18. TELECOMMUNICATIONS & AVIATION

18.1 INTRODUCTION

This chapter presents an assessment of the potential effects of the proposed wind farm development on telecommunication and aviation interests.

Fixed radio links, scanning telemetry systems and radar are used by communication companies, the emergency services, utility companies, the National Air Traffic Service and the Ministry of Defence. The presence of a wind turbine can affect the signals from such systems by reflecting, refracting or masking the signals.

Masking is when an obstacle, such as a wind turbine, prevents a transmitted signal reaching a receiver, resulting in the signal being blocked. Static objects such as large buildings or structures can reflect signals, causing multiple routes to the receiver; it is also possible that large structures refract the signal away from its intended path which can also result in a loss of reception. Moving objects such as wind turbine blades also do this, but the effect is not constant. In this situation dynamic affects such as Doppler shift of the signals cause additional issues.

Wind turbines, as with any large structure, can potentially interfere with electromagnetic signals, particularly telecommunications and television. This study has been carried out by Airtricity on behalf of Viking Energy Partnership, to investigate and evaluate the extent to which the proposed Viking Wind Farm may cause electromagnetic interference to existing telecommunications facilities. In particular, the study considers the potential impacts of the proposed windfarm on:

- Television broadcast;
- radio communications;
- air traffic control;
- military radar;
- civilian airspace; and
- military airspace.

18.2 SCOPE OF ASSESSMENT

The assessment has taken account of scoping responses from relevant bodies as well as existing policy relevant to telecommunications and aviation issues/infrastructure likely to be affected by the windfarm development.

18.3 POLICY CONTEXT

The undernoted regulatory references were considered in undertaking the aviation impact assessment to establish the minimum operating criteria:

- CAP 168 - Licensing of Aerodromes, Civil Aviation Authority, February 2007;

- CAP 670 - Air Traffic Services Safety Requirements, Part B, Section 4, Civil Aviation Authority (Safety Regulation Group), October 2007;
- CAP 738 - Safeguarding of Aerodromes, Civil Aviation Authority (Safety Regulation Group), December 2006; and
- CAP 764 - CAA Policy and Guidelines on Wind Turbines, Civil Aviation Authority (Safety Regulation Group), July 2006.

18.3.1 Summary of regulatory requirements

A review of the documents noted in paragraph 18.3 above has identified the following regulatory requirements that are applicable to the proposed Viking Wind Farm:

- Officially safeguarded aerodromes must be consulted if the proposed wind turbines are within 30km;
- consultation with the operators of officially safeguarded technical sites is required if the proposed wind turbines are within 10km;
- an assessment of the radar interference effects is required if the development is within potential line of sight of an civilian or military aerodrome, NATS en-route or air defence radar; and
- stakeholder consultation and further assessment will be required if the planned location of the turbines is within:
  - 17km of a licensed aerodrome with a runway of 1100m or more;
  - 5km of a licensed aerodrome with a runway of less than 1100m;
  - 4km of an unlicensed aerodrome with a runway of more than 800m;
  - 3km of an unlicensed aerodrome with a runway of less than 800m; or
  - 3km of any other unlicensed aviation land use.

18.4 METHODOLOGY

The assessment has comprised a desk-based review of available information and consultation with all relevant statutory bodies and service providers. The relevant consultees are listed in table 18.3. For the purpose of this study the significance of effects has been measured by classifying each impact as being in one of the following categories: negligible, minor, moderate or major. It is assumed that all identified effects of the proposed wind farm on communications links etc. are adverse. In table 18.2 a definition of each level of significance is given. To see the results of the impact analyses please refer to table 18.4.

Table 18.2 Impact Significance Categories

Significance	Definition
Negligible	Very small or no effect. No need for further consideration.
Minor	Small effects. Unlikely to need further consideration but reasons for elimination of the effect and mitigation measures have been

	considered.
Moderate	Medium effects. Need further consideration and the development of appropriate mitigation measures.
Major	Severe effects. Require alterations to project design or appropriate mitigation measures.

