Airwave Solutions Limited

Application for a determination as to whether or not Prior Approval is required in respect of the installation a non-ground intrusive electronic communications base station at Westwood New Road, near A61 / A616 roundabout, Tankersley, Barnsley, S75 3DL

NGR – 433786, 399094

We have submitted an application for a determination as to whether or not prior approval is required on behalf of Airwave Solutions Limited, in respect of:

> installation of non ground penetrating electronic communications equipment comprising monopole, aerials, dish antennas, steel grillage, concrete blocks, equipment cabin, meter cabinet, gps antenna, palisade security fence and ancillary development thereto on highways land known as Westwood New Road, near the A61 / A616 roundabout junction, Tankersley, Barnsley, South Yorkshire

Background Information – The Airwave TETRA System: The need for the Development

The electronic communications requirement of any public safety group including, the Police, Ambulance and Fire and Rescue services is to avoid putting human lives at risk.

In the past when UK disasters have struck, emergency response teams from different police forces and emergency services had a difficult time communicating with each other, due in part to the lack of standardisation in their mobile radio equipment. Each of the 45 geographic police forces in the UK was responsible for establishing and maintaining its own emergency telecommunications systems. This resulted in a situation when adjoining police forces often used systems employing different equipment and differing operating frequencies. This had the overall effect of providing a rigid, unresponsive and overloaded system (especially in periods of heavy demand) and affected the ability of the police forces to conduct their business effectively.

Other emergency services including Ambulance, Fire and Rescue, British Transport Police, Ministry of Defence Police, Civil Nuclear Constabulary, HMRC Customs and Immigration Service, Mountain Rescue and local authority emergency planning, also used separate systems with limited interconnectivity and significant problems often arose during major incidents, when a fully coordinated approach of all services was required. This led to severe criticism in the reports of the inquiries following amongst others the Hillsborough football and Kings Cross rail disasters and more recently the London terrorist bombings.

In the past, the emergency services also suffered radio interference on their systems, originating both within and from outside of the UK, which caused severe operational difficulties. The systems used by the emergency services were also limited; almost every police force and other emergency service had areas in which they operated without any effective radio coverage. This led at times, such as during the Hungerford massacre incident, to emergency services falling back on using the commercial public mobile phone networks to try to improve communications, which were not secure.

Attempting to patch different systems together, in order to aid the deployment of officers and equipment by the emergency services significantly added to the congestion of the systems; especially in major incident situations, and because these systems offered no prioritisation of calls, overloaded radio channels could seize up and provide no effective communication at all.

Most forces' equipment could not transfer data or text, an important operational requirement, and few had any form of encryption (using a secret code, so as to make messages unintelligible to unauthorised parties). They were open to listening by anyone prepared to buy cheap scanning equipment.

Against this background, and following the events such as those previously described, where poor communications exacerbated already exceptional situations, the Association of Chief Police Officers (ACPO) requested the Home Office to carry out a review of police mobile communications. The ACPO decided that future policing demands required a radio service which:-

- Operated on a national basis
- Provided guaranteed levels of coverage and service
- Provided voice, text and data
- Could be used to access vital data bases, such as the Police National Computer, from vehicle or hand held radios.
- Would enable officers to work in separate 'talk-groups'
- Would allow seamless communications with officers in neighbouring forces and across the country.
- Would be encrypted to such a high standard that only a determined professional would have any chance of intercepting police communications.
- Have a panic button that the officer could press in an emergency and which would immediately alert the control room and colleagues.

This led to the Major Review of Emergency Services' Communications. The Home Secretary accepted the outputs of the Major Review, leading to the creation of the Public Safety Radio Communications Project. The aim was to have one totally integrated system across the UK for the police and also to allow for the integration of other emergency services into the system including Fire and Rescue, the Ambulance service, Coastguard, Mountain Rescue and HM Customs and Excise, amongst others.

The system identified as the most suitable to meet these requirements was TETRA (Terrestrial Trunked Radio) which is the only official European Standard for Digital Professional Mobile Radio. TETRA is a global standard for radio communication in the same way that GSM, UMTS and LTE are the standards for 2G, 3G and 4G mobile telephony, respectively.

TETRA is a trunked radio system where the radio channels are in a common pool and the TETRA system automatically allocates the radio channel to the radio users at the beginning of each call. The user does not need to know what channel he or she is using. This automatic allocation from a common pool is called trunking and the systems using this method area called trunked mobile radio systems.

A simple analogy to trunking is to compare it with a common queue in a bank, where the queue feeds several cashiers windows. This provides a more efficient service for the user when compared with forming separate queues at each cashier's window.

In addition to trunking, the TETRA system also employs Time Division Multiple Access (TDMA). This further saves channels as it can split the trunked channel between four users. That is to say that the channel is split into four timeslots enabling 4 users to be given a quarter of the time on the channel: each user is given approximately 14 milliseconds in every 56 milliseconds to transmit their signal.

The result is that TETRA gives better voice quality, more advanced data features, more efficient use of the valuable RF spectrum and security from eavesdropping through encryption (scrambling).

