South Kesteven Local Plan

Appendix 3: Renewable Energy

1 Introduction

1.1 Under the Town and Country Planning Act 1990, local planning authorities are responsible for considering renewable and low carbon energy development proposals.

1.2 Before commissioning any renewable energy generation scheme it is advisable to contact the Planning Department to seek advice and to submit a pre-application for consideration.

1.3 This Appendix sets out specific criteria to be used for development management purposes in the determination of planning applications for solar, biomass/anaerobic digestion and wind energy facilities. Criteria to be used for these forms of renewable energy are set out in the blue boxes within this Appendix.

1.4 Domestic and non-domestic micro-generation equipment which meets certain specific criteria may fall under *The Town and Country Planning (General Permitted Development) (England) Order 2015 :*commonly referred to as 'permitted development rights'. As such, domestic and non-domestic wind turbine developments, active solar technology and biomass facilities which meet the specified criteria may not need planning permission.

1.5 The context to the Renewable Energy Policy in this Local Plan is provided by the National Planning Policy Framework (NPPF) 2012, the Planning Practice Guidance for Renewable and Low Carbon Energy 2015 and by Ministerial statements; in particular a Written Ministerial Statement made by the Secretary of State for Communities and Local Government on 18 June 2015.

2. Wind Turbines

2.1 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 to reflect the normal life of the turbine, 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.

2.2 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. 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.

2.3 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 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. There can be considerable variations in turbine heights and outputs depending on the make and manufacture of the machine used. For the purpose of this Appendix the scale of turbine set out in Table 2.1 will be used.

Table 2.1: Typical scales of individual wind turbines

Typical Scales of Wind Turbines	Typical Turbine Output	Approximate Turbine Height to Blade tip
Micro	**Less than 2.5 KW**	**Usually less than 10m**
Small	**1.5 to 50 KW**	**Up to 30m**
Medium	**50 KW to 1MW**	**30m – 100m**
Large	**1-3 MW or over**	**Usually over 100m**

2.4 **Large, medium and even some small** turbines are usually connected to the national grid. Micro and some small scale turbines are 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.

2.5 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 Appendix, 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.

2.6 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. Two blade horizontal turbines are also available as well as vertical axis machines (Figure 2c) – although the latter two tend to be less common.

2.7 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.
- 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).

2.8 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.

2.9 **Medium and some small 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 storagesystem if off-grid.
- An anemometer mast (although this may not be required for smaller turbines).

2.10 It should be noted that wind turbines, regardless of their design are often not suitable in urban areas and/or any green space within those urban areas due to the separation distance required. In order for a turbine to operate efficiently it needs a ‘clean’ flow of air. Buildings create a great deal of turbulence and ‘wind shear’ that

hampers the electricity generation capacity of the turbine. Turbines also generate noise and in some cases shadow-flicker, and in an urban area it is likely that a turbine would be too close to other properties to be considered acceptable.

The planning issues

2.11 Although wind turbines can be beneficial to some aspects of the environment through their ability to generate renewable energy there are also other negative considerations that need to be taken on board. A wind turbine is probably the most visually intrusive of all renewable energy technologies, mainly due to its height and movement of its blades. The siting of any wind turbine should be carefully chosen to minimise the impact on the landscape.

2.12 Choosing an appropriate siting can be hard as the need to minimise the impact on the landscape is often difficult to reconcile with the need to ensure an uninterrupted flow of wind to the turbine. The flow of wind to the turbine should be free from obstructions such as trees, buildings or hills in the prevailing wind direction to minimise turbulence. The problem arises as the best operational location for a wind turbine may be in a more exposed setting but this may be the worst location in terms of landscape impact.

2.13 This section only applies to wind turbine development which is subject to planning consent. 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 section outlines the key planning issues associated with wind energy and provides criteria to be applied in line with Local Plan policy RE1 regarding the siting and design of developments within South Kesteven. The criteria covered are:

- Landscape and visual amenity
- Residential amenity
- Cumulative impact
- Ecology, Biodiversity and ornithology
- Historic Environment
- Hydrology
- Traffic and Transport
- Noise and Vibration
- Socio-economic and other impacts
- Shadow Flicker
- Aviation
- Telecommunications

- Agricultural land

2.14 Medium to large scale wind turbine proposals may be required to be accompanied by an Environmental Impact Assessment (EIA) under the EIA regulations. An EIA will assess the potential impact of the proposal on all identified relevant matters such as landscape biodiversity, telecommunications etc. The scope of an EIA will be established by the District Council and the applicant as part of a Scoping stage (where this is requested) before the EIA is prepared to ensure that all relevant matters are considered.

Landscape and Visual Amenity

Landscape and Visual Impact Assessment (LVIA)

2.15 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. Any visualisations shall be undertaken in accordance with the latest best practice guidance, including Scottish National Heritage Visual Representations of Windfarms and Landscape Institute's Advice Note 01/11 or any guidance which supersedes it.

2.16 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.

Wind Energy Criteria 1

The Council requires that a LVIA is provided 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 Heritage Visual Representations of Windfarms and the Landscape Institute's Advice Note 01/11 (Photography and Photomontage in Landscape Visual Impact Assessment as a guide)). The LVIA shall cover all the points above. Information on landscape and visual impacts shall also be provided for non-EIA development. Visualisations should be based on photography with a 70/75 mm lens. The Council welcomes pre-application discussions with developers to agree the scope of LVIA required.

Site selection

2.17 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 particularly relates to large scale turbines and 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 locations in close proximity to industrial areas, infrastructure corridors or on brownfield sites;
- avoid overbearing or overwhelming visual impacts on residential properties or settlements;
- for large and medium 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 where they would overwhelm important cultural or historic landmark features;
- 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.

Wind Energy Criteria 2

The Council requires that site selection shall have regard to the local landscape character. The LVIA or landscape and visual assessment/appraisal shall show how the location takes into account local landscape character and addresses the points outlined in paragraph 2.17 above

Layout and design of turbines

2.18 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. 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 to 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 for medium and large wind turbines;
- 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
- 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.

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 reasonably possible;
- if lighting is required on turbines for aviation purposes, use infra-red lighting where possible to minimise visual impacts at night ;
- Where impact to ecology and/or ornithology is unavoidable, mitigation should be implemented and the habitats concerned should be reinstated and, wherever possible, enhanced post construction.

Wind Energy Criteria 3

The Council requires that the layout and design of turbines and ancillary features shall address the points outlined in paragraph 2.18 above.

Residential Visual Amenity

2.19 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), residential amenity is also affected by noise, which is addressed later in this chapter. There is no published guidance, for England, on how impacts on residential visual amenity should be assessed. No individual has the right to a particular view per se and the visual effect of a wind farm does not have to be 'unacceptably overbearing', 'oppressive' or 'unpleasantly overwhelming and unavoidably present in main views' for there to be a material harm to residential visual amenity.

2.20 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 only turbine tips of large and medium scale turbines 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.

2.21 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. 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. The study area should be agreed with the Planning Authority at the earliest opportunity.

Wind Energy Criteria 4

The Council requires that 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 30m to blade tip), or for any scheme where their impact on residential visual amenity is seen by the Council to be an issue. The study area should be agreed with the Planning Authority.

Cumulative impacts

2.22 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 requires a proportionate approach, tailored to the scale of turbine and should be undertaken in accordance with Scottish Natural Heritage's Guidance 'Assessing the Cumulative Impact of Onshore Wind Energy Development' (2012).

2.23 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 dominating a settlement with wind turbines at close quarters leading to an overbearing or overwhelming presence of turbines.

Wind Energy Criteria 5

The Council requires that a cumulative impact assessment, taking account of the points in paragraph 2.23 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. The study area will need to be agreed with the Planning Authority but may need to be up to 30km or 35km from the proposal for large scale developments

Ecology, Biodiversity and Orinthology

2.24 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.

2.25 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. The Local Plan policy ENV2 aims to “facilitate the conservation, enhancement and promotion of the biodiversity and geological interest of the natural environment throughout the District” and development proposals should avoid adverse impact on ecological and geological sites and where impact cannot be avoid, mitigation or compensation shall be sought.

2.26 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) (Baston Fen and Grimsthorpe Park) as well as Local Wildlife Sites, Local Geographical Sites and other sites of high biodiversity value. 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 and Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations) or the Protection of Badgers Act 1992.

<u>Ecological Impact Assessment (EcIA)</u>

2.27 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.

2.28 Developers shall undertake an ecological impact assessment (EcIA) in accordance with best practice guidelines published by the Institute of Ecology and Environmental Management 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. The assessment of impacts of decommissioning will be controlled through the imposition of a planning condition on a planning permission.

