

**AIRPORT OPERATORS ASSOCIATION**

**&**

**GENERAL AVIATION AWARENESS COUNCIL**

supported by

**CIVIL AVIATION AUTHORITY**

*'Working in Co-operation'*

## **SAFEGUARDING OF AERODROMES**

### **Advice Note 7**

#### **Wind Turbines and Aviation**

##### **1. Aerodrome Safeguarding Requirements**

The Safeguarding of Aerodromes is a process of consultation between the Local Planning Authority (LPA) and an Aerodrome. For some aerodromes this is an official requirement imposed on it by statutory direction. The Aerodrome Safeguarding Process is an integral part of the Town and Country Planning Process. The statutory instrument in England and Wales is Safeguarding Aerodromes, Technical Sites and Military Explosives Storage Areas: The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002. In Scotland Safeguarding of Aerodromes, Technical Sites and Military Explosives Storage Areas: The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 applies.

The purpose of Aerodrome Safeguarding is to ensure the operation and development of aerodromes that are important to the national air transport system are officially safeguarded and not inhibited by buildings, structures, erections or works which; infringe the aerodromes obstacle limitation surfaces; obscure runway approach lights; have the potential to impair the performance of aerodrome navigation aids, radio aids or telecommunication systems; by lighting which has the potential to distract pilots; or by developments which have the potential to increase the numbers of birds or the bird hazard risk.

For statutorily safeguarded aerodromes, Local Planning Authorities within the safeguarded area are issued with safeguarding maps which require the LPA consult with the aerodrome concerned in a planning application should it meet certain criteria relating to the location of the proposed development relative to the aerodrome and its height or it's bird attractant properties. A separate map is issued for wind turbine developments. An overview of Aerodrome Safeguarding is given in the first Advice Note in this series. Where a proposed development might impact on the safe or efficient operation of an aerodrome an objection may be raised.

## 2. Impact of Wind Turbines on Aviation

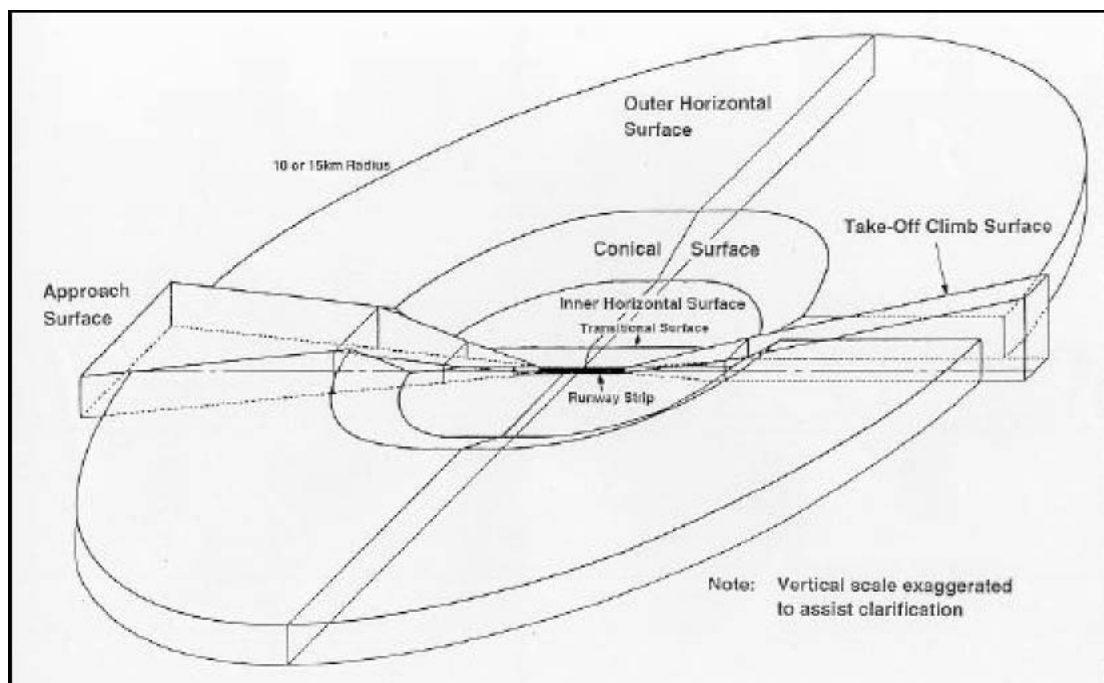
Wind Turbine developments have the potential to impact on aviation interests in a number of ways. Further information is available in Civil Aviation Publication CAP 764 – Policy and Guidelines on Wind Turbines, which is available on the CAA website at <[www.caa.co.uk/publications](http://www.caa.co.uk/publications)>. If the wind turbine development is located within 15km of the aerodrome there is the potential for the turbines to infringe the aerodrome's Obstacle Limitation Surfaces due to the physical size of the turbines. This in turn may impact on flight routings to and from the aerodrome.

