on the signal frequency) of the path of a fixed link or a mobile phone transmitter/receiver. If a link or transmitter/receiver is identified, OFCOM will instruct the developer to contact the appropriate operator. Developers must also contact any local utility

companies and emergency services who depend upon any telecommunications coverage in the area.

Mitigation

3.142 Where site investigations reveal a likely impact on domestic radio or TV reception, various solutions are possible including upgrading of domestic aerials or delivery of the signal by other means, for example by cable or satellite. A member of the Confederation of Aerial Industries Ltd should be able to advise on technical solutions.

3.143 Where fixed links or mobile phone transmitters/receivers are potentially affected by a proposed wind development, a detailed investigation of the likely impact must be undertaken. It is often possible to mitigate impacts by careful siting of individual turbines within a site so that turbine blades avoid a buffer zone, typically 100m either side of the signal path. Failing this, it may be necessary for the developer to fund the re-routing of the signal around the turbine(s).

Developers must undertake consultation with the BBC, OFCOM and identified telecommunications operators to identify the potential for any television, radio or telecommunication links (including mobile phone signals) to be affected. Where potential impacts are identified, appropriate mitigation measures must be put in place to eliminate or substantially to reduce the impacts.

C. Sources of further information

Guidelines and further information on television reception problems caused by wind farms are provided in:

- Renewables UK (2011) Small Wind: Planning Guidance – A Good Practice Guide.
- OFCOM (2009) Tall Structures and their impact on Broadcast and Other Wireless Services.
- BBC Online Wind Farm Assessment tool: http://www.bbc.co.uk/reception/info/windfarm_tool.shtml

4. The Application Process

Introduction

1.37 This final chapter:

- addresses the different consenting mechanisms for wind energy developments;
- describes the circumstances under which Environmental Impact Assessment (EIA) is required and signposts further information on its procedures;
- outlines when a Habitats regulation Assessment may be required and the key issues that should be considered;
- provides a summary of who to consult and when during the development process;
- outlines the role of planning conditions and planning obligations.

Consenting Mechanisms

1.38 As outlined in **Chapter 1**, wind energy developments with an electrical output capacity of **more than 50MW** are determined by the Secretary of State for Energy and Climate Change following a recommendation by the National Infrastructure Directorate of the Planning Inspectorate. The Council will be a statutory consultee in these cases. Proposals of this scale require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008 (and amended by the Localism Act 2011).

1.39 **Wind farms of less than 50MW capacity** will need to apply for planning permission to South Kesteven District Council under the Town and Country Planning Act 1990.

1.40 **Micro-scale turbines (i.e. typically below 2.5kW)** which are sited on buildings, or within their proximity can be installed under Permitted Development Rights (i.e. they do not require planning permission), as long as specified limits and conditions are met. These are set out in **Box 4.1** below.

Box 4.1: Permitted Development Criteria for Micro-scale Wind Turbines

For domestic building mounted turbines, the criteria include:-

- The house is detached; or the building is detached if it is in the grounds of a dwellinghouse or block of flats;
- The turbine must comply with Microgeneration Certificate Scheme (MCS) Planning standards;
- Only one turbine is permitted;
- There is no other wind turbine or air source heat pump on the site;
- The top of the turbine blade is no more than 3 metres above the top of the house (excluding the chimney), or 15 metres above the ground, whichever is the lesser;
- The lowest part of the turbine blade is at least 5 metres above the ground;
- All of the turbine is at least 5 metres from the edge of the householder's property;
- The turbine's swept area must not exceed 3.8 m^2;
- The site must not be designated as a Scheduled Monument, a Listed Building, nor within a National Park, and Area of Outstanding Natural Beauty, the Broads, a World Heritage Site or an area designated for the enhancement and protection of the natural beauty and amenity of the countryside.
- The site must not be aviation or defence safeguarded land,
- If in a Conservation Area, the turbine must not be sited on a wall or roof slope which fronts a highway.

For domestic standalone pole-mounted turbines, the criteria include:-

- The turbine must be located within the curtilage of a house or a block of flats.
- The turbine must comply with MCS Planning standards;
- Only one turbine is permitted;
- There is no other wind turbine or air source heat pump on the site;
- The top of the turbine blade is no more than 11.1 metres above ground;
- All of the turbine is at least 5 metres above the ground;
- All of the turbine is at least 1.1 times the height of the turbine away from the edge of the householder property;
- The turbine's swept area must not exceed 3.8 m2;
- The site must not be designated as a Scheduled Monument, a Listed Building, nor within a National Park, and Area of Outstanding Natural Beauty, the Broads, a World Heritage Site or an area designated for the enhancement and protection of the natural beauty and amenity of the countryside.
- The site must not be aviation or defence safeguarded land,
- If in a Conservation Area, the turbine must not be nearer to any highway which bounds the curtilage than the part of the house or block of flats which is nearest to that highway.