2.29 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, where impacts upon them may be significant in terms of either legislation or policy, shall be identified and be the subject of more detailed assessment.

2.30 Consultation shall be conducted with Natural England and the RSPB to inform the scope of the Ecological Impact Assessment for large and medium scale developments. Small schemes may need an assessment if there is a reasonable possibility of ecology being affected and this should be discussed and agreed with the South Kesteven Development Management team. The Lincolnshire Environmental Records Centre holds information on non-statutory sites not available elsewhere and should be contacted to provide information for assessments on the 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.

Wind Energy Criteria 6

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

Biodiversity

2.31 For sites of international nature conservation value – namely Baston Fen and Grimsthorpe Park SACs, wind energy schemes within their vicinity, which will depend on the qualifying interests of the site and the nature/scale of the development, 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.

2.32 For national sites, wind energy schemes will need to demonstrate that they will not have a material adverse effect on a SSSI. Strict measures would be taken to ensure that harmful effects on SSSIs are avoided, minimised or mitigated against. For local sites wind energy schemes will need to demonstrate that they will not have a material adverse effect on a Local Wildlife Site, Site of Nature Conservation Importance or other county level designation. Strict measures should be taken to ensure that harmful effects on local sites are avoided, minimised or mitigated against.

2.33 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.

2.34 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 and those identified as of principal importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Many of these habitats and species extend outside protected sites, and consideration must be given to potential impacts when developing any scheme.

2.35 Areas where uncultivated peat wetlands 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. Wind farm developments in close proximity to ancient woodland where, particularly in the construction phase, there may be significant adverse effects particularly along the edge of the ancient woodland may also be unacceptable.

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

Wind Energy Criteria 7

The Council requires that developers shall assess the effects of potential schemes, alone or cumulatively, on statutory and non-statutory designated nature conservation sites, habitats and species and identify measures to avoid, minimise 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 provide the local planning authority with enough information on the likely significant effects of the scheme to enable the local planning authority to complete an assessment in accordance with the Habitats Regulations.

Birds

2.37 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. Where appropriate 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. The cumulative impacts on birds must also be assessed in relation to other proposed, approved or operational wind energy schemes and other developments.

2.38 In relation to small scale wind energy developments, householders and installers should be aware that all bird nests are fully protected from damage, destruction or interference whilst in use or 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).

2.39 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.

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

Wind Energy Criteria 8

The Council requires that an assessment of potential impacts on bird populations is undertaken for all developments where a potential impact may occur. Consultation shall be undertaken with 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 and the British Wind Energy Association. The cumulative impacts on birds must also be assessed in relation to other proposed, approved or operational wind energy schemes /other developments.

Bats

2.41 All bats and their places of shelter are protected under UK and European legislation. 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.

2.42 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 must also be assessed in relation to other proposed, approved or operational wind energy schemes.

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

Wind Energy Criteria 9

The Council requires that bat surveys are undertaken 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 must also be assessed in relation to other proposed, approved or operational wind energy schemes and other developments.

Minimising and mitigating impacts

2.44 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 impacts on 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 should be minimised;
- wind turbines shall be sited at least 50m away from linear features, except in the case of small turbines, 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 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.

The restoration and enhancement of surrounding habitats should be carefully considered so that sensitive species are not attracted into close proximity with turbines which may place them at risk of collision or barotrauma. Translocation of species should only be carried out as a last resort when no other options to avoid or mitigate harm are available.

Wind Guidance Note 10

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 above in paragraph 2.44 where appropriate.

Historic Environment Considerations

2.45 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. 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.

2.46 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.

2.47 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 heritage assets, leading to adverse effects on their significance including:
- interruption of short and long distance views of heritage assets;
- interruption of key (generally visual) relationships between heritage assets that have a functional or symbolic link;
- changes in the perceived scale and visual prominence of heritage assets – for example historic church spires and towers;
- reduction in the ability to appreciate and understand heritage 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;
- 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.

Historic landscape character

2.48 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. In the Fen area 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.

2.49 Heritage 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 Church of St. Peter Claypole 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 are particularly sensitive to visual intrusion (see Belton House and Park Setting Study).

Heritage assets

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

- 92 Scheduled Monuments;
- 110 Grade I, 195 Grade II* and 1843 Grade II Listed Buildings;
- 2 Grade I, 3 Grade II* and 5 Grade II Registered Parks and Gardens(9); and
- 47 Conservation Areas.

2.51 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

2.52 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); and The National Trust.

2.53 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).

Physical impacts

2.54 Physical impacts on heritage 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.

Wind Energy Criteria 11

The Council will have a presumption in favour of preserving heritage assets intact and in situ.

2.55 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.

Non-physical impacts

2.56 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 archaeological 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.

Wind Energy Criteria 12

The Council requires that developers shall provide detailed assessment of all heritage assets within and close to the proposed site, including all heritage 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 for an assessment is agreed.

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

- NPPG – Conserving and Enhancing the Historic Environment
- Historic England – Historic Environment: Good Practice Advice in Planning Note 2 Managing Significance in Decision-Taking in the Historic Environment, 2015
- Historic England – Historic environment Good Practice Advice in Planning Note 3 – The Setting of Heritage Asses, 2015
- Historic England (formerly English Heritage) – Seeing History in the View, 2011
- Institute for Archaeologists (IfA) Codes, Standards and Guidelines

2.58 The Council will generally expect assets with theoretical visibility 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. Large and medium scale wind energy developments may require an assessment within 10km radius for significant assets with particular sensitivity to visual impacts – such as designed landscapes with key structured views.

2.59 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. 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).

Wind Energy Criteria 13

The Council will require heritage assets with theoretical visibility to or from the proposed development within 5km to be assessed for potential impacts, this to be applied flexibly in line with the proposed scale and likely visibility of the scheme, and within 10km radius for large and medium scale wind energy developments for significant heritage assets with particular sensitivity to visual impacts.

Impacts on historic landscape character

2.60 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. 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.

Wind Energy Criteria 14

The Council requires that 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 historic landscapes.

Site selection

2.61 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. 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 unacceptable harm to 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 unacceptable harm to areas with numerous heritage assets and high archaeological potential to reduce the likelihood of physical impacts;
- avoid unacceptable harm to areas with intricate and small-scale historic landscapes (such as well-preserved field patterns), and where historic features are the only scale reference;
- avoid unacceptable harm to undeveloped skylines visible from key heritage assets and key long distance views into heritage assets
- avoid unacceptable harm to designed and other significant views from and towards parks, gardens, designed landscapes and historic buildings – particularly those where visibility/extensive views were intrinsic 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;
- consider the potential for indirect impacts on the setting of heritage assets including noise and shadow flicker.

Wind Guidance Note 15

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 Council requires that the siting principles outlined in paragraph 2.61 above shall be adhered to.

Layout and design of turbines

2.62 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.

2.63 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).

Wind Energy Criteria 16

The Council requires that 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 paragraphs 2.62 and 2.63 above.

Layout and design of ancillary features

2.64 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 where possible follow, the grain of historic field patterns and other land divisions;
- route cables and tracks to avoid or minimise physical impacts on archaeological sites and reduce visibility from heritage 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).

Wind Energy Criteria 17

The Council requires that developers shall take into account the principles listed in paragraph 2.64 above when considering the layout and design of ancillary features.

Cumulative impacts

2.65 When designing a wind energy development it is important to consider how the scheme fits with other schemes under construction, consented, the subject of a valid planning application or formally notified at scoping stage (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.

Wind Energy Criteria 18

The Council requires that a cumulative assessment of effects on the historic environment would be undertaken in parallel with that required for landscape and visual effects.

Hydrology

2.66 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.

2.67 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.

2.68 The National Planning Policy Framework highlights the need to consider when determining an application for development whether flood risk will be increased elsewhere and only consider development appropriate in areas at risk of flooding. Wind energy development is not precluded from Flood Zones 1, 2 or 3. The Environment Agency should be consulted in relation to all large and medium scale wind energy developments. For small scale proposals it should be consulted where certain criteria are met.

2.69 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.

2.70 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 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 and groundwater

2.71 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 effect need to apply to the Environment Agency for a Flood Consent.

2.72 The potential risk posed to controlled waters from piling should be considered, particularly where the wind turbine(s) is located on brownfield land or is located over a vulnerable aquifer.

Flood zones

2.73 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, applicants should consider the flood resilience of the development and in particular ensure that all sensitive electrical equipment is

installed above the predicted flood levels. This will ensure the development remains operational during flood events. If this is to be done by land raising greater than 100 sq m, an assessment of impacts on third parties from any displacement of flood water or interruption of flood flow routes will be required. The Environment Agency shall be consulted on this assessment.

