

# Capabilities Report



## Specialist Consultancy Services

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## 1 COMPANY PROFILE

Pager Power is a Suffolk-based consultancy service that provides aviation and communication studies from the earliest stage of potential wind farm development, through to assisting leading energy companies in addressing complex planning permission objections.

Founded in 1997, Pager Power is established as a leading authority within the field of aviation studies. Mike Watson, the managing director, has developed a range of specialist software that provides technical analysis on the impact of wind farms on radar and communications links.

Pager Power offers a flexible and dynamic approach to overcoming these obstacles with its combination of consultancy services, bespoke packages and specialist software. Pager Power can assess the viability of potential wind developments at an early stage giving their partners a competitive advantage, saving time and money. Pager Power has extensive experience of developing and progressing mitigation solutions, with knowledge of more than thirty mitigation solutions and practical experience with data fusion.

Pager Power has the skill and specialist software to solve radio, TV and radar interference issues, and has helped to overcome a large number of planning objections. In addition to the skill and specialist software required to help resolve these issues, Pager Power has developed good working relationships with stakeholders, regularly working with the MoD, BAA, NATS, NERL, Regional Airports, Ofcom and all large communications operators.

### Systems we assess include:

- Civil airfields and radars
- Military airfields and radars
- Microwave links and telemetry
- Television and radio
- Marine and meteorological radar
- Military low flying areas
- Mitigation solutions
- Shadow flicker



### Clients we work with include:

- |              |                  |                    |
|--------------|------------------|--------------------|
| • Airtricity | • Npower         | • Novera Energy    |
| • Infinergy  | • Scottish Power | • E.On             |
| • SWS        | • Infinis        | • RPS              |
| • Nuon       | • North Energy   | • Senergy Econnect |

## 2 SERVICES OFFERED

### 2.1 Initial Feasibility

Initial feasibility studies identify any issues that may affect a prospective wind farm site, and Pager Power can offer you services that you can use to gain a competitive advantage in the early stages of a project. As a result, you can avoid frustrating delays and significantly reduce your planning and administrative costs.

#### Pre-Screen Report

The pre-screen report gives the developer a basic overview of the proposed development. It details the most significant aviation issues, and identifies any Air Traffic Control, Air Defence or Meteorological radar within 30km. It will also inform the developer of how many microwave links are identifiable on our database, which may pass over or near to the site.

The report aims to highlight any immediate showstoppers, and indicates the effort that would be required to overcome likely issues.



#### Initial Site Assessment

The initial site assessment is designed to assist a developer's own initial assessment of a proposed development. Whilst it may not cover all possible Radar, Aircraft, Communications and Radio issues, it provides an overview of those issues that may affect the site's suitability for a Wind Farm development that may need further consideration.

The initial site assessment includes a desk-based study of:

- Television Transmitters
- BBC and Independent Radio Broadcast Transmitters
- Microwave communications
- Radio Telemetry and Control links
- UK AIP listed Civil Aerodromes and Heliports
- Civil Airport ATC radars
- Ministry of Defence ASACS radar sites
- Military Aerodromes
- Military ATC radar sites
- Ministry of Defence Tactical Training Areas
- Spadeadam EWTR Low Flying Area
- NATS en-route radar sites
- En-Route radio navigation beacons
- Meteorological sites
- Radar Ceiling Heights for radar associated with:
  - identified Civil installations.
  - identified MOD installations.

## 2.2 Aviation

When planning a new wind farm, it is necessary to determine its impact on aviation. The primary concern is aviation safety. Other areas of impact include current and future air traffic capacity, air traffic delays, fuel burn and controller workload. Pager Power is able to offer an extensive range of products to help the developer determine the impact a proposed development may have on aviation activities in the area.

### Aviation Impact Assessment

An aviation impact assessment primarily focuses on the effect of a development on aviation interests. In particular, the report will highlight any radar interference, radio navigation aid interference and obstruction to aerial navigation the proposed wind farm could cause. The scope of the project should be dictated by previous scoping work.

