

# **General Background Information for Telecommunications Development**

This document is designed to provide general background information on the development of the Vodafone and Telefónica networks. It has been prepared for inclusion with planning applications and supports network development proposals with generic information.

## **1.0 INTRODUCTION**

Over 25 years ago under the Telecommunications Act 1984, a licence was granted to Vodafone and Telefónica to provide a wireless (or mobile) phone service utilising unused radio frequencies adjacent to those transmitted for over 50 years by the television industry. Initially, because this wireless technology was new and the number of potential customers unknown, a number of tall masts were used to provide basic radio coverage to the main populated areas. The design strategy used was similar to that used by local radio/television i.e. tall masts to cover large distances over all types of topography.

It is important to note that in recent years form has followed function and digital technology has resulted in the development of smaller equipment. In addition, smaller radio coverage areas have resulted in antenna/mast heights being generally reduced. The industry has also been able to develop low impact designs for use in sensitive planning areas such as in Conservation Areas, on Listed Buildings, and in National Parks etc. The wireless telegraph pole solution is just one example of a design which has minimised impact on visual amenity of the local neighbourhood.

## **2.0 DIGITAL NETWORKS**

The Vodafone and Telefónica 2G digital networks were developed in the early 1990s. This digital technology is often referred to as GSM (Global System for Mobile Communications) which is the common European operating standard enabling phones to inter-connect to other networks throughout Europe and Internationally.

In April 2000, Vodafone and Telefónica were successful in their bids for two of the five licences available to provide a 'Third Generation' mobile telecommunications service known as 3G or UMTS.

In addition to voice services, this technology enables Vodafone and Telefónica to offer high resolution video and multi-media applications. Among other things this enables office services, virtual banking, e-retailing, video conferencing and high quality broadband internet access to be provided to users on the move. This is all made possible by higher rates of data transfer allowing wireless broadband access to the Internet for mobile phones and laptop computer data card users.

The 3G radio base station is designed to provide a service via cells in a similar way as the GSM (2G) system but with a few differences. Due to the increased data transfer, the location of base station sites is even more critical. Base stations must be located where the local demand exists in order to provide the required levels of service, otherwise the network will not function.

In February 2013, Vodafone and Telefónica were successful in their bids for 4G spectrum. 4G (sometimes called LTE (Long Term Evolution)) is the next major enhancement to mobile radio communications networks and will allow customers to use ultra-fast speeds when browsing the internet, streaming videos or sending emails. It also enables faster downloads. To meet this demand and improve the quality of service, additional base stations or upgrades to the equipment at an existing base station may be needed.

Vodafone and Telefónica will ensure it complies with planning policy guidance by ensuring apparatus is installed on existing buildings and structures, including masts wherever possible. However, in spite of these efforts, there are likely to be instances where there is a need to install additional base stations to provide contiguous service. This is largely due to the characteristics of radio propagation at these frequencies, demands on the service and the high data transfer rates.

It is very important to note that mobiles can only work with a network of base stations in place where people want to use their phones (or other wireless devices). Without base stations, the mobile phones we rely on simply won't work.

### **2.1 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. Vodafone and Telefónica use "radio frequencies" to transmit and receive calls at 900 MHz or 1800 MHz for 2G whilst 3G uses slightly higher frequencies within the 2100 MHz range. 4G will use frequencies within the 800MHz and 2600 MHz ranges.

### **2.2 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 a similar 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’.

### **2.3 Factors affecting network services**

The siting of a radio base station is largely dependent on the characteristics of the radio signals which they transmit. Physical features such as buildings or landscape can obstruct the signals. 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.

