

CHAPTER 15 – ELECTRO-MAGNETIC SIGNALS

Introduction

- 15.1 A wide range of operators transmit electro-magnetic signals for aviation, television and telecommunications use. The main ones identified in Wales are:
- MOD (radar and microwave links for communication and military flights);
 - National Air Traffic Services Ltd (“NATS”) (domestic flights) and the Civil Aviation Authority (“CAA”);
 - television (BBC, ITV and Channel 5);
 - emergency services (police, ambulance and coast guard); and
 - mobile phone operators.
- 15.2 A variety of methods are used to transmit signals but most systems require either a clear line of sight and/or radio communication. The construction of large structures can interfere with the line of sight communications and cause interference.
- 15.3 Wind turbines can be detected by some radar equipment which can cause confusion for radar operators. Whether turbines interfere with radar will depend on their location in respect of the radar.
- 15.4 In addition, wind turbines can cause ghosting of television pictures due to signals being interrupted and the television receiving reflected signals fractionally later than the bulk of the signal.

Policy Planning Context

- 15.5 Technical Advice Note 8 (“TAN 8”) on Planning for Renewable Energy (Welsh Assembly Government, 2005), provides technical advice to supplement the policy set out in Planning Policy Wales (“PPW”) (Welsh Assembly Government, 2014). The PPW does not contain any specific guidance on the potential electro-magnetic interference resulting from wind turbine developments. TAN 8 recommends consultation with a number of organisations.
- 15.6 Technical Advice Note 19 (“TAN 19”) on Telecommunications (Welsh Assembly Government, 2002) provides guidance on planning for all forms of communications cable or radio, either public or private. It covers transmission of signals and the disruption of signals.

Assessment Method

- 15.7 ADAS initially consulted telecommunications and aviation organisations with regard to potential interference in 2006. As the wind farm layout had changed since 2006 the organisations were re-consulted in 2011.

Consultations

- 15.8 The following organisations were consulted and their responses are summarised in **Table 15.1**. Details of consultee responses are provided in **the Consultation Report (Document Reference: MYG-AD-5)**.

Table 15.1: Consultees			
Consultee	Issue	Response 2006	Response 2011
Defence Estates (MOD)	Radar and military low flying	Initial objection when layout included turbines west of the River Wye. Objection was removed once turbines were constrained to east of River Wye. They advised they have no concerns to the 23 turbine layout (letter of 17 th July 2006).	No objection to the proposal (response received 15 th January 2013).
Civil Aviation Authority	Aviation	Advised on possible need to install aviation obstruction lighting and recommend consultation with the MOD and National Air Traffic Services Ltd (NATS En-Route Ltd.).	Do not provide pre-application advice anymore.
NATS via online maps	Aviation radar	Wind farm within 'blue area' of operational infrastructure. NATS to assess the application in detail at the planning application stage.	No change.
British Telecom ("BT")	Electromagnetic Compatibility (EMC) and BT point-to-point radio links and satellite	Advised development is unlikely to cause interference to the BT's radio networks.	Advised development should not cause interference to BT's current and presently planned radio networks.
Cable and Wireless ("C&W")	Electo-magnetic signals	No objection to the development.	No objection to the development.
Orange	Electo-magnetic signals	No objection to the development.	No Orange microwave links affected by this application.
Arqiva	Re-Broadcast Links ("RBLs") and microwave links	Advised development is unlikely to affect microwave links.	Advised development is unlikely to affect their RBLs and microwave links.
National Grid Wireless (formerly Crown Castle)	Electo-magnetic signals and broadcast links	No objection to the development.	(now merged with Arqiva)
British Broadcasting Corporation ("BBC")	Electo-magnetic signals	Recommended the use of wind-farm assessment tool which was subsequently carried out.	Wind-farm assessment tool used.

Table 15.1: Consultees			
Consultee	Issue	Response 2006	Response 2011
CSS Spectrum Management Services Ltd. / Welsh Water	Electo-magnetic signals; Ultra High Frequency (“UHF”) Scanning Telemetry Systems	No objection to the development.	Reconsulted 14 th February 2014 – no response received. Welsh Water determined that the proposal will not affect Welsh Water’s Telecoms Assets (response received 24 th February 2014)
Joint Radio Company Limited (“JRC”)	Radio systems operated by utility companies	No potential problems identified with 460 MHz point to multi-point telemetry and telecontrol radio systems operated by utility companies from the development.	No potential problems identified.
Office of Communications (“Ofcom”)	Microwave fixed links managed and assigned by Ofcom		Identified link 0474681/1 within 500m range and advised consultation with Orange.
O2	Microwave links		No affect identified (response received 17 th February 2014)
T-mobile/Mobile Broadband Network Limited (“MBNL”)	Microwave links		No objections (response received 18 th February 2014)

- 15.9 In addition, the BBC web-based wind-farm assessment tool was used in 2006 and 2011 as requested by the BBC in the initial consultation.
- 15.10 None of the organisations consulted identified any significant problems to their electro-magnetic signals from the proposed layout of the turbines.