Account has also been taken of scoping responses from relevant bodies. Layout modifications have been fed to the consultees throughout the design process to allow the changes to be plotted and potential impacts measured. Table 18.3 shows a list of services and companies contacted as well as a brief description of the outcome of each consultation.

Table 18.3 Consultees

PROVIDER	OUTCOME
OFCOM	Provided a list of microwave link service providers.
JRC	Provided an objection on behalf of SSE (electricity distribution in Shetland) for several microwave links and scanning telemetry.
CSS	No Objection
ARQIVA	Supplied link data in the area. None is within or near the windfarm location
T-MOBILE	Awaiting response
SSE	Objection to link 13104. SSE has a 50% stake in the proposed Viking Wind Farm. Therefore a solution will be found within the company. A scanning telemetry link also passes through part of the development; the licence for this link is being returned to Ofcom in the very near future so will not cause any further issues.
BT	No Objection
THUS	Awaiting response
AIRWAVE	Have not responded with the required details to date.
SUMBURGH AIRPORT	No Objection
SCATSTA AIRPORT	They are currently checking with the CAA about re-writing their missed approach procedures. Awaiting outcome of this meeting.
TINGWALL AIRPORT	No Objection
NATS	No Objection
MoD	Awaiting return correspondence

18.5 BASELINE CONDITIONS

The site is located on the area known as Mainland Shetland. At the Southern most tip of the mainland is Sumburgh Airport which accounts for most of the aviation traffic on the island and carries most commercial flights. In the centre of the mainland, and to the south of the windfarm, is Tingwall airstrip which is a small private airstrip servicing mainly short-hop flights from Mainland Shetland to the outlying islands. Finally, directly to the north of the windfarm is Scatsta airstrip which is a commercial airstrip servicing the oil and gas fields surrounding the islands.

Located around Mainland Shetland are various telecommunications towers with radio link and broadcast/mobile telecommunications equipment. Due to the terrain and pattern of settlement on the island most equipment is located towards coastal areas on elevated positions, reducing the potential for interaction with the proposed Viking Wind Farm.

18.6 IMPACT ASSESSMENT

The potential impacts of the windfarm are summarised as follows:

- Interference with radar communications systems at Scatsta. The assessment found that Tingwall and Sumburgh airports have no radar issues;
- disruption to flight paths through physical obstruction at Scatsta airport;
- interference with point-to-point telecommunications link from 'Hill of Sound' to 'Collafirth';
- interference with television and radio reception to properties in the area.

18.6.1 Radar Impacts

The effects of reflecting, refracting or masking signals can have negative impacts on radar equipment used by local airfields and by National Air Traffic Service (NATS) En Route Plc (NERL) which manages air traffic in the airspace above the UK.

There are 2 radars at or near the proposed Viking Wind Farm, one at Sumburgh airport and one at Scatsta airport. Sumburgh Airport have confirmed that they have no objections to the turbines and believe it will have little, if any, impact on their radar. Scatsta airport is close to several proposed turbine locations. However, the airport operators are of the opinion that the nature and location of the radar installation at Scatsta mean that there will be no reduction in its performance or quality of service.

18.6.2 MOD Impacts

The Defence Estates department (MoD) have been consulted using the correct proforma, with details of the proposed development, to determine whether there are any issues with the MoD communication systems, air surveillance, radar, air defence radar, low flying activities or aerodrome operations radar. The MoD has not yet replied to this consultation.

18.6.3 Airport Impacts

There are three airports on the Shetland Mainland; Sumburgh, Scatsta and Tingwall. There are no expected problems at Tingwall and Sumburgh. Scatsta airport believes there may be a potential issue with the distance of some of the turbines from the airfield. At

present the CAA's Directorate of Airspace Policy (DAP) who is responsible for the regulation of UK airspace is reviewing the situation and will respond in the near future.

18.6.4 Communication Impacts

There has been extensive research done into the communication links that run through or near the windfarm. There are two links which may be affected by inference from the wind turbines, both of them operated on behalf of SSE.