The work includes as standard:

- Radar Line of Sight Analysis for the proposed turbines
- Analysis of the turbines as physical obstructions
- Analysis of Air Traffic and Airspace above the proposed development.
- Assessment of the operational impact on the relevant installations
- Consideration of obstruction lighting
- Study of mitigation options
- Desktop shielding study

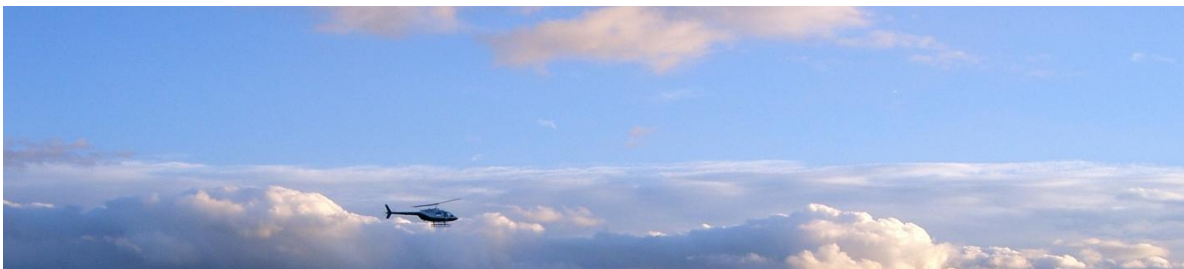


### Radar Detectability Analysis

A radar detectability assessment carried out by Pager Power will provide the client with an understanding of the potential impacts a wind development may cause on radar stations, and a desk-based assessment of overground obstructions. The report uses the assessment method for determining the impact of wind turbines on Aeronautical Radar Stations described by the Civil Aviation Authority (CAA) in Appendix 7 to the first edition of Civil Aviation Publication (CAP) 764 – CAA Policy and Guidelines on Wind Turbines (CAP 764 Assessment).

### Radar Mitigation Study

When an operational impact on a stakeholder has been identified, the radar mitigation study can aid the developer in decision-making by providing specific mitigation solutions via bespoke analysis.



## Civil Aviation Authority (CAA) Assessment

Pager Power can offer developers a highly accurate in-house assessment of CAA issues for a proposed wind development. With a good understanding of CAA concerns, our analysts are able to give an overview of the situation in order to assess the likelihood of the CAA objecting to the proposed site. Although the CAA provide this as a free service, it can take up to 12 weeks to receive a response. For a small fee, we can deliver our assessment to the client within 2 weeks, saving valuable time.

## Ministry of Defence (MoD) Assessment

Pager Power is also able to offer developers an in-house assessment of MoD issues for a proposed wind development. With a good understanding of MoD concerns, our analysts are able to give an overview of the situation in order to assess the likelihood of the MoD objecting to the proposed site. This can be delivered to the client within 2 weeks, saving valuable time compared with going directly to the MoD.



## Civil Aviation Authority (CAA) Consultation

Although not essential during pre-planning, it is expected that most developers will need to carry out consultation with the CAA to assess the issues that may arise between the wind farm development and CAA operations. Our CAA consultation service includes the submission of a CAA Consultation Pro-forma and covering letter, and electronic feedback of the response.

## Ministry of Defence (MoD) Consultation

It is also expected that developers will need to carry out consultation with the MoD to assess the effects a proposed wind farm development could have on military operations. Our MoD consultation service includes the submission of a MoD Consultation Pro-forma and covering letter, and electronic feedback of the response.

## In-house National Air Traffic Services (NATS) Report

A NATS report aids the developer by identifying likely NATS En-Route plc (NERL) issues for a proposed wind farm development. This assessment offers Pager Power's view on the likelihood of a sustained NERL objection based on Pager Power's knowledge of historical cases, and factors likely to be considered by NERL. It also outlines various mitigation options that may be required. This document is intended to reduce the risk of any decisions made relating to the development of a particular wind farm.

The report includes:

- Consideration of coverage from NERL primary radars within 150 km of the wind farm (and beyond this if they may be affected by the wind farm).
- An assessment of other NERL navigation aids within 20 km of this wind farm.
- An assessment of airspace use and NERL operations in the area
- An overview determining NERL's likely operational decision



## **National Air Traffic Services (NATS) Consultation**

It is expected that developers will need to carry out consultation with NATS to assess the effects a proposed wind farm development could have on their services. Our NATS consultation service includes the submission of a NATS En-Route plc (NERL) report request for a technical assessment or a technical and operational assessment, a covering letter and electronic feedback of the response.