Following a European wide competition, Airwave Solutions Ltd, was awarded the contract by the Home Office for the UK wide project in February 2000. Airwave was formerly part of BT but, following the demerger of O2 from BT and its subsequent sale, is now in the private ownership, and is a group company, of Motorola Solutions.

Airwave Solutions Ltd is an Electronic Communications Operator pursuant to the Communications Act 2003, with the responsibility to establish and operate the emergency telecommunications network throughout the United Kingdom. For the police this had to be fully operational by 2005, before the old frequencies started to be withdrawn and the radio systems decommissioned. The Fire and Rescue and Ambulance services followed from 2006 onwards.

Airwave introduced the new network throughout the country on a police force by police force basis; Fire and Rescue and Ambulance services were similarly deployed on a county by county basis. The system has now been fully operational for some time with all the 'Blue Light' emergency services, together with other state security and rescue agencies including British Transport Police, Civil Nuclear Constabulary, Customs and Immigration, Mountain Rescue and the Coastguard using the system. The Airwave service is also used by the military, for example, when the Army runs major public events such as the 'Ten Tors Challenge' on Dartmoor.

The Airwave system is fully functioning and all its users have informed Airwave it is a considerable improvement over their previous systems. It has demonstrated its benefits at a number of major civil emergencies: the role of Airwave at the Boscastle emergency was the subject of praise by the Chief Constable of Devon and Cornwall. During the emergency in Carlisle, Airwave was the only telecommunication system not affected by the floods and continued to provide service throughout the emergency. During the terrorist bombings in London on 7 July 2005, Airwave provided a dedicated service for the British Transport Police and the City of London Police, and the system was deployed using 'leaky-feeders' to provide additional communications to aid the emergency services operations underground. The Airwave system was also made available to all the emergency services so that they could all communicate with each other, which aided the rescue operations. The Airwave service played a vital role in policing and customs and excise work following the grounding of the ship 'MSC Napoli' off the East Devon coast in January 2007. And of course more recently, Airwave provided the pivotal security communications role for all Homeland security during the 2012 Olympics.

The Airwave network is required to provide communications to all its subscribers without interruption, in contrast to the severe congestion sometimes experienced by the public cellular operators, where congestion on the public cellular networks results in calls being dropped or missed altogether, or their customers receiving an 'network busy' message and being unable to use their phones for many hours. On occasions, the commercial mobile networks are switched off; for example, following the terrorist bombings all the commercial mobile networks were switched off in London for some hours for security reasons to prevent further bombs being detonated using mobile phone signals or text messages.

In summary, the operational requirements mean that Airwave system must exhibit flexibility, reliability, rapidity and security, coupled with an excellent grade of service, with full radio coverage. The TETRA system more than meets these requirements and differs from public mobile radio systems primarily in terms of faster call set-up, group calls, prioritisation of call, enhanced security features and the possibility of direct calls from mobile station to mobile station without a connection via a base station, called direct mode operation.

These requirements, coupled with the need to avoid the frustrations and operational risks which would arise if there were, for example, excessive waiting time for call set-ups or frequent call disconnections, can be satisfied only through a system offering good and robust radio coverage, which requires a comprehensive network of telecommunications base stations to be available at all times.

It is the users of the system, normally the police, not Airwave, **who specify the level of RF coverage to be provided in any location**; Airwave is then contractually required to provide that level of RF coverage at all times, even if it means deploying temporary sites until permanent coverage can be achieved.

In Tankersley and across a section of the M1 around its Tankersley junction, junction 36, Airwave currently provide a specific dedicated level of in-building radio coverage by way of a site share of the existing O2 base station, csr2750, which located at Tankersley Plantation, Upper Tankersley. However following network consolidation with Vodafone, O2 have confirmed that their base station is no longer and that they require vacant possession of the site in order that they can return the land to its owner. Consequently formal legal paperwork known as a 'Notice To Quit' has been received by Airwave requiring the removal of all its equipment and to deliver up vacant possession of the site. As a result, to remove the equipment without a suitable replacement site, would leave the Emergency Services with no communications service whatsoever in Tankersley, Hoyland and High Green and a section of the M1 motorway, which if nothing else given the current security threat level coupled with the coronavirus pandemic is non-negotiable and clearly is not an option.

A fully functioning and operational Airwave system is therefore of overriding importance to the security of state and the general public in and around Tankersley and Hoyland, and the personal duties of those officers employed to carry out those often onerous and dangerous duties on behalf of state and public.

General Background Information to Radio Networks

How the cellular radio network works

The building blocks of the mobile telecommunications network are called radio base stations which transmit and receive calls to and from mobile phones using radio waves, similar to those used in domestic television and radio equipment. Radio base stations are often associated with free-standing masts, however they can be located on, or even inside, existing buildings and other structures.

How radio signals are transmitted

The radio signals are transmitted from antennas which are part of the radio base station and cover an area known as a “cell”, hence the term “cellular phone”. The size of the cell is dependent on a number of factors including: the height at which the radio base station is positioned; the topography of the surrounding landscape; anticipated demand; and the population density in the area.