18.6.5 Television Impacts

The BBC provides an online assessment tool (BBC, 2009) which is designed to allow developers to assess the impact of wind turbines on TV broadcasts received by nearby homes. The tool suffers from limitations on the number of turbines which can be entered at any one time, and therefore it cannot give accurate readings for a windfarm as large as the proposed Viking Wind Farm. Therefore a full TV assessment is scheduled to take place in order to identify which areas may be potentially affected.

The analogue TV signal is due to be phased out and replaced with a digital signal in June 2010. At that time Viking Energy Partnership will carry out a further survey in order to fully understand which areas will be affected. It is believed that because a digital signal is less suseptable to interference there should be few homes affected. Viking Energy Partnership commits to rectifying any ill affects on TV signals caused by the turbines.

18.6.6 Broadcast Radio Impacts

There is currently ongoing work to find out the exact impact of the windfarm on broadcast radio signals. It is believed that large communities should not be affected. However, due to the nature of omni-directional radio transmissions which emit radio signals in a circular non-direct manner, it is highly unlikely that a turbine would interfere with the transmission of radio signals to any of the potential receptors on the wind farm site.

18.7 MITIGATION

18.7.1 Radar

There are no significant issues with radar and therefore no mitigation is required.

18.7.2 MOD

The MoD has not yet replied to Viking Energy Partnership consultations. Therefore it is assumed that there are no issues and as such no mitigation measures are proposed. It is not thought to be an area where low flying activities take place.

18.7.3 Aviation

The only aviation issue relates to Scatsta airport and can be resolved by changing the existing approach procedures if found to be feasible by the DAP.

18.7.4 Mobile and Fixed communications

Since the Link 13104 is an SSE microwave link the company will look to move the link transmitter to a more suitable location which will bypass the windfarm. The windfarm has an internal fibre optic communications network that can be used to re-route signals from the affected antenna to a new antenna location as agreed by the link operator. In this case the link operator is SSE and therefore a solution will be found within the company. A second link is predicted to be affected by turbine induced interference. This is also an SSE link which is not being used and is no longer required. The license for this link is to be returned to Ofcom in the very near future.

18.7.5 Television

It is anticipated that a Section 75 agreement (a legally binding agreement between the applicant and the local authourity and any relevant third parties) will accompany the consent for the windfarm. This will be worded to ensure that television reception is maintained in the area and will state that Viking Energy Partnership will implement any necessary mitigation measures to rectify any interference to television signals directly attributable to the windfarm. If it is found that a home believes the signal to be degraded by the wind farm an assessment of the equipment will be carried out and the possibility of upgrading the aerial to a higher gain aerial, upgrading the cable to low loss cable or improving the alignment of the aerial will be carried out. If the assessment finds that the TV signal will not be improved by any of the above measures then a form of Free Satelite digital service will be provided.

18.8 SUMMARY OF RESIDUAL EFFECTS

Subject to satisfactory outcomes relating to Scatsta Airports missed approach procedures, no significant impacts on aviation or telecommunications are anticipated.

Table 18.4 Summary of Residual Effects

Potential Impact	Significance	Mitigation	Residual Impact
Interference with Scatsta Airfield	Moderate	Progressing discussions with DAP	Negligible
Disruption to MoD Radar	No Effect	None	No Effeect
Interference with Mobile telecommunications	Negligible	None	Negligible
Interference with fixed telecommunications	Negligible	If any links do suffer interference then they can be re-routed using existing or new infrastructure	Negligible
Interference with television/radio	Moderate	Re-pointing of aerial, upgrade of	Negligible

reception		aerial or provision of a digital/satellite aerial	
Impact on Radar	Negligible	None	Negligible

18.9 MONITORING

Future monitoring of the TV transmitter signal levels will be carried out after the construction of the windfarm, in order to ensure there is no significant impact. It should however be noted that the analogue to digital switch over takes place in April – June 2010.

18.10 REFERENCES

BBC (2009) BBC Windfarm Assessment Tool. BBC, London. http://windfarms.kw.bbc.co.uk/cgi-bin/rd/windfarms/windfarm.cgi, accessed April 2009.