1.41 This summary is not fully comprehensive and reference must be made to the detailed legislation (Statutory Instrument 2011 no.2056, The Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2011).

Grid Connection

1.42 As outlined in **Chapter 2**, the District Network Operator (DNO) (Western Power Distribution) is responsible for establishing the connection between the substation and the grid and this forms part of a separate consenting process. The works required to connect a wind turbine development to the local electricity distribution network can either form permitted development, require the submission of a separate planning application for permission, or an application for consent to the Secretary of State for Energy and Climate Change under Section 37 of the Electricity Act 1989. Developers must however provide information on the proposed route and method for the grid connection to the proposed wind energy development with their planning application for turbines (even if they do not require consent for the grid connection from South Kesteven District Council) and as part of any EIA. It is also recommended that the EIA (if required) shall undertake a scoping assessment of the potential impacts of the proposed grid connection route to identify if it likely to have any significant environmental effects.

Environmental Impact Assessment (EIA)

1.43 Certain wind energy development proposals require Environmental Impact Assessment (EIA) under EIA Regulations which implement the EU's Environmental Impact Assessment Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC.

1.44 Individual wind turbines and windfarms are listed under Schedule 2.3(i) of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011. For Schedule 2 developments, if requested, the Council will provide a 'Screening Opinion' on the need for EIA, based on consideration of whether the project is likely to give rise to significant environmental effects. The EIA Circular 2/99 states that significant effects are more likely for developments which:

- are of more than local importance;
- are in particularly vulnerable or sensitive locations;
- have unusually complex and potentially hazardous environmental effects.

1.45 In judging the likelihood of significant effects, the Council will also have regard to the thresholds and criteria set out in the Regulations. Schedule 2 of the EIA regulations states that EIA ***may*** be required for the installation of more than two turbines or the hub height of any turbine or height of any other structure exceeds 15 metres. If this threshold is not met, EIA will not normally be required, although it may still be necessary for development in an environmentally 'sensitive area'[26] or when directed by the Secretary of State. If the proposed development exceeds the threshold, it does not mean that an EIA is automatically required. This is a matter for further consideration by the Local Authority with reference to the additional guidance set out in Circular 2/99.

1.46 Circular 2/99: Environmental Impact Assessment which provides guidance on the EIA regulations states that the likelihood that a proposed wind farm development will have significant effects will generally depend upon the scale of the development, its visual impact, and potential noise impacts. It goes on to state that EIA is ***more likely*** to be required for commercial developments of five or more turbines, or more than 5MW of new generating capacity. Further information on the procedural requirements for EIA, including how to prepare an Environmental Statement is available in the CLG publication *Environmental Impact Assessment: A Guide to Procedures (2000)*[27] and the Institute of Environmental Management and Assessment: *Guidelines for Environmental Impact Assessment* (2004)[28].

1.47 It is clear that a number of small wind system developments may fall below the criteria for an EIA. Consultation shall be undertaken with the South Kesteven District Council at the earliest opportunity to clarify if EIA is required or not. Even if an EIA is not required, in all cases some environmental assessment will be necessary to assess whether there are any issues. Assessments that are still likely to be required include a landscape appraisal of the potential landscape and visual impacts of the proposal and ecological surveys to determine the habitats and presence of any protected species using the site. This list is not exhaustive as the level of assessment required will be proportional to the impacts anticipated to arise from the development proposals.

Rochdale Envelope

1.48 The 'Rochdale Envelope[29]'is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been resolved at the time when the application is submitted. In the case of wind turbine developments this may relate to the proposed height of the turbine (s) i.e. the maximum and minimum height to blade tip and nacelle (hub) and their exact location etc. It is for the planning authority to determine what degree of flexibility can be permitted in each particular case having regard to the specific facts of the application. It is essential however that sufficient information is provided to enable the main or the likely significant effects on the environment to be assessed and the mitigation measures described. If an assessment concludes that a particular effect falls within a fairly wide range, a 'worse case' approach should be adopted and this should feed through into the proposed mitigation measures.