Description of Baseline Conditions

Aviation

- 15.11 The CAA aeronautical chart indicates that the proposed wind farm is not within any controlled airspace or aerodrome traffic zone (“ATZ”) i.e. airspace of defined dimensions established around an airport for the protection of traffic.
- 15.12 NATS operate an air traffic control radar at Burrington (NGR 260486E 11689N). There is also a NATS radar site at Clee Hill, Titterton, Shropshire. NATS En Route Plc (“NERL”) has replaced its pre-planning consultation process with wind farm developers with maps and information which can be assessed via the internet (<http://www.nats.co.uk/nats-services/issues/windfarms/self-assessment-maps/>). The maps provide developers with information about areas where wind turbine

development may be of concern to NERL. These maps identify blue areas where wind farm developments are likely to interfere with the operational infrastructure and yellow areas where there is a potential to interfere with this infrastructure. The maps are displayed for a range of tip heights. From the 125m tip height map analysed for the Mynydd y Gwynt wind farm, the proposed wind farm is within the blue safeguarding area. Most of Area D is also within this area, as is a large proportion of England and Wales. The maps are indicative and for guidance only and NERL would assess the application in detail at the formal planning application stage.

Television and Telecommunications

- 15.13 The nearest main analogue television transmitters to the site is at Blaenplwyf (SN 569756). There is also a relay transmitter near Llangurig (SN 900794).
- 15.14 There is a Met Office wind profiling radar station at Aberystwyth and a weather radar station at Crug y Gorllwyn.

Description of Construction Period Effects

- 15.15 Any potential effects on aviation and telecommunications during construction are likely to be caused by tall cranes and erection and commissioning of the turbines. Any effects are therefore likely to be the same as the effects during operation.

Description of Operational and Long-term Effects

Aviation

- 15.16 The CAA raised no significant effects in the initial consultation. In addition Defence Estates had no issues with the 27 turbine layout.

Television and Telecommunications

- 15.17 The switchover to digital TV has been completed in Wales. The Ofcom report (2009) on 'Tall structures and their impact on broadcast and other wireless services' states that "*digital television signals are much better at coping with signal reflections, and digital television pictures do not suffer from ghosting*". While digital television signals could still be affected, particularly in areas where the digital signal is weak, the extent of the problem is less than for analogue transmission. The report also recommends that turbines are sited 500m from any viewers. The closest residential property to a turbine is over 800m away and therefore well within the recommendation provided by Ofcom.
- 15.18 The BBC recommended the use of their web-based wind-farm assessment tool to determine whether the proposed turbines would affect terrestrial television reception. The assessment identified that the Llangurig UHF transmitter may be affected although no homes would be likely to be affected. Arqiva, who is responsible for providing BBC's transmission network, was consulted and has confirmed that the revised turbine numbers and locations are unlikely to affect any of their RBLs.
- 15.19 Although wind turbines have the potential to create interference with television and telecommunication transmissions, such effects can be mitigated and are therefore not a significant constraint to wind farm development.

- 15.20 Consultations with the organisations listed in **Table 15.1** above did not identify any significant problems caused by the layout of the turbines.

Mitigation of Operational and Long-term Effects

Aviation

- 15.21 Whilst the CAA Directorate of Airspace Policy had no site specific observations they proposed generic mitigation as follows:

“There might be a need to install aviation obstruction lighting to some or all of the associated wind turbines should this wind farm development be progressed.”

“There is a requirement in the UK for all structures over 300 feet high to be charted on aviation maps”.

- 15.22 Further consultation with regard to aviation obstruction lighting was undertaken with the MOD in which they requested that cardinal turbines should be fitted with 25 candela combination omni-directional red lighting and infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point. In addition, the perimeter turbines should be fitted with 25 candela omni-directional red lighting or infrared lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point.
- 15.23 Wind Power Aviation Consultants Ltd. (“WPAC”) was commissioned to propose a lighting scheme based on the MOD requirements (see **Appendix 15.1**). Proposed lighting includes:
- Combination Infra Red and Red Lights (IR + Red) on Turbines: 1, 3, 12, 27, 20 (the site does not easily fit four cardinal lights);
 - Infra Red lights on Turbines: 8, 19, 24, 25, 16, 13, 5 (perimeter turbines).
- 15.24 The landscape assessment in **Chapter 8**, did not perceive any significant impacts from the use of the Combination Infra Red and Red Lights.
- 15.25 Details of the development would need to be provided to the Defence Geographic Centre for charting.
- 15.26 Defence Estates and the CAA would be advised before construction commences of the location and size of the proposed wind farm, the date construction starts and ends and the maximum height of construction equipment.

Television

- 15.27 In the unlikely event of the wind farm causing reception problems various technical solutions are available including:
- change in aerial height;

- replacement of receiving aerials; and
- provision of satellite or cable services to affected householders.

Telecommunications

15.28 No adverse impacts on telecommunications have been predicted and no mitigation is required.

Residual Effects

15.29 No significant residual effects are identified.

References

Ofcom, (2009). Tall structures and their impact on broadcast and other wireless services. (Ref-15-001)

Welsh Government, Planning Policy Wales, Edition 6 – February 2014. (Ref-3-015)

Welsh Assembly Government, (2005). Planning Policy Wales, Technical Advice Note 8: Planning for Renewable Energy. (Ref-3-011)