Drainage

2.74 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, which may include minimising impermeable areas or ensuring access roads are constructed using permeable materials where possible, in consultation with the Environment Agency, the Local Lead Flood Authority (Lincolnshire County Council) and Internal Drainage Boards.

Contaminated land

2.75 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 South Kesteven District Council (Environmental Protection) and the Environment Agency. Documents to which the applicant shall refer when dealing with potential for contaminated land are listed below.

Environmental Management Plan (EMP)

2.76 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.

Wind Energy Criteria 19

Large and medium wind energy developments have the potential to affect hydrology and local water resources. The Council requires that developers shall undertake an assessment to determine the likelihood of hydrological effects, and the Environment Agency, the Local Lead Flood Authority, 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.

Traffic and Transport

2.77 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, although these may largely be temporary and not permanent:

- 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;
- temporary effects on pedestrian and highway safety.

2.78 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.

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

Road Network

2.80 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. 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.

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

2.82 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. .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.

2.83 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.

2.84 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.

Wind Energy Criteria 20

The Council requires that developers take account of guidance on Transport Assessment 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

2.85 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. 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;
- minimise 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;
- avoid siting turbines where motorists need to pay particular attention to driving such as the immediate vicinity of road junctions, sharp or unexpected bends and crossings for pedestrians and cyclists. The associated road network should be reviewed with particular attention being paid to the complexity of junctions, traffic flows and the possible presence of short headways between vehicles. Information on existing
  'accident black-spots' can be obtained from the police service.

Wind Energy Criteria 21

The Council requires that the site selection process for large and medium scale wind energy developments shall address the points outlined in paragraph 2.85 above.

Minimum set back distance

2.86 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).

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

Wind Energy Criteria 22

The Council requires that 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, unless otherwise agreed with the appropriate authorities.

Design and Restoration of construction road works

2.88 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'. 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.

Noise and Vibration

2.89 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.

2.90 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.

2.91 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.

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

1. 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. Potential impacts associated with aerodynamic noise include.

   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 conditions that occur typically during the night and large wind turbines. 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.

2. 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.

2.93 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.

Noise impact assessment

2.94 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, although many people consider that ETSU does not take account of the adverse health impacts of low frequency noise.

2.95 The Institute of Acoustics published a "Good Practice Guide to the application of ETSU-R-97 for wind turbine noise assessment" in May 2013. The Guide supplements ETSU-R-97 providing guidance on the technical issues relating to ETSU-R-97 noise assessment procedures.

2.96 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.

2.97 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.

2.98 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).

<u>Amplitude modulation and wind sheer</u>

2.99 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

2.100 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 and other available information.

Mitigation

2.101 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.

2.102 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 Energy Criteria 23

Wind turbines have potential to cause noise impacts at nearby properties and also vibration. The Council requires that 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 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 and other available information.

Socio-economic and other impacts

2.103 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

2.104 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

2.105 Potential impacts on recreation and tourism are a key consideration in the location and design of medium and large scale wind turbines. They can affect views, and change the character of the landscape in which many rural recreation activities such as bird watching, angling and walking take place.

2.106 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. Positive effects have been attributed to visitor centres co-located with some of the first large turbines in the country. However, this is very unlikely to be the case for current or future development.

2.107 The District attracts valuable tourism, particularly to Stamford, Grimsthorpe 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 £156 million per annum to South Kesteven's economy.

2.108 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 is a number of historic parks and gardens in the District and an extensive network of accessible woodland between Grantham and Bourne.

Local economy and employment

2.109 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

2.110 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.

2.111 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) is considered an acceptable separation distance from public rights of way (this is called the 'falling over' measurement) with the minimum distance often being taken to be that the turbine blades do not overhang a public right of way. In the case of bridleways, the PPS22 Companion Guide refers to a 200 metre exclusion zone around bridle paths to avoid frightening horses suggested by the British Horse Society (BHS) but that some negotiation should be undertaken if this is difficult to achieve. The BHS published advice on bridleways and wind farms in 2013, which 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 advised in the PPS22 Companion Guide being seen as the minimum, where it is shown in a particular case that this would be acceptable.

Tourism

2.112 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 and Visual Amenity section for more details)
- amendments to the location/layout of the wind turbines to avoid locations which attract significant tourism.

Sports Facilities

2.113 Wind turbines located on playing fields or located near to playing fields and other sports facilities can have an impact on the ability to play sport at that site.

Where relevant, this should be assessed using the guidance published by Sport England on the impact of wind turbines on sports facilities.

Wind Energy Criteria 24

The Council requires that developers shall complete an assessment of social and economic impacts for all large and medium scale wind energy proposals. Where recreational impacts are possible, 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 from any rights of way. In the case of bridleways a distance of three times the overall height of any turbine should be the starting point with a minimum separation distance of 200m where this would be difficult to achieve.

Shadow Flicker

2.114 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, for example, migraine and epilepsy. A definition and explanation of shadow flicker is given in the Companion Guide to Planning Policy Statement 22 (ODPM, 2004).

2.115 Paragraph 73 of the Technical Annex on Wind (Onshore) to the Companion Guide states that that:
"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".

2.116 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.

2.117 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(19) (ODPM, 2004, DECC 2011). Therefore, if a turbine has a rotor diameter of 80m, shadow flicker will not occur beyond 800m from the turbine.

2.118 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.

2.119 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.

2.120 Where 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.

2.121 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”.

2.122 However, a DECC study of shadow flicker evidence 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.

Wind Energy Criteria 25

The Council requires that where large and medium scale developments are located within ten rotor diameters away from potentially affected properties, the possible shadow flicker effects will be investigated and 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 the application of this requirement will be at the reasonable discretion of South Kesteven District Council.

Aviation

2.123 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.

2.124 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.

2.125 In line with Civil Aviation Authority (CAA) policy, 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 the CAA, MOD and DAP shall be conducted using a standard Renewables UK (formerly BWEA) proforma (see below), which is submitted to the MoD who consults its various departments, as well as with the CAA. NATS should be consulted separately, preferably to its e-mail address.

2.126 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. Further information is available from the NATS FAQ document on its website.Other tools that may assist in identifying potential aviation issues with a proposed development include the RESTATS Website and NATS website.

2.127 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".

2.128 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 or through technical mitigation. Developers must submit clear evidence that CAA, MoD and NATS have been involved in the siting and design of proposed wind development.

2.129 Any structure of 150 metres or more must be lit in accordance with the Air Navigation Order and should be appropriately marked. If an aviation stakeholder (including the MOD) made a request for the lighting of a structure below 150 metres in height it is likely that the CAA would support such a request, particularly if the request falls under Section 47 of the Aviation Act. It is the responsibility of the aviation stakeholder requesting aviation warning lighting to define the technical specification of such lighting. Where possible, infra-red lighting should be used to minimise visual impacts at night. Although infra-red lighting may satisfy MOD requirements it is unlikely to satisfy civil aviation requirements.

Wind Energy Criteria 26

The Council requires that consultation shall be undertaken with NATS for all wind turbine applications and with the CAA, MOD, East Midlands Airport 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.

Telecommunications

2.130 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; and
- Interference with point-to-point transmission links operated by telecommunications service providers in the area, including mobile phone and data services.

2.131 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. 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.

2.132 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.

2.133 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.

2.134 It is understood that turbines under 15 metres in height and those that do not have metal blades are unlikely to cause significant effects on television signals.

2.135 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

2.136 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.

2.137 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).

Wind Energy Criteria 27

The Council requires that for all wind energy schemes (except micro-generation schemes) 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.

Impact on agricultural land

2.138 Farming and the agro-food industry are key parts of the South Kesteven economy as they are for much of Lincolnshire. There should be no need to have to choose between productive farmland and wind power generation as there are other places where wind power generation can take place. I large scale wind energy schemes are to be allowed anywhere they should first and foremost be on derelict or brownfield land. After that they should preferably be on poor agricultural land defined as MAFF Grade 4 or 5.The NPPF, Planning Practice Guidance and the Ministerial Statement quoted above make it clear that permission should only rarely be given on 'Best and Most Versatile Agricultural Land' defined as MAFF Grades 1, 2 and 3A all of which are capable of growing a variety of arable and food crops. This is important when there is a rapidly increasing national population and a declining percentage of food grown in the UK

2.139 South Kesteven has a relatively dry climate and good soils which makes much of its farmland suitable for growing grain and food crops. In South Kesteven Grade 1, 2 and 3A land should be reserved for agricultural use. Much of the rest of South Kesteven's farmland is Grade 3b which is still defined as *"moderate quality agricultural land - Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year".*
It should be borne in mind that other parts of England do not have this rich farming asset and therefore may be more suitable for large scale ground mounted solar energy generation.