Design and Access Statements

1.49 A Design and Access Statement must accompany a planning application and explain the design thinking behind an application, in order to demonstrate and justify how the proposed design or use is appropriate to its surrounding area. In the context of wind energy developments, it is important

[26] As defined in the Regulations, and including National Parks, AONBs, SSSIs, World Heritage Sites, and scheduled monuments.
[27] Available from http://www.communities.gov.uk/publications/planningandbuilding/environmentalimpactassessment
[28] Available from http://www.iema.net/shop/product_info.php?products_id=6962
[29] Further information on the Rochdale Envelop is set out in http://infrastructure.independent.gov.uk/wp-content/uploads/2011/02/Advice-note-9.-Rochdale-envelope-web.pdf

that this Statement details the design strategy for the location and layout of the proposed development.

1.50 The statement shall also show how the accessibility of the development has been considered to ensure that it is as inclusive as possible. The statement shall clearly illustrate the process behind the development of the proposal and shall not be just a description or list of technical specifications. It is not a substitute for drawings and other information required as part of the planning application or EIA (where appropriate) itself. Further guidance on preparing Design and Access Statements is contained on South Kesteven District Council's website[30].

Habitats Regulations Assessment (HRA)

1.51 Habitats Regulations Assessment (HRA) refers to the assessment required under the 'Habitats Regulations'[31] of the potential effects of a plan or project on one or more European nature conservation sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs):

- **SPAs** are classified under the European Council Directive 'on the conservation of wild birds' (79/409/EEC; 'Birds Directive') for the protection of **wild birds and their habitats** (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species).
- **SACs** are designated under the Habitats Directive and target **particular habitats** (Annex 1) **and/or species** (Annex II) identified as being of European importance.

1.52 It is also government policy that potential SPAs (pSPAs), candidate SACs (cSACs) and Ramsar sites should be included within the assessment.

- **Ramsar sites** support internationally **important wetland habitats** and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971).

1.53 For ease of reference during HRA, these three designations are collectively referred to as **European sites**, despite Ramsar designations being at the wider international level.

1.54 The overall purpose of the HRA is to conclude whether or not a project (e.g. a wind energy proposal) or plan would adversely affect the integrity of the site in question. This is judged in terms of the implications of the project or plan for a site's 'qualifying features' (i.e. those Annex 1 habitats, Annex II species, and Annex I bird populations for which it has been designated). Significantly, HRA is based on the precautionary principle - where uncertainty or doubt remains, an adverse impact must be assumed.

1.55 The HRA for the South Kesteven Core Strategy identified two European sites within the district that could potentially be affected by development – Baston Fen SAC and Grimsthorpe SAC. Baston Fen consists of a 2km long main drain which retains a high population of Spined loach - Cobitis taenia. The Grimsthorpe SAC comprises around 0.35ha of the Grimsthorpe Estate and is the most northerly outpost for the wild flower early gentian - Gentianella anglica.

1.56 In line with good practice in HRA, sites that fall within a buffer of 10-15km of a Local Authority boundary shall be considered for assessment, in addition to those within the district. A further two European sites were identified within this buffer area around South Kesteven – Rutland

[30] http://www.southkesteven.gov.uk/index.aspx?articleid=2492
[31] Conservation of Habitats and Species Regulations 2010 (SI No. 2010/490).

Water SPA and Ramsar site and Barnack Hills and Holes SAC. These sites are designated for their important populations of wintering wildfowl and orchid-rich grassland respectively.

1.57 Wind energy developments could have a range of impacts on the various qualifying features of these SACs, SPAs and Ramsar sites, including:

- Physical loss or damage to habitat as a result of the development of the wind farm site and associated infrastructure such as access tracks.
- Non-physical disturbance from noise, vibration and water pollution – this is particularly likely to occur during the construction and decommissioning phases of a wind farm development and may be associated with construction vehicle movements as well as on-site activities.
- Biological disturbance – e.g. direct mortality of qualifying bird species as a result of bird strike from wind turbines.

1.58 If a proposed wind energy development has the potential to have a significant impact on the integrity of any of the European Sites, consultation must be undertaken with Natural England and South Kesteven to 'screen' the proposal. If any impacts cannot be screened out, it is necessary to undertake the more detailed appropriate assessment stage, which can involve identifying mitigation measures for any potential impacts identified. The third stage of the process involves undertaking an assessment where no alternatives exist and adverse impacts remain taking into account mitigation. It is necessary to identify 'imperative reasons of overriding public interest' (IROPI) and this stage should be avoided if at all possible as the test of IROPI and the requirements for compensation are extremely onerous.