## **Blocking Point Survey**

Pager Power's blocking point survey is a detailed report which includes a range of analysis to determine potential blocking points between known radar and a proposed wind development. A survey is undertaken to investigate physical obstructions and analyse the impact this could have on line-of-sight assessment. Once a blocking point survey has been undertaken, this information can be combined with a radar detectability report to produce a detailed analysis of the situation.

## **Line-of-Sight Assessment**

A Line-of-Sight Analysis produced using Pager Power's bespoke in-house software provides the developer with a number of terrain-based line-of-sight profile charts for the proposed development and surrounding radar installations. These give the developer an idea of the potential issues that may arise between a proposed wind farm development and existing radar, and can indicate further work that needs to be carried out in order to overcome any identified issues.

## **Bespoke Solutions**

The aviation industry is subject to continual change and therefore it is important that developers remain aware of the aviation issues that could potentially impact a proposed development. Pager Power prides itself on being able to provide tailored solutions to individual developer issues, and would be happy to discuss any issues that arise for a site.



## 2.3 Telecommunications

Communications links are present all across the UK. The development of a wind farm can impact on the services provided by telecommunications companies and therefore it is important to assess proposed developments to identify any links that cross or constrain a potential site. Pager Power is able to help developers become aware of any issues through a range of tailored products.

### Communications Link Survey and Report

Through the creation of a communication link survey and report, Pager Power is able to investigate all potential communication link issues for a proposed wind farm. The report includes:

- Full consultation with Ofcom and all relevant identified link operators;
- A full survey of all communication link ends identified as potential issues;
- Antenna Location Record Sheets for each surveyed link end;
- An exclusion zone chart of the proposed site and all relevant links;
- Exclusion zone calculations for any identified potential turbine/link conflicts (calculated using the published Ofcom method) and;
- Pager Power's conclusions and recommendations
- Pager Power can also create the report based on client supplied consultation data.

Pager Power also offers to create GIS datafiles for the identified microwave link paths so that they can be marked as constraints against the site. This is particularly useful for any developer wishing to determine a suitable turbine layout taking into account all site constraints.



### Microwave Link 3D Analysis

Our 3D communications link analysis service comprises of a desk-based report that analyses any potential link issues in detail to identify exclusion zones. A chart is prepared illustrating the exclusion zones, and this is then superimposed onto a 1:50 000 OS map.

### Microwave Link Mitigation and Consultation

Following initial analysis of the potential issues concerning microwave links, Pager Power is able to work on behalf of the developer with an aim to overcome any objections to the wind development through negotiation with concerned parties and the development of practical mitigation solutions.

## 2.4 Television

During the last few years there have been many occasions where wind turbines have been a source of disturbance in the transmission of terrestrial television signals, followed by complaints from local communities. Pager Power is pleased to be able to offer a range of services to ensure the developer gains a full understanding of the television interference levels that can arise for a proposed development.

### Initial Site Survey for Television

Pager Power is able to offer an initial site survey of home TV aerials in and around the area of the proposed wind development. The purpose of the initial site survey would be to determine which transmitter television viewers are using, for incorporation into a full television assessment.



### Television Desk Study Assessment

Pager Power can offer to undertake a TV Signal Interference Desk Study Assessment for a proposed wind development, to provide developers with interference charts detailing where issues could arise if a wind farm was developed in the area. The analysis takes Earth Curvature and Refraction into account, and is superimposed onto a 1:250 000 Ordnance Survey map of the area to allow for easy interpretation.

### Television Baseline Survey

The baseline TV reception survey can be carried out for any existing wind development. The measurements are taken using an advanced television analyzer and the report can recommend mitigation solutions to developers where potential issues arise.

### Television Briefing Note

A TV Interference Briefing Note provides the developer with an overview of the proposed wind development area, giving an idea of the level of television interference that could be caused through the development of a wind farm. The model can also be used post-construction to analyse specific issues. In addition to this, it can confirm whether a pre-construction survey would be advisable.