Wind Energy Criterial 28
The Council requires that any proposals in this District on agricultural land for wind turbines will:

- first be required to carry out an extensive search for derelict or brownfield sites – these could for example be former industrial sites, old quarries or former airfields. This test should not necessarily be confined to the District, in line the Wherstead appeal decision;
- second be required to carry out a search for poorer agricultural sites ie of Grades 4 and 5 . This test should also not necessarily be confined to the District;
- third be required to prove the MAFF agricultural grade classification for the proposed site and if it is Grade 3 whether or not it is Grade 3A or 3B. As there is no national mapping of these sub divisions, this will require a site survey using trail holes/augers produced by a qualified expert; and
- fourth, be required to prove why the site has to be located close to a particular power grid line and that there is spare capacity in that grid line.

The fact that land may have been left idle or fallow is no reason in its favour for removal from an assumed agricultural use. The Council will often ask an independent expert to verify the conclusion of a soil test report. Verification that land is Grade 3B will not in itself necessarily lead to consent. The argument that wind energy proposals are necessary for farm diversification will carry little weight as good farmland is a pure resource not just related to the present management of it. The Council will closely scrutinise any proposal that argues continued agricultural use of

a wind energy site as a deciding factor in its consent as it has seen little convincing evidence of this as a mitigating factor.

If a proposal includes the development of the best and most versatile agricultural land, where possible, wind energy developments shall be sited so as to minimise the impact on agricultural operations during its operation and also during associated installation, maintenance and decommissioning works (including the establishment of access tracks for example). As such, where opportunity exists:
i) Proposals should be sited at the periphery of fields rather than in central positions; or
ii) Where it is not possible to locate on the periphery, due to physical constraints or another material consideration rendering such positioning unviable, the development should be sited in a strategic position which avoids unnecessary disruption to agricultural operations.
c) At the end of the operational life of the installation, all equipment should be removed in its entirety and the land restored to its former use.

The Application Process

2.140 This section covers: 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; and outlines the role of planning conditions and planning obligations.

Consenting Mechanisms

2.141 Developers of wind turbines or 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.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. Key criteria are set out below:

Permitted Development Criteria for Mirco-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 dwelling house or block of flats;
- The turbine must comply with Mirco-generation 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 is at least 5 metres from the edge of the householder's property;
- The turbine's swept area must not exceed 3.8sqm;

- The site must not be designated as a Scheduled Monument, a Listed Building, nor an area designated for the enhancement and protection of 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 stand-alone pole-mounted turbines, the criteria include:

- The turbine must be located within the curtilage of a house or 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 the 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 3.8sqm;
- The site must not be designated as a Scheduled Monument, a Listed Building, nor an area designated for the enhancement and protection of 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 of block of flats which is nearest to that highway.

2.142 This summary is not fully comprehensive and reference must be made to the detailed criteria set out in the Town and Country Planning (General Permitted Development) (England) Order 2015).

Grid Connection

2.143 As outlined above, 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.

2.144 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)

2.145 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. 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.

2.146 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' 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.

2.147 The National Planning Policy Guidance 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 DCLG publication Environmental Impact Assessment: A Guide to Procedures (2000)and the Institute of Environmental Management and Assessment: Guidelines for Environmental Impact Assessment (2004).

2.148 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

2.149 The ‘Rochdale Envelope‘ 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

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

2.151 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.

Habitats Regulations Assessment (HRA)

2.152 Habitats Regulations Assessment (HRA) refers to the assessment required under the ‘Habitats Regulations’(6)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 (and/or species identified as being of European importance.

2.153 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).

2.154 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.

2.155 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.

2.156 There are two identified 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 - Cobitistaenia. The Grimsthorpe SAC comprises around0.35ha of the Grimsthorpe Estate and is the most northerly outpost for the wild flower early gentian - Gentianellaanglica.

2.157 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 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.

2.158 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; and biological disturbance, for example the direct mortality of qualifying bird species as a result of bird strike from wind turbines.

2.159 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

2.160 There is a statutory duty to carry our pre-application consultation under the Localism Act Section 122 and the Development Management Order (section 3 and 4). Prior to submitting an application, wind energy developers should hold appropriate 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. Developers shall discuss relevant consultees further with the Development Management Team.

2.161 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.

Wind Energy Criteria 29

The Council requires that planning applications for large and medium scale developments should be submitted together with a statement of community involvement setting out how the community has been consulted on a proposal and what the outcome of this consultation was. This should include reference to the comments made through consultation and how the submitted proposal has sought to address concerns, or where agreement has not been reached on matters arising from consultation. The submission of a statement of community involvement for small scale developments will be at the discretion of the Planning Authority

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Planning Conditions

2.162 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). 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.

2.163 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).

2.164 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 ecologist to be present prior to and/or during construction to safeguard environmental interests on site;
- an archaeological scheme of works - i.e. programme of archaeological work in accordance with a written scheme of investigation;
- 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;
- control of the decommissioning and removal of turbines for large and medium scale turbines (requiring that the turbines and foundations 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; and
- notification to Defence Geographic Centre (for developments 21.3 metres in height, or greater, above ground level) of the location(s), height(s) and lighting status of the structure, the estimated and actual dates of construction and the maximum height of any construction equipment to be used.

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

<u>Planning Obligations (S106 Agreements)</u>

2.166 Planning obligations, also known as Section 106 (s.106) agreements, 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.

2.167 To be valid, the National Planning Policy Framework (NPPF) (para 204) and the Community Infrastructure Levy Regulations require 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 obligations 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.”

2.168 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.

2.169 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.

2.170 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 compensate for these off site impacts.

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

3 Solar Technologies

3.1Solar power can be split into two distinct categories:

• Solar Photovoltaic PV

• Solar hot water collectors - both types are discussed below.

3.2 Solar PV - Solar electricity systems capture the sun's energy using photovoltaic (PV) cells. The cells convert the sunlight into electricity, which can be used to run appliances and lighting. Solar PV cells are usually attached to the roofs or walls of a building, but can also be free standing within a designated area i.e. Solar Farm. Solar PV cells can also take the form of roof tiles. Each cell is made of one of two layers of a semi conducting material, most commonly silicon. When sunlight shines on the cells it creates an electric field across the layers. Solar cells do not need constant direct sunlight, and will still produce energy on even overcast days. However, the stronger the sunshine, the more electricity is produced. Similarly, the larger the area covered with solar cells, the more electricity is produced. In order to operate most efficiently, solar PV cells should face as close to due south as possible to maximise the hours of sunlight they will receive during the day. In the UK it is recommended that panels should be mounted at an angle of about 30° to 40° from the horizontal although, practically, the existing roof pitch often governs the angle. Any site chosen should be as free from shadow as possible. Trees, other buildings, chimneys, and even TV aerials can overshadow solar cells and reduce their efficiency. Solar PV cells are heavy, and if mounted on a building, you must be sure that the roof or walls are capable of taking the extra weight.

3.3 Solar Hot Water Collectors - Solar hot water systems use energy from the sun to heat water. Basically, a thermal fluid (water and anti-freeze) is pumped through the solar collector and heated. This hot fluid runs through a coil inside an insulated hot water tank and heats the water inside it. The hot water is then stored in the insulated tank ready to be used. There are two main designs of collectors used in the UK.

These are either:

• Evacuated tube collectors, or

• Flat plate collectors.

3.4 The most common type is an evacuated tube collector. These feature a series of tubes, which due to their cylindrical design can receive direct sunlight for a longer proportion of the day as part of them will usually be pointing at the sun. However flat plate collectors are easier to maintain, protrude less from a roof, and are cheaper. As with solar PV panels, solar hot water collectors ideally need to be installed on a south facing roof at an angle of around 30° to 40° from the horizontal for maximum efficiency. Any sitting chosen should be as free from shadow as possible. Trees, other buildings, chimneys, and even TV aerials can overshadow solar cells and

reduce their efficiency. Proximity to the hot water tank is important to minimise heat loss between the collector and the tank.

3.5 Tracker solar installations (those which move to follow the daily movement of the sun) may have additional impacts compared to static installations. All policies apply to both static and tracker installations: the criteria of each policy, where applicable, will be duly taken on board in relation to the specifics of a proposal.