### a) Obstacle Limitation Surfaces (OLS)

Obstacle Limitation Surfaces (OLS) represent the lower limit of the blocks of protected airspace around an aerodrome. They take the form of a complex set of 3-Dimensional surfaces, which extend upwards and outwards from the runway(s).

The OLS completely surround the aerodrome, but those surfaces aligned with the runway(s) used to protect aircraft landing or taking-off can be more limiting than those surrounding the rest of the aerodrome, particularly as you get closer to the aerodrome. Details of the OLS can be found in Civil Aviation Publication CAP 168 Licensing of Aerodromes, which is also available on the CAA website at <[www.caa.co.uk/publications](http://www.caa.co.uk/publications)>.

Under the terms of their Licence, aerodromes are required to take all reasonable steps to ensure the aerodrome and its airspace are safe for use by aircraft. It is for this reason that accurate information on the location and height of a proposed development within the vicinity of an aerodrome is required.



*Obstacle Limitation Surfaces*

## **b) Radar and Electronic Aids to Air Navigation**

Wind turbines may also interfere with an aerodromes radar and other aids to air navigation. In low visibility conditions pilots are entirely dependant on the accuracy of the information displayed on the instruments in the cockpit to navigate and land their aircraft. Similarly, air traffic controllers rely on the accuracy of the information displayed on the radar screens in front of them to maintain safe separation between aircraft. It is essential, therefore, that this information has not been distorted by interference to the radio signals involved in the operation of the navigation aids. There are two principal types of radar system in use at aerodromes - Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) and both systems can be impacted by wind turbines.

Both types of radar signal are shown on the radar display for use by the air traffic controllers. Not all aircraft carry SSR equipment and these aircraft will show up on the radar screens as a primary return only. Primary and secondary returns will move continuously on the controller's radar screen, indicating the speed and direction of an aircraft or objects actual movement.

Filtering equipment can be used to prevent buildings, birds, weather and other objects from producing radar returns on the screen – so-called radar ‘clutter’ but this is not effective in reducing returns from wind turbine blades. An effective means of filtering returns from rotating turbine blades has not yet been developed. Experience of wind turbine developments that have been constructed show that the turbine blades will regularly produce radar returns that are identical to and easily confused with, those produced by small or slow moving aircraft. In addition radar clutter produced by the turbines can mask any aircraft within the airspace above the wind turbine development that is not using SSR. In order to assure safety, traffic will often need to be given headings to avoid the area of clutter.

**c) Primary Surveillance Radar (PSR)** systems send out pulses of energy which are reflected back to the radar head and the position of objects detected is plotted on the radar screen. These primary ‘returns’ show only the position of an aircraft or any other object that is detected by the radar system and not the height.

PSR can be affected by wind turbines and will produce moving radar returns on the radar screen when the turbine blades are ‘visible’ to the radar head. The apparent movement of the turbines is caused by the rotation of the turbine blades ‘confusing’ the PSR circuitry.

Aerodromes will often raise concerns to any wind turbine proposal within (radar) line of sight of its PSR equipment. Whether an objection will follow will depend on the requirement to avoid any potential area of clutter. This will depend on several site specific factors including: the location and size of the development, the amount of ‘clutter’ it is likely to generate, the rules relating to the operation of the airspace, how heavily the area is trafficked, the proximity to potential areas of conflict such as glider or GA facilities and ultimately the controllers perception on whether they consider safety would be compromised. Each wind turbine proposal must therefore be assessed on its own merits.

**d) Secondary Surveillance Radar (SSR)** systems send out an interrogation signal to a transponder, a piece of equipment located on board the aircraft. The on-board equipment responds with a signal that produces both the position of the aircraft and other data such as height and identification data.

The propagation of the SSR radar signal in space can be affected by wind turbines where the wind turbine structures are sufficiently close (empirical evidence indicates less than 15Nm). Aerodromes may raise concerns to wind turbine developments inside this distance if the turbines are also within (radar) line of sight of its SSR equipment.