### **2.4 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.

### **2.5 Technical Requirements**

Vodafone / Telefónica radio engineers identify the need for a new radio base station where the existing signal strength is insufficient to support network requirements, or where demand on the system is such that we need to increase capacity. The location of each radio base station is determined by the following factors:-

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

## **3.0 SITE SELECTION PROCESS**

The following site selection procedures apply to each new installation to identify and sequentially discount alternative site options:-

1. Following a technical review which identifies need, Vodafone / Telefónica radio engineers undertake a desktop analysis to identify the best way of meeting the site requirement. This is completed by using computerised radio propagation modelling tools. These tools show every site on the existing networks 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 telecommunications installations. This interrogation of databases ensures any mast-sharing opportunities are maximised. Where available the LPA’s 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 with acceptable commercial terms, adherence to planning and environmental policy, and other site specific issues such as initial power and link availability. These options are then returned to the radio engineers for a computer modelling assessment, taking into account the ground height, potential available antenna height and surrounding obstructions.
5. Discussions are offered to the local planning authority to consider local policies and any protected areas and to agree additional public consultation if required. These discussions are used to identify a ‘preferred’ option.

6. A plan for local consultation is drawn up, and where appropriate, a consultation exercise is undertaken with the local community.

7. Finally a site survey provides a full structural analysis of the 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.

Vodafone and Telefónica are committed to ensuring the number and visual impact of any additional sites is minimised.

#### **4.0 PLANNING POLICY GUIDANCE ON TELECOMMUNICATIONS**

Technical Advice Note (TAN) 19: Telecommunications, takes account of the growth of the telecommunications industry and technology, of the new social and economic demands of communications and of the Welsh Assembly Government's environmental policies. TAN 19 should be read in conjunction with sections 12.11 – 13 of Planning Policy Wales 2016 which outlines the importance of telecommunications infrastructure for the social and economic wellbeing of Wales;

"Adequate and efficient infrastructure, including services such as education and health facilities along with water supply, sewers, waste management, electricity and gas (the utilities) and telecommunications, is crucial for the economic, social and environmental sustainability of all parts of Wales."

"The Welsh Government recognises that widespread access to affordable, secure telecommunications infrastructure is important to citizens and businesses across Wales. It is important that the telecommunications infrastructure in Wales is able to meet this challenge, helping to build a thriving and prosperous Welsh economy..."

...Local planning authorities are encouraged to respond positively to telecommunications development proposals, whilst taking account of the advice on the protection of urban and rural areas."

LPA's are encouraged to respond positively to telecommunications development proposals, while taking account of the advice on the protection of the environment. Authorities should not question the need for the telecommunications system that the proposed development is to support, nor seek to prevent competition between different operators. The aim should be for LPA's and operators to work together to find optimum solutions to development requirements.

TAN 19 recognises that siting and design concerns may centre particularly on the type of mast and its impact, particularly if located in a designated area. Its height, ancillary development and the scope for landscaping and screening will also be important considerations. However, many antennas have special siting needs because they have a limited range or require line of sight and TAN 19 states that LPA's should take full account of these needs.

TAN 19 also recognises that LPA's should ensure that they understand the constraints the operators face, whether due to the nature of the technology or the legal requirement to provide a service while PPW '2016 builds on this by stating; "Criteria should be sufficiently flexible to accommodate technical changes and may be concerned with the siting and appearance of apparatus, including location and landscaping requirements designed to minimise the impact on amenity consistent with operational requirements."

Significantly, PPW makes clear that decision makers should attach limited weight to outdated policy and guidance which cannot take account of modern siting, design and service provision necessity. Therefore significant weight should be attached to the social and economic benefits of modern service provision as detailed in PPW: "Planning permission or approval of details *should not be refused on the basis of policies that take insufficient account of the growth and characteristics of modern telecommunications.*"

TAN 23 Economic Development recognises that broadband and other forms of technology infrastructure are particularly important to help support rural economies.

#### **5.0 SITE / MAST SHARING**

Vodafone and Telefónica 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. Vodafone and Telefónica have implemented a number of measures to identify and maximise site-sharing opportunities.