3.6 Whilst the majority of the criteria within this section are applicable to all installations, some policies are only applicable to certain installations, such as ground mounted solar installations only. Where this is the case it is clearly indicated within the policies. Whilst general guidance on solar photovoltaic energy generation is set out in current Planning Policy Guidance (18 June 2015) this may well change over the period of the Local Plan and the following section covers how the Council will encourage and test proposals for all photovoltaic energy generation and transmission that require planning permission.

3.7 As with all forms of renewable energy if a local community comes forward with a serious proposal for solar energy generation of sufficient size to require planning permission this will greatly assist and favour the consideration of planning permission. However it will not obviate the tests that need to be applied as there could be adverse impacts upon particular sections of the community or heritage or landscape assets or upon adjacent communities.

Domestic proposals above the permitted development level

3.8 At present solar panels can be installed on the roofs of domestic properties or outbuildings or within their curtilage up to 9 square metres in area under permitted development regulations subject to detailed provisions under those regulations, However, if the site is within a conservation Area, a World Heritage Site or is on a Listed Building then permission may be required. Proposals that exceed the size limit are considered on their merits and/or harmful effects according to some of the factors applicable to larger scale developments below. The difference is that they are more likely to affect residential amenity.

3.9 The Council's preference is for solar panels on new dwellings to be integrated as part of the design of the dwellings and in this way blend in better with the townscape/village-scape. Developers will be encouraged to incorporate such an approach into their designs. Likewise proposals involving non domestic properties may well be permitted development and covered by the relevant regulations if under 1 megawatt capacity on roofs or under 9 square metres on the ground.

Large scale roof mounted proposals for industrial and commercial buildings

3.10 This category of renewable energy generation will be greatly encouraged by the Council. The UK Solar PV Strategy Part 2 was published by the Department of Energy and Climate Change in April 2014. The Ministerial foreword to the document states that:" *There are an estimated 250,000 hectares of south facing commercial roofs in the UK. With the obvious environmental benefits and financial advantages for any organisation installing solar PV it makes perfect sense to exploit this opportunity. We need to do more to encourage take up. So the Strategy we are publishing today clears the way for widespread use of mid-scale solar by using*

space on top of factories, supermarkets, warehouses, car parks and other commercial and industrial buildings. We will work with developers, commercial property owners, planning authorities, and the solar industry to cut red tape and sweep away barriers to making use of empty industrial spaces to provide the electricity we rely on every day. "

3.11 This approach of the Government at the time is very much the Council's approach subject only to planning safeguards in terms of the possible adverse impacts of glint and glare, damage to sensitive landscapes and townscapes including the settings of listed buildings and conservation areas and cumulative impact with other developments.

Large scale Ground mounted proposals (aka solar farms)

3.12 This category of possible solar pv energy generation whilst contributing substantially to total solar power generation nationally is also the most sensitive category particularly in this District. It is because of its adverse impacts, particularly on agricultural land, that the Government's clear preference in the UK Solar PV Strategy is for future expansion of solar PV power to be on commercial and industrial roof-space. This Council shares this policy. Nevertheless large scale ground mounted proposals may be acceptable subject to testing against rigorous criteria.

3.13 For the purposes of the Local Plan, large scale ground mounted proposals are defined as all those ground mounted proposals which are not permitted development although clearly the scrutiny of any proposals against the criteria is likely to be less the smaller the proposed development.

3.14 The following criteria for determining the acceptability of a large scale ground mounted solar PV have been developed in the context of the Planning Practice Guidance on Renewable and Low Carbon Energy dated 18 June 2015 and the Planning Update Written Statement by Mr Eric Pickles Secretary of State for Communities and Local Government HCWS488 dated 25 March 2015.

3.15 The technical requirements or preferences for a solar farm are acknowledged as:

- A preference for maximum sun exposure likely to favour south facing slopes or level ground
- Proximity to the national power grid of 32kv or 132kv. This does not necessarily imply immediate adjacency as there is simply a cost in buried cabling and power loss with increased distance
- Sufficient area to generate enough power to be economic
- Temporary vehicular access for construction and permanent vehicular access for servicing and maintenance
- A willing landowner seeking farm diversification

3.16 The possible harmful impacts of a solar farm will be assessed according to the following criteria:

- Visual impact on landscape or heritage settings

- Visual impact upon dwellings or communities

- Cumulative impact
- Noise
- Highways and safety
- Nature conservation
- Impact on agricultural land

3.17 In balancing the case for and against a proposal the amount of power to be generated is a key factor. Developers will be required to provide evidence based assessments of power generation based upon actual yield rather than simply installed capacity.

Visual Impact on Landscape or Heritage Assets

3.18 The Council will require a Landscape and Visual Impact Assessment (LVIA) for large scale ground mounted schemes. This should be in accordance with best practice guidelines published by the Landscape Institute and the level of detail will depend upon the sensitivity of the site. This will consider questions such as;

- Can the site be readily seen in views from heritage assets such as listed buildings and conservation areas?
- Can the site be readily seen in views from housing areas?
- Can the site be readily seen in long distance views in the landscape especially if the intervening landscape is of special significance

Any photograph based visualisations should use a 70-75 mm lens on a SLR camera as this is closest to what the human eye can see The assessment should take into account the impact of any glint, glare or colour of the solar panels and if they are rotatable the effect of the rotation.

Solar Energy Criteria 1
The Council requires a LVIA is required as part of an EIA for large solar farm energy developments. The required study area for the LVIA may vary depending on the size of development proposed (see Scottish Heritage Visual Representations of Windfarms and the Landscape Institute's Advice Note 01/11 (Photography and Photomontage in Landscape Visual Impact Assessment as a guide)). The LVIA shall cover all the points above. Information on landscape and visual impacts shall also be provided for non-EIA development. Visualisations should be based on photography with a 70/75 mm lens. The Council welcomes pre-application discussions with developers to agree the scope of LVIA required.

Visual Impact on dwellings or communities

3.19The visual impact upon any nearby dwellings or villages should be assessed as part of the LVIA, above including any effect of glint, glare or colour upon residential amenity or human health.Any proposed mitigating measures in the development such as peripheral landscaping should be taken into account as well as their establishment time and permanence.

Solar Energy Criteria 2
The Council requires that a residential visual amenity assessment, covering a study area of at least 2km from any proposed solar farm shall be undertaken. The study area should be agreed with the Planning Authority.

Cumulative Impact

3.20 Any proposals for ground mounted solar farms should consider the cumulative impact of any other such solar farms that are either visible or will be visible from the site or in views to the site. This analysis should consider any developments with permission but not yet constructed and any which have been officially notified at pre application stage. It will be a matter of judgement for the Council in considering whether cumulative impact renders a proposal unacceptable. There could also be cumulative impact with existing development. For example if there is an unsightly industrial development already located in a sensitive landscape area the construction of a solar farm adjacent could make an unacceptable combination in views.

Solar Energy Criteria 3

The Council requires that a cumulative impact assessment, taking account of the points in paragraph 3.20 above, shall be undertaken. This shall consider solar farm 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. The study area will need to be agreed with the Planning Authority.

Heritage Impact

3.21 Solar farm proposals need to take account of the rich heritage assets within and adjoining the District of South Kesteven.

Solar Energy Criteria 4

Further to Policy EN5 of the Local Plan, development on a heritage asset (designated or undesignated) or within its setting which would adversely impact upon the significance of the heritage asset (for example, by detracting from its established character or appeal, or by causing irreversible physical damage) should be avoided. In accordance with the NPPF, development must not lead to harm to or total loss of significance of a heritage asset, unless the tests set out in section 12 of the NPPF are met.

Noise impact

3.22 Noise may be emitted from the operation of active solar technology, for example from the operation of the associated invertors. Furthermore, 'tracker' solar technology which follows the daily movement of the sun may result in additional noise impact.

Solar Energy Criteria 5

The Council will require solar farm proposals to:
a) Be strategically sited so as to minimise the noise experienced by nearby residents and occupiers of business premises and important buildings (including, but not limited to hospitals and schools)
b) In any instance, operate with minimal noise output to avoid undue disturbance to nearby residents, wildlife and livestock. Where necessary, mitigation measures, such as the establishment of vegetation buffers for example, should be used to prevent adverse noise impact.

Highway Considerations

3.23 Solar farm development may have significant road transport requirements, particularly during construction but also through their operation.

Solar Energy Criteria 6

The Council will require that proposals for solar farms shall consider, and incorporate as appropriate, the following considerations:
a) The design and positioning of active solar technology should be carefully considered o avoid the potential nuisance of glint and glare onto high speed roads. Where vegetation is proposed as a form of mitigation against glint and glare, species which will provide effective screening all year round are preferable.
b) In relation to large scale ground mounted installations (commonly referred to as 'solar farms'), a construction statement should be prepared by the developer which forecasts the vehicle trips that are likely to be generated during construction and the routes which are likely to be used, so that the anticipated impact of the development upon traffic and highways safety can be considered. South Kesteven District Council may require further detailed information, such as a traffic management plan, if necessary.