Consultation

1.59 Prior to submitting an application, wind energy developers should hold pre-application discussions with South Kesteven District Council's Development Management Team. During this pre-application period, developers of at least large and medium scale developments should consult with the statutory consultation bodies, the general public (for example by attending parish council meetings and via public exhibitions) and relevant non-statutory stakeholders, in order to identify potential areas of concern and address them at an early stage in the project planning process. Table 4.1, below gives a list of consultees for developers. This list is not exhaustive and developers shall discuss relevant consultees further with the Development Management Team.

1.60 Once the Council's Development Management Team has received and validated an application, it will publicise and consult on the application. The statutory consultation bodies are set out by Government within the Town and Country Planning (General Development Procedure) Orders. The bodies listed in Table 4.1 will also be consulted at this stage by the Council.

Table 4.1 Selected statutory and non-statutory consultees

Consultation body	Areas of interest of particular relevance to wind energy development
Statutory consultees	
Environment Agency	Hydrology and hydrogeology, flood risk, abstraction licenses, discharge consents, contaminated land, air pollution
Local Internal Drainage Board (where	Flood risk and bridge crossings and culvert

Consultation body	Areas of interest of particular relevance to wind energy development
appropriate)	design
English Heritage	Heritage Assets
The Heritage Trust of Lincolnshire (Planning archaeology advisers to South Kesteven Council)	Heritage Assets
Natural England	Ecological Interests Landscape and Visual Amenity Recreation
Highways Agency	Trunk roads
Lincolnshire Highways Authority	All roads other than trunk roads, footpaths and bridleways
Ministry of Defence (MOD), National Air Traffic Services (NATS), Civil Aviation Authority (CAA)	Aviation Interests
Non-statutory consultees	
South Kesteven Environmental Health Officer	Noise
OFCOM	Telecommunications
BBC	Television
Anglian Water Company and Severn Water	Water resources
Local land owners	Private water supplies
Parish Council(s)	All issues
Campaign to Protect Rural England	Landscape, amenity, tranquillity or other valued aspects of rural areas.
Lincolnshire Wildlife Trust	Ecological Interests
Relevant wildlife bodies. RSPB (bird interest); Bat Conservation Trust (bat interest); Mammal Society (mammal interest) as advised by Lincolnshire Wildlife Trust, Natural England or County Ecologist.	Ecological Interests
Ramblers Association; British Horse Society	Recreation, especially footpaths and bridleways
Local Heritage/History societies	Heritage assets and historic landscape
Owners/operators of privately owned aviation landing areas	Aviation
Operators of telecommunications networks(including mobile phones)	Telecommunications

Consultation body	Areas of interest of particular relevance to wind energy development
Emergency services and statutory undertakers	Telecommunications

Planning Conditions

1.61 The purpose of planning conditions is to control development and to enable development which would otherwise be refused permission to go ahead. Certain conditions are also required by legislation (e.g. conditions putting a time limit on planning permission[32]).

1.62 Planning conditions are imposed by the local planning authority – i.e. South Kesteven District Council. The National Planning Policy Framework (NFFP) (para 206) requires planning conditions to be:

- *necessary;*
- *relevant to planning;*
- *relevant to the development to be permitted;*
- *enforceable;*
- *precise; and*
- *reasonable in all other respects.*
-

1.63 More detailed guidance on planning conditions for onshore wind energy development is available from the Department for Business, Enterprise and Regulatory Reform (BERR)'s Onshore Wind Energy Planning Conditions Guidance Note (2007).

1.64 Typical conditions that may be used for wind energy developments include:

- control of transport movements e.g. routeing, times of delivery during construction;
- management requirements, e.g. preparation, agreement and implementation of an Environmental Management Plan prior to construction commencing;
- limit construction activity to certain (specified) times of year to avoid any identified impacts on breeding, passage or wintering birds;
- watching brief – i.e. need for archaeologist and/or ecologist to be present prior to and/or during construction to safeguard environmental interests on site;
- design and materials of ancillary buildings, housing sub-stations, fencing and construction roads and areas
- size of turbines permitted (with reference to height and rotor diameter);
- colour and finish of turbines;
- noise limits at nearest properties (this may also cover amplitude modulation, wind shear and vibration concerns)
- monitoring requirements during operation, e.g. for noise levels, protected species monitoring etc;

[32] Sections 91 and 92 of the Town and Country Planning Act 1990 require the imposition of time-limiting conditions on grants of planning permission.