This is also advocated within TAN 19 and PPW 2016. This principle also ties in with TAN 19 and PPW '14 guidance regarding minimising the number of base stations required and, where possible, the upgrade of existing installations to provide the most modern and efficient service to meet the social and economic requirements alluded to previously and within PPW 2016.

"The Welsh Government attaches considerable importance to keeping the number of masts, and the number of sites for such installations, to the minimum consistent with the efficient operation of the network. The sharing of masts and sites is strongly encouraged where that represents the optimum environmental solution in a particular case."

## **6.0 COUNCILS**

### **6.1 Moratoria**

General Government guidance on mobile telecom installations advises that local authorities should make suitable council owned property available to network operators for base station development. If suitable council sites are not made available, operators may have to look for alternative sites which the local community might find less acceptable.

Moratoria may also increase the number of new sites needed as council owned buildings are often better suited for base stations e.g. tall buildings. The operators believe it is preferable to deal with proposed developments on council property on a case by case basis.

### **6.2 Mast register**

Guidance in the Code of Best Practice on Mobile Phone Network Development recommends that local authorities develop a register of local base stations.

TAN 19 strongly encourages Local Planning Authorities to maintain a register of masts and other structures to which apparatus could be attached.

The MOA welcomes the provision of registers of base stations by local authorities in addition to Ofcom's public database of UK base stations. <http://www.ofcom.org.uk/sitefinder/>

## **7.0 CONSULTATION WITH SCHOOLS**

The operators fully comply with Government Guidance on pre application consultation with schools and colleges. They provide evidence to the local planning authority that they have consulted the relevant body of the school or college.

The Code of Best Practice on Mobile Phone Network Development gives guidance on the factors operators should consider when determining whether consultation is required, as each development is different. These factors are equally applicable for Local Planning Authorities who carry out their own consultation once the application has been submitted.

A recent report stated there is no scientific basis for siting base stations away from schools (NRPB report, January 2005)

## **8.0 LEGAL CASES**

The following legal cases may be helpful:-

### **8.1 Harrogate case November 2004**

The Court of Appeal gave a judgment that Government Planning Guidance in PPG8 and now replaced by the NPPF (in England) is perfectly clear in relation to compliance with the health and safety standards for mobile phone base stations. The Court of Appeal and the High Court both upheld Government policy in response to a planning inspector's decision that departed from that policy and failed to give adequate reasons for doing so.

### **8.2 Winchester case November 2004**

The Court of Appeal decision upheld an earlier decision by Mr Justice Sullivan that a mobile phone network operator should not use its compulsory acquisition powers as part of its day to day radio base station siting processes.

The Court of Appeal agreed with Mr Justice Sullivan that these far-reaching statutory powers were never intended for use in day to day planning situations and should be used by an operator only as a last resort when there is no other siting alternative. The House of Lords on 16 March 2005 refused leave to appeal the Court of Appeal ruling.

### **8.3 Bardsey case January 2005**

The Court of Appeal confirmed that the permitted development regime for mobile phone base stations is compliant with the Human Rights Act.

This was a case in which a local planning authority failed to comply with its obligations to act within the 56 day period provided under the permitted development regulations.

## **9.0 FURTHER INFORMATION**

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

The enclosed site-specific details will identify any alternative discounted options and reasons why they were rejected and how the proposed site complies with national and local planning policies.

The Local Government Ombudsman's Special Report on Telecommunication Masts gives some positive recommendations and general advice to Local Planning Authorities in determining Prior Approval applications. A copy of the report is available at <http://www.lgo.org.uk/GetAsset.aspx?id=fAAxADEANgB8AHwARgBhAGwAcwBIAHwAfAAwAHwA0>

TAN 19 - <http://gov.wales/desh/publications/planning/technicaladvicenotes/tan19/tan19e.pdf?lang=en>

Chapter 12, Planning Policy Wales - <http://gov.wales/docs/desh/publications/140731chapter-12-en.pdf>