Nature conservation considerations

3.24 The construction and operation of solar farms may effect biodiversity and nature conservation.

Solar Energy Criteria 7

The Council will require that proposals should demonstrate that due consideration has been given to the potential impacts of the proposal on local, national and international designated sites, including those outside the District. Where a proposal is likely to have adverse impacts, applicants should demonstrate how these potential impacts have been addressed in the proposal, with proposed mitigation measures being commensurate to the significance of the designation, in relation to the local, national, international hierarchy. This applies to all proposals, regardless of scale. In instances where a proposal would have an adverse effect on a protected habitat or species, the applicant should demonstrate that the need for and public benefits of the development clearly outweigh the harm caused, and that mitigation and/ or compensation measures can be secured to offset the harm and achieve, where possible, a net gain for biodiversity (see also paragraph118 of the NPPF).

Developers are encouraged to consider opportunities to achieve net biodiversity gains (i.e. gains in addition to any measures deployed to mitigate any adverse impacts that may result from the development), regardless of whether the proposal will result in adverse impacts in order to conserve, enhance and promote the biodiversity and geological interest of the natural environment throughout South Kesteven.

In relation to the above applicants will be required to undertake surveys and provide evidence as necessary in relation to the anticipated impacts of their proposal, including the impact of the loss of agricultural land on biodiversity. In instances where the evidence supplied includes uncertainty in relation to the anticipated impacts of a proposal, or in instances where there is a lack of evidence, a precautionary approach will be taken by South Kesteven District Council.

Habitat Regulations Assessment

3.25 Note: Proposals which have the potential to impact upon European sites require a Habitat Regulations Assessment, as per Regulation 61 of the Conservation of Habitats and Species Regulations 2010.

Aircraft Movements and Associated Activities

3.26 Developers of solar farm proposals must ensure that their operation avoids any potential effect on aircraft movement and associated activities.

Solar Energy Criteria 8

The Council will require that solar farm proposals shall demonstrate that the design and positioning of proposed solar installations have been carefully considered to avoid the potential nuisance of glint and glare to aircraft movements.

Impact on Agricultural Land

3.27 Farming and the agro-food industry are key parts of the South Kesteven economy as they are for much of Lincolnshire. There should be no need to have to choose between productive farmland and solar power generation as there are other places where solar power generation can take place. This would preferably be on the roofs of commercial or industrial buildings but if large scale ground mounted panels are to be allowed anywhere they should first and foremost be on derelict or brownfield land. After that they should preferably be on poor agricultural land defined as MAFF Grade 4 or 5.The NPPF, Planning Practice Guidance and the Ministerial Statement quoted above make it clear that permission should only rarely be given on 'Best and Most Versatile Agricultural Land' defined as MAFF Grades 1, 2 and 3A all of which are capable of growing a variety of arable and food crops. This is important when there is a rapidly increasing national population and a declining percentage of food grown in the UK.

3.28 South Kesteven has a relatively dry climate and good soils which makes much of its farmland suitable for growing grain and food crops. In South Kesteven Grade 1, 2 and 3A land should be reserved for agricultural use. Much of the rest of South Kesteven's farmland is Grade 3b which is still defined as *"moderate quality agricultural land - Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year".* It should be borne in mind that other parts of England do not have this rich farming asset and therefore may be more suitable for large scale ground mounted solar energy generation.

3.29 The NPPF (2012, paragraph 112), states: "*Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality and in preference to that of a higher quality*". Prior to considering agricultural land, prospective developers should undertake an extensive search of suitable derelict or brownfield sites, both within South Kesteven and in neighbouring areas. Following this, a search could be conducted of suitable sites of poorer agricultural land, namely grades 4 and 5; again, the extent of this search should be both within is search within the District and also cover neighbouring areas. The developer will be required to prove the MAFF agricultural grade classification for any proposed site, and if it is grade 3 whether it is grade 3a or 3b. This is likely to require a site survey using trial holes/augers, produced by a qualified expert, to the satisfaction of the Council. The fact that land may have been left idle or fallow is no reason in its favour for removal from its agricultural classification. The best and most versatile agricultural land (land in grades 1, 2 and 3a of the Agricultural Land Classification) should be protected in light of the positive contribution it makes to the character of the landscape and of the need to produce food locally due to climate change.

Solar Energy Criteria 9

The Council requires that any proposals in this District on agricultural land for solar farms will:

- first be required to carry out an extensive search for derelict or brownfield

sites – these could for example be former industrial sites, old quarries or former airfields. This test should not necessarily be confined to the District, in line the Wherstead appeal decision;

- second be required to carry out a search for poorer agricultural sites ie of Grades 4 and 5 . This test should also not necessarily be confined to the District;
- third be required to prove the MAFF agricultural grade classification for the proposed site and if it is Grade 3 whether or not it is Grade 3A or 3B. As there is no national mapping of these sub divisions, this will require a site survey using trail holes/augers produced by a qualified expert; and
- fourth, be required to prove why the site has to be located close to a particular power grid line and that there is spare capacity in that grid line.

The fact that land may have been left idle or fallow is no reason in its favour for removal from an assumed agricultural use. The Council will often ask an independent expert to verify the conclusion of a soil test report. Verification that land is Grade 3B will not in itself necessarily lead to consent. The argument that solar power is necessary for farm diversification will carry little weight as good farmland is a pure resource not just related to the present management of it. The Council will closely scrutinise any proposal that argues continued agricultural use of a solar farm site as a deciding factor in its consent as it has seen little convincing evidence of this as a mitigating factor.

If a proposal includes the development of the best and most versatile agricultural land, where possible, solar development should be sited so as to minimise the impact on agricultural operations during its operation and also during associated installation, maintenance and decommissioning works (including the establishment of access tracks for example). As such, where opportunity exists:
i) Solar technology should be sited at the periphery of fields rather than in central positions; or
ii) Where it is not possible to locate on the periphery, due to physical constraints or another material consideration rendering such positioning unviable, the development should be sited in a strategic position which avoids unnecessary disruption to agricultural operations.
c) At the end of the operational life of the installation, all equipment should be removed in its entirety and the land restored to its former use.

4 Dry Biomass and Anaerobic Digestion Facilities

Introduction

4.1 There are two main methods of producing energy from biomass for which the fuel can be wood, wood pellets or chips, straw, arable crops, plant and animal waste or general waste. These are:

- By combustion to provide direct heat or electricity production and
- Anaerobic decomposition to produce methane for direct fuel or electricity production

Combustion forms of biomass

4.2 Biomass is increasingly used for both boiler and Combined Heat and Power (CHP) applications to provide heat and hot water to residential properties and commercial premises. Many of the smaller investments will be permitted development or part of planning applications for other development, especially when they do not provide energy or power beyond that development itself. This part of the Local Plan is primarily concerned with biomass combustion proposals which involve conversion to electricity and the export of the electricity to the Grid. Such mini power stations can vary from a couple of boilers on a farm to a sizeable power station. Locally, the Sleaford Power Station just outside the District burns only straw and has a 38MW power production capacity (equivalent to say 13 large wind turbines) It is the largest straw burning power station in England and draws straw from farms within a 40 mile radius. A side benefit is the hot water it provides for heating facilities in the adjacent town of Sleaford including the public swimming pool, making it a CHP plant.

4.3 Anaerobic digesters that are reliant on the importing of food waste would not normally be suitable in remote rural locations in the District, as the waste would need to travel a considerable distance by road, and many of the smaller rural roads in South Kesteven are not suitable for sustained journeys by large vehicles.

4.4 Development which falls under The Town and Country Planning (General Permitted Development) (England) (Order) 1995 does not require planning permission. This section therefore only applies to development which is subject to planning consent.

4.5 It should be noted that proposals which include the generation of energy from waste are a County matter and as such will be dealt with by Lincolnshire County Council

Assessing Dry Biomass and Anaerobic Digestion Proposals

Surrounding Landscape and Townscape and Heritage Assets

4.6 The criteria below outlines the factors that will be taken into consideration when assessing dry biomass and anaerobic digestion proposals in relation to the surrounding landscape, and townscape When considering a proposal against these

factors, the individual impacts of the proposal will be taken into consideration, but also the likely cumulative impacts of the proposal. Proposals should also meet the relevant criteria in Policies EN1-5 of the Local Plan.

