



Planning Policy Statement 10 (PPS 10)

Telecommunications

Planning Policy Statements (PPSs) set out the policies of the Department of the Environment on particular aspects of land-use planning and apply to the whole of Northern Ireland. Their contents will be taken into account in preparing development plans and are also material to decisions on individual planning applications and appeals.

This PPS sets out the Department's planning policies for telecommunications development. It embodies the Government's commitment to facilitate the growth of new and existing telecommunications systems whilst keeping the environmental impact to a minimum. The PPS also addresses health issues associated with telecommunications development.

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Preamble

The Department of the Environment is responsible for planning control in Northern Ireland. The Planning Service, an Agency within the Department, administers its planning functions.

The Department has a statutory duty, laid down in Article 3 of the Planning (Northern Ireland) Order 1991, to formulate and co-ordinate policy for securing the orderly and consistent development of land and the planning of that development. The Department's planning policies are normally issued through Planning Policy Statements and PPS 1 'General Principles' advises that:

"Planning Policy Statements set out the policies of the Department on particular aspects of land-use planning and apply to the whole of Northern Ireland. Their contents will be taken into account in preparing development plans and are also material to decisions on individual planning applications and appeals."

This Planning Policy Statement, PPS 10 'Telecommunications', sets out the Department's planning policies for telecommunications development. It embodies the Government's commitment to facilitate the growth of new and existing telecommunications systems whilst keeping the environmental impact to a minimum. It also addresses health issues associated with telecommunications development.

The PPS is therefore of direct relevance to the public, the telecommunications industry and others whose actions have a direct physical impact upon the natural or man-made environment including land owners, developers, government departments and agencies, district councils, other statutory undertakers and voluntary organisations.

The policies of this Statement supersede Policy PSU 13, Telecommunications, of the Planning Strategy for Rural Northern Ireland. Where this policy is referred to elsewhere in the Planning Strategy the policies of this Statement will take precedence. The policies of this Statement will also take precedence over the provisions of existing development plans in relation to telecommunications development.

Nothing in this document should be read as a commitment that public resources will be provided for any specific project. All proposals for expenditure by the Department are subject to economic appraisal and will also have to be considered having regard to the overall availability of resources.

1.0 Introduction

- 1.1 Modern telecommunications¹ are an essential and beneficial element in the life of the people of Northern Ireland and of the regional economy. Much of the telephone network is, of course, long established. However, the growth in the mobile communications sector in Northern Ireland over the past 10 years has been remarkable with an estimated 1 million people now registered as mobile phone subscribers. The new communications technology has spread rapidly to meet the growing demand for better communications at home, in business, in public services and in support of electronic commerce.
- 1.2 The telecommunications industry is passing through a period of rapid expansion, technical innovation and intense competition. These are worldwide trends and Northern Ireland must take account of the changes that are underway to ensure the future social and economic wellbeing of the country.
- 1.3 It is recognised that the economic and social benefits of advanced telecommunications to Northern Ireland can only be achieved if the necessary infrastructure is developed, including the networks of base stations. However the Department considers that the industry must devote greater attention to the siting and design of equipment. The aim of the PPS is therefore to ensure that new telecommunications infrastructure, such as masts, antennas and associated equipment can be developed in a way which continues to provide Northern Ireland with world class telecommunications services, while at the same time minimising the environmental impact of new or replacement equipment.
- 1.4 The PPS also addresses health issues associated with telecommunications development in response to the report prepared by the Independent Expert Group on Mobile Phones (IEGMP) under the chairmanship of Sir William Stewart which considered the health effects from the use of mobile phones, base stations and transmitters.

¹ References to telecommunications throughout the PPS should be read as including all forms of communications by electrical or optical wire and cable and radio signals (whether terrestrial or from satellite), both public and private, except where otherwise stated.

2.0 Policy and Legislative Context

UK Government Telecommunications Policy

- 2.1 The aim of Government² telecommunications policy is to ensure that people have:
- a wide range of services from which to choose;
 - equitable access to the latest technologies as they become available; and
 - more choice as to who provides telecommunications services.
- 2.2 Fast, reliable and cost-effective modern telecommunications can attract new businesses and enable economic growth by opening up new markets and new opportunities for diverse and innovative services. The Government aims to make the UK the best place to do business electronically by 2002. It has been the policy of successive Governments to extend the social and economic benefits of modern telecommunications technology throughout the UK. Further development of the telecommunications infrastructure is therefore essential to the continued success of this policy, particularly to support widespread and affordable access to broadband services.