## 2.5 Shadow Flicker

Rotating turbine blades can cause brightness levels to vary periodically at locations where they obstruct the sun's rays. This effect is known as shadow flicker. Such effects can be a cause of great annoyance at residences near onshore wind developments. Pager Power has developed a range of products to help developers assess possible shadow flicker impacts, and can work with developers to come up with the most suitable mitigation options.

### Shadow Flicker Zone Assessment

A Shadow Flicker Zone Assessment gives a basic overview of the proposed development identifying regions where shadow flicker may be an issue. This assessment would consist of a Shadow Flicker Zone Chart and a single page of notes, indicating the areas where shadow flicker is predicted.

### Shadow Flicker Impact Assessment

The Shadow Flicker Impact Assessment also identifies regions where shadow flicker may be an issue, but takes into consideration all dwellings within 1km of the proposed wind turbines. The assessment would require dwellings data which Pager Power can obtain in a number of ways:

**Option 1:** The client would supply Pager Power with the required dwellings data.

**Option 2:** The assessment would be desk based, using maps to identify dwellings.

**Option 3:** A survey of the dwellings would be undertaken by Pager Power.



## 2.6 Other services offered

### Preparation of Environmental Statement (ES) Chapters

Pager Power offer to undertake Environmental Statement Chapter Work to cover aviation, telecommunications, TV and shadow flicker issues for a proposed wind development, using a provided template. The ES Chapter would be based on work that has already been undertaken.

### Meeting attendance

There are many situations when a meeting with relevant stakeholders is required. This could be to discuss their consultation responses to a proposed wind development, take issues forward, or examine mitigation options. Pager Power is happy to arrange and attend meetings with stakeholder representatives and provide a full post-meeting discussion along with an informal report explaining any technical matters arising from the meeting.

### 3 PROJECT INVOLVEMENT

Pager Power has been involved with many wind farm developments, a large number of which are not yet in the public domain, and are therefore confidential. However, below are a few of the UK wind farm developments that are now operational or consented that Pager Power has had involvement with:

- Clyde
- Whitelee
- Blacklaw
- Greenock
- Arecleoch
- Avonmouth
- New Albion (Towns Close)
- Glyndebourne Opera House
- Lisset

The case studies below demonstrate some of the work that Pager Power has carried out.

#### 1 WESSEX WATER MICROWAVE LINK CASE STUDY

##### Wessex Water

'Wessex Water is the regional water and sewage treatment business serving an area of the south west of England, covering 10,000 square kilometres including Dorset, Somerset, Bristol, most of Wiltshire and parts of Gloucestershire and Hampshire.'

Not only is Wessex Water committed to giving all of its customer's excellent standards of service but they are also recognised by water industry regulator Ofwat as the most efficient operator in England and Wales.

As part of its ongoing investment in local regions Wessex Water is designing a four wind turbine scheme at its Bristol Sewage Treatment Works in Avonmouth.

##### Wind Farm Situation

As part of the Environmental Impact Assessment, Pager Power was commissioned as an independent consultant on both communication and aviation issues. Ofcom consultation and Pager Power's analysis identified various communication links that constrained the development.

It was identified that mitigation would be required to satisfy the relevant stakeholders.

##### Solution

Pager Power and Wessex Water identified simple mitigation solutions for all but one communication link. The challenge was to find a suitable location which could be used to reroute the final communication link using relay dishes. Various buildings on the sewage works site were assessed but it was concluded that these would not be suitable due to forestry blocking line of sight.

An existing onsite mast was identified for relay dishes with the use of a 26m pneumatic mast. Pager Power produced a mitigation report proposing this solution that assisted in removing the final communication constraints on the Avonmouth development.

## 2 INFINERGY LTD – NEW ALBION WIND FARM – MOD RADAR ISSUE (RAF COTTESMORE)

### The Challenge

Pager Power Ltd was contracted via RPS Group, environmental consultants for Infinergy Ltd on the New Albion wind farm project, an 8-turbine proposal 5km south west of Corby, in Northamptonshire, to provide a scoping opinion for aviation (and other) issues.