Biomass Energy Criteria 1

The Council will require appropriate biomass proposals to consider, and incorporate as appropriate, the following considerations:
Development which would result in adverse impact (individual or cumulative) upon the landscape/ townscape, either in terms of direct impacts or impacts upon the character of the landscape/ townscape, should be avoided. Direct impacts are those which affect the physical landscape/ townscape and include, for example, the removal of established vegetation or road modifications. Effects on character relate to the way in which and the extent to which the proposed development, alongside existing renewable energy developments, will affect the characteristics of the receiving landscape/ townscape. In instances where it is not possible to wholly avoid adverse impact, applicants should demonstrate that they have minimised the potential for adverse impact on the landscape/ townscape through consideration of both the direct effects and the effects upon the character of the landscape/ townscape: suitable mitigation measures should be proposed as necessary.

4.7 The criteria below outline the factors that will be taken into consideration when assessing dry biomass and anaerobic digestion proposals in relation to heritage assets. When considering a proposal against these factors, the individual impacts of the proposal will be taken into consideration, but also the likely cumulative impacts of the proposal. Proposals should also meet the relevant criteria in Policies EN1 of the Local Plan.

Biomass Energy Criteria 2

The Council will require appropriate biomass proposals to consider, and incorporate as appropriate, the following considerations:
Further to Policy EN1 of the Local Plan, development on a heritage asset (designated or undesignated) or within its setting which would adversely impact upon the significance of the heritage asset (for example, by detracting from its established character or appeal, or by causing irreversible physical damage) should be avoided.
In accordance with the NPPF, development must not lead to harm to or total loss of significance of a heritage asset, unless the tests set out in section 12 of the NPPF are met.

Residential and Visual Amenity

4.8 The criteria below outlines considerations in relation to residential and visual amenity that will be taken into account when assessing dry biomass and anaerobic

digestion proposals. When considering a proposal, both the individual and cumulative impacts will be taken into account.

Biomass Energy Criteria 3

The Council will require dry biomass and anaerobic digestion proposals to consider, and incorporate as appropriate, the following considerations (where applicable):

a) Where necessary and where opportunity exists, micro-siting should ensure that the existing built environment and/ or existing vegetation is utilised for screening. In the event that no existing screening is present or that the existing screening is insufficient, the proposal should incorporate screening measures which are proportional to the nature and level of impact and which are sympathetic to the local setting.

b) Cumulative visual impacts concern the degree to which proposed renewable energy development will become a feature in particular views or sequences of views. In order to prevent detrimental cumulative visual impacts it is desirable to include landscape mitigation, where necessary, which is appropriate and proportionate to the proposed development in terms of scale and design, including off site enhancements where necessary.

c) Appropriate materials, colours and design finishes should be used to achieve high design standards.

d) All external flues should be unobtrusive in terms of size, design and position.

e) The operation of the proposed facility should not result in notable dust and/ or smoke which negatively impacts upon sensitive receptors, such as residential dwellings.

As such:

i) Proposals should demonstrate that the prevailing wind direction at the site and the juxtaposition of the equipment in relation to any sensitive receptors surrounding the site have been duly considered; and

ii) Facilities which may generate dust from the deposition and/ or transfer of biomass within the site should aim to minimise the levels of dust expelled through design and micro-siting: for example, the drop off bay for biomass material could be closed rather than open air.

f) Proposals for commercial facilities should, as required, detail the measures that will be implemented in order to control air quality as well as the procedure for responding to any problematic air quality issues that arise.

g) The operation of the proposed facility should not result in odour which is unacceptable to sensitive receptors such as residential areas, recreational areas or businesses. Where applicable, developers should prepare an odour management plan which identifies measures to prevent adverse odour in the first instance and to mitigate against adverse odour in the second instance.

h) Security lighting should only be incorporated in a proposal where there is demonstrable need. In instances where security lighting is necessary, the lighting and all fittings should be minimal and discrete; the height at which light fittings are mounted should be minimal; the lighting should be designed so as to minimise light pollution and ‘spillage’; and light should be strategically directed so as to avoid nuisance to the occupiers or users of nearby buildings and disturbance to wildlife.

Noise impact

4.19 The criteria below outlines principles for the assessment of dry biomass and anaerobic digestion proposals in relation to noise impact. The Council's Environmental Health department will be consulted to assess the anticipated noise outputs of dry biomass and anaerobic digestion facilities and equipment in relation to relevant current guidance.

Biomass Energy Criteria 4

The Council will require proposals for dry biomass or anaerobic digestion equipment or facilities to:
a) Not result in noise levels which would be deemed unacceptable to occupiers of nearby residential buildings, schools, hospitals, business premises and well used public areas; and
b) Demonstrate how potential adverse noise impacts will be reduced and managed: this could, for example, be demonstrated through a noise management plan. Where necessary, mitigation measures, such as the establishment of vegetation noise buffers for example, should be used to prevent adverse noise impact.

Highway Safety Considerations

4.20 The criteria below outlines the factors, in addition to the Local Plan, NPPF and other relevant guidance that will be taken into consideration when assessing dry biomass and anaerobic digestion proposals in relation to highway safety. When considering a proposal against these factors, both the individual impacts of the proposal and the likely cumulative impacts of the proposal will be taken into consideration. The assessment of proposals will also be informed by formal representations received from consultees.

Biomass Energy Criteria 5

The Council requires that proposals should consider, and incorporate as appropriate, the following considerations (where applicable):

a) Access: Where possible, in relation to commercial/ staffed facilities, the primary access for deliveries and staff should avoid sensitive areas such as, but not limited to, residential areas and areas in close proximity to school entrances.
b) Site layout: The site layout should allow for turning and manoeuvring of all delivery and staff vehicles to take place on-site: it should not be necessary for vehicles to utilise the public highway for turning.
c) Construction: Where necessary, a construction statement should be prepared by the developer which forecasts the vehicle trips that are likely to be generated during construction and the routes which are likely to be used, so that the probable impact of the development upon traffic and highway safety can be considered.
d) Transport statement: Where necessary, a transport statement should be prepared by the developer which forecasts the vehicle trips that are likely to be generated by the operation of the facility and the routes which are likely to be used so that the probable impact of the development upon traffic and highway safety can be

considered. In instances where the impact upon the highway will be notable (for example, if the proposal is likely to generate a high volume of traffic), or in instances where the existing road network is unsuitable for the anticipated level, type or frequency of traffic, a detailed traffic management plan should also be prepared. Where necessary, the transport statement should include measures to mitigate against straw drop from vehicles which may have a detrimental impact on surface water drainage, leading to an increased risk of flooding.
e) Parking:
Where necessary, sufficient staff and visitor parking should be provided onsite: in line
with recognised parking standards, parking needs fora sui-generis use, such is a dry biomass or anaerobic digestion facility, will be assessed on the scheme's merits in relation to the demand for parking which is likely to be generated.

Nature Conservation Considerations

4.20 The criteria below outlines the factors, in addition to the Local Plan, NPPF and other relevant guidance that will be taken into consideration when assessing dry biomass and anaerobic digestion proposals in relation to biodiversity and nature conservation. When considering a proposal against these factors, both the individual impacts of the proposal and the likely cumulative impacts of the proposal will be taken into consideration. The assessment of proposals will also be informed by formal representations received from consultees.

Biomass Energy Criteria 6

The Council requires that proposals should consider, and incorporate as appropriate, the following considerations (where applicable):
Due consideration has been given to the potential impacts of the proposal on local, national and international designated sites, including those outside South Kesteven. Where a proposal is likely to have adverse impacts, applicants should demonstrate how these potential impacts have been addressed in the proposal, with proposed mitigation measures being commensurate to the significance of the designation, in relation to the local, national, international hierarchy. This applies to all proposals, regardless of scale.
In instances where a proposal would have an adverse effect on a protected habitat or species, the applicant should demonstrate that the need for and public benefits of the development clearly outweigh the harm caused, and that mitigation and/ or compensation measures can be secured to offset the harm and achieve, where possible, a net gain for biodiversity (see also paragraph118 of the NPPF).

Developers are encouraged to consider opportunities to achieve net biodiversity gains (i.e. gains in addition to any measures deployed to mitigate any adverse impacts that may result from the development), regardless of whether the proposal will result in adverse impacts in order to conserve, enhance and promote the biodiversity and geological interest of the natural environment throughout South Kesteven.

In relation to the above applicants will be required to undertake surveys and provide

evidence as necessary in relation to the anticipated impacts of their proposal. In instances where the evidence supplied includes uncertainty in relation to the anticipated impacts of a proposal, or in instances where there is a lack of evidence, a precautionary approach will be taken by South Kesteven District Council.