Radio signal transmission from a radio base station can be likened to water being distributed from a garden sprinkler. The area immediately adjacent to the sprinkler remains almost “dry”. However the grass gets progressively wetter moving further away from the sprinkler, until a wettest point is reached. Then the further away from the centre, the ground becomes progressively drier. Radio base stations provide network services in the same manner. The area immediately beneath the antennas receives limited or, occasionally, no signal. Moving further away, the signal steadily improves until it reaches an optimum level and then gets progressively weaker.

In order to use mobile phones whenever and wherever we are, a network of radio base stations is required to maintain a continuous signal or ‘network service’ across a geographical area. The network is designed so that the cells from each radio base station slightly overlap. Travelling even a short distance may take us through a number of cell areas. Mobile phones are designed to monitor the strength of signal from surrounding radio base stations and automatically select the clearest signal, which often comes from the nearest site. As you approach the edge of the cell area, the phone will automatically select the adjoining radio base station, to provide a continuous service. This process is known as ‘call handover’.

Factors affecting network services

The siting of a radio base station is largely dependent on the characteristics of the radio signals which they transmit. The signals are similar to noise or heat in that physical features such as buildings or landscape can obstruct them. In open rural areas one base station can typically cover several kilometres in radius. However in urban areas where surrounding buildings will obstruct the signal, this range can be reduced to as little as a few hundred metres.

Network Capacity

Radio base station sites can only receive and transmit a limited number of simultaneous calls to and from mobile phones. In areas where the use of phones is particularly high, such as major towns or cities, many sites will reach the maximum number of calls they can process. When a customer attempts to make a call in an area where the network has reached its full capacity, the 'network busy' message is displayed on their mobile phone. In order to continue to meet customer demand and improve the quality of services in these areas, there is a need to increase the capacity of the network to allow more calls to be made.

Technical Requirements

Airwave Solutions Limited's radio engineers identify the need for a new radio base station where the existing signal strength is insufficient to support network requirements, where demand on the system is such that we need to increase capacity or where formal Notice is issued by a land owner requiring the removal of an existing base station from the land (Notice To Quit). The location of each radio base station is determined by the following factors:

1. The proximity of adjacent radio base stations and the signal coverage from them.
2. The terrain height of the area and surrounding topography.
3. The height and density of the buildings and structures within the area.
4. The potential customer demand within the area.
5. The service type that is required.

Site Selection Process

The following site selection procedures apply to each installation:

1. Following a technical review to define need, Airwave Solutions Limited's radio engineers undertake a desktop analysis to identify the best way of meeting the site requirement. This is completed by using Airwave Solutions Limited's computerised radio propagation modelling tool. This tool shows every site on our existing network and identifies those areas where insufficient signal level exists or where there is a need to increase capacity.

2. The desktop search also identifies other operators' existing electronic communications installations, including Arqiva, Wireless Infrastructure Group, British Gas, etc. This interrogation of databases ensures any mast-sharing opportunities are maximised. Where available the LPAs mast register is also reviewed.

3. The radio engineers define a search area, which is then issued to an acquisition agent who undertakes a detailed ground search with the radio engineer to identify suitable options.

4. The acquisition agent will obtain site-specific details to identify those sites that are viable options. The possible options are short-listed according to those that combine the following: location within or close to the search area, a willing landlord, adherence to planning and environmental policy, and sensitivity. These options are then returned to our radio engineers for a computer modelling assessment, taking into account the ground height, potential available antenna height and surrounding obstructions.

5. A plan for local consultation is drawn up, and where appropriate, a consultation exercise is undertaken with the local community. The issues associated with the proposal are discussed to obtain their comments on the options under consideration. After this review the final preferred option is selected.

6. Finally a site survey provides a full structural analysis of site including identifying power routes and how the site will be linked into the network. Terms with the landlord are then finalised, detailed plans prepared and the application submitted.

Site / Mast Sharing

Airwave Solutions Limited actively encourages and supports site sharing for both commercial and environmental reasons. All operators are required to explore site-sharing opportunities under the terms of their licence. Airwave Solutions Limited has implemented a number of measures to identify site-sharing opportunities.

Where a new ground based radio base station site is required, every effort will be made to ensure that sufficient land is acquired to accommodate a second operator's equipment. Approximately two thirds of all Airwave Solutions Limited radio base stations are now located on existing structures, such as buildings, pylons or existing masts.

Site sharing with other operators on an existing mast may not always result in the most visually acceptable structure. Typically, only lattice masts can accommodate other operators' antennas. With each additional set of antennas, the height of the mast will increase by between four and six metres. This is because antennas have to be vertically separated by at least one metre in order to avoid potential interference.

The following factors are considered when assessing a mast share:

- Is the structural capacity of the mast sufficient to accommodate the weight of additional antennas?

- Is there space at the right height on the mast for the additional operators to provide network coverage to their chosen area?

- Will the landlord allow further land to be released to accommodate the additional operator's equipment?

We trust the above answers your main queries regarding the generalities behind our planned installation.