At just over 30km and with terrain contour analysis showing an almost unobstructed line-of-sight from the Primary Surveillance Radar (PSR) at RAF Cottesmore, Charles Morelli quickly identified that this was a major issue which needed to be resolved before committing significant expenditure to the project. This was later confirmed in the response from the Ministry of Defence (MoD) to Pager Power's formal pre-planning consultation.

### The Solution

Since the site was otherwise very favourable for a wind farm, Charles took a closer look at the issue. A detailed, desk-based study of mapping and aerial photography indicated that large hangars on the airfield as well as other objects, such as the civilian village of Cottesmore and two large woods at significant points on the line-of-sight path, were likely to raise the radar's line-of-sight in the direction of the wind farm such that the turbines would lie below it.

A further quick look suggested that even discounting these buildings and woods, the height of the radar relative to the turbines, combined with the distance, Earth's curvature, and likely radar signal attenuation due to terrain effects, a detectability assessment (such as that found in Appendix 7o the 1<sup>st</sup> Edition of the Civil Aviation Authority (CAA) document Civil Aviation Publication (CAP) 764, *CAA Policy and Guidelines on Wind Turbines*), would be expected to show that the turbines would be marginally detectable at worst.

Charles advised the customer of these findings, and recommended an on-site survey of the buildings and woods to confirm their locations and heights for incorporation into Pager Power's custom Sight Lines line-of-sight analysis software. If necessary, a radar detectability (a 'CAP 764') assessment could be conducted, without and/or with the surveyed buildings and woods data to robustly argue that the turbines would not be detectable by the radar.

The survey was conducted and the results analysed and incorporated into the line-of-sight model. This showed that the turbines would not be detected, and a constraints chart indicating the most hidden areas on the wind farm site was produced. The developer then conducted further consultation with the MoD, in which Pager Power's results were checked and accepted, leading to a withdrawal of the MoD's concerns.

### The Benefit

Pager Power's technical expertise and ability to quickly identify solutions to major problems, combined with its understanding of aviation issues and its relationship with the MoD and many other aviation stakeholders as a reliable and independent consultancy, allowed the above problem to be quickly identified and resolved. Thus, a major hurdle for the development of a promising wind farm was quickly removed allowing site development to proceed swiftly and without waste of effort and resources.

## 4 SEMINAR INFORMATION

Throughout the year Pager Power runs a number of one-day seminars in an aim to widen understanding about the impact of wind turbines on radar. The seminar is open to anyone involved in wind farm development who is interested in learning more about the main planning barriers and technical issues surrounding wind farm developments with regard to aviation, radar, telecommunications and TV.

To find out the date of our next seminar, please contact Pager Power directly.

### Understanding the Impact of Wind Turbines on Radar

**Audience:** Developers, Planning Consultants, Planners, Civil Servants, MOD Staff, Aviation Stakeholders

**Scope:** The majority of the seminar will be UK focused, however the seminar is intended for all countries including USA and France.

**Overview:** At the end of this course you will have a greater understanding of the planning barriers and technical issues surrounding wind farm developments with regard to aviation, radar, telecommunications and TV.

Structure: Introduction

Radio & Television  
Radio Theory; Television Interference; Technical Mitigation;

Microwave Links and UHF Telemetry  
Microwave Communications and UHF Telemetry Links; Interference Mechanisms and Clearance Calculations; Mitigation options and costs; Planning Process and Safeguarding

Introduction to Radar and Wind Farms  
Radar Types and Systems; Wind Turbine Interference; Radar Assessment Methodologies; Operational Impacts

Radar and Wind Farm Mitigation

Radar Issues and the Planning System  
Planning and consultation process – UK; Public Inquiries and important decisions – UK; Radar USA; Recent news and developments

Aviation – Physical Safeguarding and Lighting  
Physical Safeguarding; Protected Surfaces; Secondary Surveillance Radar

## 5 FURTHER INFORMATION

If you would like to discuss any of the information presented in this report further or would like to find out what Pager Power could do for you, please do not hesitate to contact us using the contact details provided below:

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