4.21 Note: Proposals which have the potential to impact upon European sites require a Habitat Regulations Assessment, as per Regulation 61 of the Conservation of Habitats and Species Regulations 2010.

Agricultural Land

4.22 The NPPF (2012, paragraph 112), states:

"*Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality".*

4.23 Prior to considering agricultural land, prospective developers should undertake an extensive search of suitable derelict or brownfield sites, both within South Kesteven and in neighbouring areas. Following this, a search could be conducted of suitable sites of poorer agricultural land, namely grades 4 and 5; again, the extent of this search should be both within is search within the District and also cover neighbouring areas. The developer will be required to prove the MAFF agricultural grade classification for any proposed site, and if it is grade 3 whether it is grade 3a or 3b. This is likely to require a site survey using trial holes/augers, produced by a qualified expert, to the satisfaction of the Council. The fact that land may have been left idle or fallow is no reason in its favour for removal from its agricultural classification. The best and most versatile agricultural land (land in grades 1, 2 and 3a of the Agricultural Land Classification) should be protected in light of the positive contribution it makes to the character of the landscape and of the need to produce food locally due to climate change.

4.24 The criteria below outlines the considerations in relation to agricultural land that will be taken into account when assessing dry biomass and anaerobic digestion proposals. When considering a proposal, both the individual and cumulative impacts will be taken into account.

Biomass Energy Criteria 7

The Council requires that proposals should consider, and incorporate as appropriate, the following considerations.
a) The advice as set out at paragraph 112 of the NPPF (2012) and follows the location search process set out in paragraph 5.23 above.
b) If a proposal includes the development of the best and most versatile agricultural land, where possible, development should be sited so as to minimise the impact on agricultural operations during its operation and associated installation and maintenance works.
As such, where opportunity exists:
i) Equipment/ facilities should be sited at the periphery of fields rather than in central positions; or

ii) Where it is not possible to locate on the periphery, due to physical constraints or another material consideration rendering such positioning unviable, the development should be sited in a strategic position which avoids unnecessary disruption to agricultural operations

Emissions/pollution

4.25 Full evidence-based details will be required of emissions from the combustion plant and planning conditions will be applied to control these emissions. These tests will be on an absolute level and also take into account proximity to housing, local communities and businesses.

Straw Drop

4.26 Experience of the straw catchment area for the Sleaford Power Station much of which falls within South Kesteven has increased awareness of the hazards of 'straw drop' on roads. The main risk is that of blocking surface water drains and a consequent exacerbation of flooding risk. The cost of remediating straw drop should fall to the operators and deliverers of the straw and not to the public authorities. At present local authorities are often involved in street and drain cleaning and in over-hanging tree reduction along roads at considerable public cost. Planning conditions to minimize straw drop are likely to include the compulsory netting of vehicles.

Fire risk

4.27 In the design of plants particular regard will need to be given to the fire risk from the storage and use of the methane gas in terms of both risk to workforce and to nearby buildings, people and activities. Fire risk also needs yo be assessed in relation to the stacking of straw and other material prior to use.

Storage on site

4.28 The storage and processing of raw materials on the site of an anaerobic power plant can lead to smell and vermin and measures to prevent/ control this may be required. This is especially the case with slurry or other animal waste

Balance of benefits and dis-benefits

4.29 Finally, in assessing the balance of benefits and dis-benefits of the proposal the Council will take into account the amount of power to be fed into the Grid from the project as well as any immediately local use of the power or heat for example in relation to local farms.

Appendix A: Abbreviations and Glossary

Abbreviations

AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
CAA	Civil Aviation Authority
DECC	Department of Energy and Climate Change
EIA	Environmental Impact Assessment
EU	European Union
HGV	Heavy Goods Vehicle
LCA	Landscape Character Assessment
LVIA	Landscape and Visual Impact Assessment
MOD	Ministry of Defence
MW	megawatt
NATS	National Air Traffic Services
NPPF	National Planning Policy Framework RSPB -
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection Area
SPD	Supplementary Planning Document SSSI - Site of Special Scientific Interest ZTV - Zone of Theoretical Visibility

Glossary

Abnormal Load - An 'abnormal load' is a vehicle that has any of the following: a weight of more than 44,000 kilograms; an axle load of more than 10,000 kilograms for a single non driving axle and 11,500 kilograms for a single driving axle; a width of more than 2.9 metres; a length of more than 18.65 metres

Aerodynamic Noise - noise emitted by a wind turbine due to the passage of air over the blades

Amplitude Modulation - sound modulated in amplitude when its level exhibits periodic fluctuations

Ancient Woodland - an area that has been wooded continuously since at least 1600 AD

Area of Outstanding Natural Beauty - is an area of countryside considered to have significant landscape value that has been specially designated by Natural England. No part of South Kesteven District is designated as an AONB: the closest is the Lincolnshire Wolds AONB

Background Noise - the ambient noise level already present within the environment in the absence of wind farm operation

Barotrauma - is physical damage to body tissues caused by a difference in pressure between a gas space inside, or in contact with the body, and the surrounding fluid. Barotrauma typically occurs when the organism is exposed to a significant change in ambient pressure

Biodiversity Action Plan - plans that set out a methodology to protect, conserve and enhance the diversity of wildlife. A UK BAP applies across the United Kingdom and South Kesteven is also covered by a local BAP (Lincolnshire BAP)

Conservation Area - areas of special architectural or historic interest, the character of appearance of which it is desirable to preserve or enhance. There are currently 48 conservation areas in South Kesteven

Core Strategy - document which sets out the long term spatial vision for the local planning authority area, and the spatial objectives and strategic policies to deliver that vision

Ecological Impact Assessment - assesses the potential effects of a development on habitats and species, particularly those protected by national and international legislation or considered to be of particular nature conservation importance

Environmental Impact Assessment - a procedure to be followed for certain types of project to ensure that decisions are made in full knowledge of any likely significant effects on the environment

Flood Zones - land assessed by the Environment Agency as being at low, medium or high risk of flooding .Flood Zone 1 comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding; Flood Zone 2 comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding in any year. Flood Zone 3 comprises land assessed as having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from the sea in any year.

Heritage Asset - A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).

Listed Buildings - protected structures that are considered to be of local, regional and national importance for their historical and architectural significance

Local Wildlife Sites - are identified and selected for their local nature conservation value

National Infrastructure Directorate - agency responsible for operating the planning process for nationally significant infrastructure projects (NSIPs). NSIPs are usually large scale developments such as new harbours, power generating stations (including wind farms), and electricity transmission lines, which require a type of consent known as
'development consent'

National Planning Policy Framework - sets out the Government's planning policies for England and how these are expected to be applied. Published in March 2012 it replaced all previous national planning policy statements and guidance notes

National Policy Statements - National Policy Statements (NPSs) are produced by Government. They give reasons for the policy set out in the statement, and include an explanation of how the policy takes account of Government policy relating to the mitigation of, and adaptation to, climate change. Current NPSs include: overarching energy; renewable energy; fossil fuels; oil and gas supply and storage; electricity networks; nuclear power; ports; transport networks (including rail and roads); and aviation

Ramsar sites - are wetlands of international importance designated under the Ramsar
Convention. The closest Ramsar site to South Kesteven is Rutland Water

Register of Parks and Gardens of Historic Interest - provides a listing and classification system for historic parks and gardens similar to that used for listed buildings. Over 1,600 sites are listed, ranging from the grounds large stately homes to small domestic gardens, as well other designed landscapes such as town squares, public parks and cemeteries

Renewable and Low Carbon Energy - Includes energy for heating and cooling as well as generating electricity. Renewable energy covers those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass and deep geothermal heat. Low carbon technologies are those that can help reduce emissions (compared to conventional use of fossil fuels)

Scheduled Monuments - an early historical structure or monument worthy of preservation and study due to archaeological or heritage interest

Setting of a Heritage Asset - the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

Significance - 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. Significance derives not only from a heritage asset's physical presence, but also from its setting

Site of Special Scientific Interest - sites designated by Natural England under the Wildlife and Countryside Act 1981

Special Areas of Conservation - areas given special protection under the European Union's Habitats Directive and target particular habitats and/or species. Baston Fen and Grimsthorpe Park are designated SACs

Special Protection Areas - ares classified under the European Union's Directive on conservation of wild birds for the protection of rare and vulnerable birds and for regularly occurring migratory species

Supplementary Planning Document - elaborates on policies or proposals in Plans and gives additional guidance

Wind Shear - the increase of wind speed with height above the ground

Zone of Theoretical Visibility - represents the area over which a development can theoretically be seen, based on digital terrain data.