- control of the decommissioning and removal of turbines for large and medium scale turbines (requiring that the turbines are removed after a specified time period – typically 25 years or when they fall into disuse);
- the restoration and after use of the site.
- The restoration of temporary construction roads and work areas

1.65 The Council welcomes early discussion to establish planning conditions that may be relevant.

Planning Obligations (s106 agreements)

1.66 Planning obligations, also known as Section 106 (s.106) agreements[33], are private agreements negotiated between a developer and a local planning authority or unilateral undertakings by a developer to an local planning authority, which are intended to make acceptable, development which would otherwise be unacceptable in planning terms. It is a fundamental principle of the planning system that planning decisions must be decided according to the relevant planning issues and in accordance with the development plan. To be valid, the National Planning Policy Framework (NPPF) (para 204) requires that a planning obligation be:

- *"necessary to make the development acceptable in planning terms;*
- *directly related to the development; and*
- *fairly and reasonably related in scale and kind to the development.*

Planning conditions should only be imposed where they are necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects."

1.67 Planning obligations may take various forms, for example:

- they may **prescribe** the nature of development, e.g. providing additional infrastructure such as widened temporary access roads;
- they may **compensate** for loss or damage, e.g. contribute to compensatory open space or habitat lost to the proposed development;
- they may **mitigate** a development's impacts, e.g. correcting TV interference caused by wind turbines.

1.68 Where relevant, in the case of habitat management proposals for example, an agreement shall include appropriate management provisions, and allow for monitoring of both the impacts and the effectiveness of any mitigation or compensation measures, with scope to amend the provisions as necessary.

1.69 Contributions may either be in kind or in the form of a financial contribution. The impacts of a proposed development may extend beyond the immediate development site and planning obligations are more flexible than planning conditions in that they can be used to mitigate or

1.70 The Council welcomes early discussion to establish any planning obligations that may be relevant.

[33] Section 106 of the Town and Country Planning Act 1990.

Appendix 1

This appendix includes examples of other local authority's approaches to residential separation distances, as referred to on page 18.

Wiltshire Submission Core Strategy (submitted for examination 26th June 2012)

Proposed Changes to the Wiltshire Core Strategy (Policy 42) Pre-Submission Document

'Additional guidance will be prepared to support the implementation of Core Policy 42 to identify appropriate separation distances between wind turbines and residential premises in the interests of residential amenity, including safety. In the interim period, prior to the adoption of the guidance, the following minimum separation distances [1] will be applied:

If the height of the wind turbine generator is—

(a) greater than 25m, but does not exceed 50m, the minimum distance requirement is 1000m;
(b) greater than 50m, but does not exceed 100m, the minimum distance requirement is 1500m;
(c) greater than 100m, but does not exceed 150m, the minimum distance requirement is 2000m;
(d) greater than 150m, the minimum distance requirement is 3000m.

Shorter distances may be appropriate where there is clear support from the local community.'

Milton Keynes Council Adopted Wind Turbines SPD (July 2012)

Extract from Emerging Wind Turbine Policy

'2. Requirements for Minimum Distance from Residential Dwellings

(a) The "minimum distance requirement" means the necessary minimum distance between the wind turbine generator and residential premises, as set out in subsection (d).

(b) "Residential premises" means any premises the main purpose of which is to provide residential accommodation, including farmhouses.

(c) If a number of wind turbine generators are being built as part of the same project the minimum distance requirement applies to each wind turbine generator individually.

(d) If the height of the wind turbine generator is:
(i) 25m, the minimum distance requirement is 350m;
(ii) 100m, the minimum distance requirement is 1000m;
(iii) between 25m and 100m, the minimum distance requirement is pro-rata between (i) and (ii) above, according to its height; or
(iv) greater than 100m, the minimum distance requirement is projected between (i) and (ii) above, according to its height.

(e) The height of the wind turbine generator is measured from the ground to the end of the blade tip at its highest point.

(f) There is no minimum distance requirement if the height of the wind turbine generator does not exceed 25m.

(g) If planning permission is granted on the condition that the proposed wind turbine generator meets the minimum distance requirement under sub-section 2(d), the actual height of the wind turbine generator must not exceed the maximum height in relation to that minimum distance.