### 3. Construction Concerns

The safeguarding aspects of a proposed development do not end with the grant of Planning Permission. The methods and equipment to be employed during construction may also need to be agreed, particularly if **cranes** or other tall construction equipment will be involved as these tend to be taller than the proposed structure.

For a project close to the aerodrome a **construction management strategy** may need to be produced to ensure construction does not prejudice the safe operation of that aerodrome. In particular, but not exclusively, it should address the use of cranes or other tall equipment, activities likely to produce dust or smoke, temporary lighting, etc.

Whether or not part of a construction management strategy, the attention of Crane Operators should be brought to the *British Standard Code of Practice for the Safe Use of Cranes, BS 7121: Part 1*, particularly paragraph 9.3.3 *Crane control in the vicinity of aerodromes/airfields*.

For further information refer to **Advice Note 4 - Cranes and Other Construction Concerns**.

### 4. Lighting of Obstacles

The addition of warning lights to obstacles and tall structures is intended to reduce the hazards to aircraft operating visually at low level while taking-off or landing at an aerodrome, particularly at night or in conditions of poor daylight visibility. The Safeguarding process will determine whether a proposed development requires to be fitted with one or more obstacle lights. This is applicable to temporary obstacles, such as cranes, as well as to permanent structures.

Where it is deemed necessary that obstacle light(s) would be required, it would be advised to the LPA as a Condition for attachment to any Planning Permission that may be granted. The Condition would state the characteristics for the light(s), which are likely to be steady red light(s) of either 200 or 2,000 candelas visible from all directions. It is preferable that such lights should be illuminated at all times, rather than just during the hours of darkness.

### 5. Consultation with Aviation Stakeholders

To ensure wind turbine developments do not adversely impact on aviation interests wind turbine developers must consult with aviation stakeholders in the following key areas:

- a) **Ministry of Defence (MOD)** interests include operations training, national defence and air traffic control for military airfields. Consultations should be sent to:
  - Defence Estates, Blackmore Drive, Sutton Coldfield, West Midlands B75 7RL
- b) **NATS En Route Ltd. (NERL)** are responsible for safeguarding the radar, navigational systems and airways between aerodromes. Consultation should be sent to:
  - NERL Safeguarding, Mailbox 27, NATS Corporate & Technical Centre (CTC), 4000 Parkway, Solent Business Park, Whiteley, Hampshire, PO15 7FL
- c) **Individual Aerodrome Operators.** Where a wind turbine development is proposed in the vicinity of an aerodrome the individual aerodrome must be consulted.
  - In the case of .....Airport/Aerodrome/Airfield (s)  
Consultations should be sent to  
.....

d) **Civil Aviation Authority Directorate of Airspace Policy (CAA DAP)** is responsible for all UK airspace and spectrum management policy. CAA DAP also acts as the focal point for pre planning consultations between wind energy developers and aviation stakeholders, including civil aerodromes. Consultations should be sent to:

- Civil Aviation Authority, Directorate of Airspace Policy, CAA House, 45 – 59 Kingsway, London WC2B 6TE.

Early consultation with aviation stakeholders is of vital importance to address any potential problems as soon as possible in the development process. To assist in this process a consultation pro-forma has been drawn up between the British Wind Energy Association (BWEA) and aviation stakeholders including MOD, CAA, NATS and AOA. This pro-forma is published as part of the *Wind Energy and Aviation Interests - Interim guidelines* available from the BWEA website at <http://www.bwea.com/aviation/avwkgp.html>. The pro-forma, is designed to standardise the information provided and speed up the consultation process. The completed form is then sent to both the Ministry of Defence and the CAA Directorate of Airspace Policy (DAP). In the case of Civil Aerodromes DAP will advise that the application should be sent to the appropriate aerodrome based on the consultation zone identified on the Wind Turbine Developments Safeguarding Map.

This Advice Note has been produced for information only jointly by the Airport Operators Association, the General Aviation Awareness Council with the support of the Aerodrome Standards Department of the Civil Aviation Authority. Its contents may be reproduced as long as the source is acknowledged. The other Aerodrome Safeguarding Advice Notes available are:

Advice Note 1: Safeguarding - An Overview

Advice Note 2: Lighting near Aerodromes

Advice Note 3: Potential Bird Hazards from Amenity Landscaping and Building Design

Advice Note 4: Cranes and Other Construction Issues

Advice Note 5: Potential Bird Hazards from Landfill Sites

Advice Note 6: Potential Bird Hazards from SUDS

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