Northern Ireland Executive Programme for Government

- 2.3 The Programme for Government (December 2001) indicates that the Executive will work to ensure that the communications infrastructure of Northern Ireland is developed to a standard that our economy requires. It advises:
- “Business is increasingly being conducted electronically. Therefore so that we can compete effectively, we will encourage the development of a cutting-edge telecommunications infrastructure. We will also ensure that access to e-business opportunities is available to all areas and all sections of our community. In this we recognise that our own development of e-Government has an important role to play.”*
- 2.4 During 2002-2005 the Executive, working with the private sector, will also continue to implement the telecommunications strategy that will ensure that all of Northern Ireland has a world class telecommunications infrastructure in terms of broadband capacity, access and cost.

Regional Development Strategy

- 2.5 The Regional Development Strategy for Northern Ireland 2025 (RDS) published in September 2001 by the Department for Regional Development acknowledges that continuing developments in telecommunications are likely to have a significant further impact on economic growth. The Strategy indicates that further enhancement of the telecommunications network can be a ‘winner’

² Please note that all references to Government in this PPS refer to the UK Government unless otherwise indicated.

in off-setting perceived peripherality and in leveraging future economic development for Northern Ireland.

- 2.6 The RDS highlights the need for the development of a long term investment strategy for infrastructure supportive of the regional economy, involving both public and private sectors. This will include promoting the development of an up-to-date, highly competitive telecommunication infrastructure – in terms of capacity, technology, access and costs. The RDS also encourages the use of information technology, telecommunications and tele-working in rural areas to help facilitate the development of rural industries, businesses and enterprises.

Regulation of Telecommunications

- 2.7 Telecommunications legislation and regulation is reserved to the UK Parliament and administered by the Department of Trade and Industry (DTI). Legislative responsibility for town and country planning is devolved to the Northern Ireland Assembly.

Telecommunications Legislation and Regulation

- 2.8 Operators of public telecommunications systems in the UK require a licence issued by the Secretary of State for Trade and Industry under the Telecommunications Act 1984. In order to facilitate the installation and maintenance of these systems the Act provides that the Secretary of State in issuing a licence may grant some operators special rights and obligations. These are set out in Schedule 2 of the 1984 Act, known as 'the telecommunications code' and hence these operators are commonly known as Code System Operators.
- 2.9 The Office of Telecommunications (OFTEL), a non-ministerial Government Department, regulates the UK telecoms industry under the 1984 Act by monitoring, enforcing and modifying the conditions attached to telecommunications licences. It is these conditions that specify operators' rights and obligations. The Northern Ireland Advisory Committee on Telecommunications (NIACT) is appointed by the Secretary of State for Trade and Industry to ensure that OFTEL and the companies that supply telephone networks, communication services and equipment take account of the needs of all consumers in Northern Ireland. To reflect the growing convergence between the broadcasting, telecommunications and information technology sectors, the Government proposes to create a new unified regulator for the electronic communications sector, the Office of Communications (OFCOM). This new regulator will replace all of the following: OFTEL; the Independent Television Commission (ITC); the Broadcasting Standards Commission; the Radiocommunications Agency; and the Radio Authority.
- 2.10 The Government White Paper entitled 'A New Future for Communications' issued in December 2000 sets out the proposed new framework for communications regulation in the 21st century. It seeks to ensure that the UK is home to the most dynamic and competitive communications market in the world

and to maintain the UK's competitive advantage in the rapidly changing international marketplace.

- 2.11 In addition to a licence required under the Telecommunications Act operators who provide telecommunication services by means of radio may require a licence issued under the Wireless Telegraphy Act (1949 and 1968) to use the radio spectrum. The Radiocommunications Agency (RA), an Executive Agency of the DTI, is responsible for the allocation, maintenance and supervision of the UK Radio Spectrum under the Wireless Telegraphy Act. The licensing process includes, where necessary, putting the transmitting sites through a radio site clearance procedure. This addresses issues such as radio interference, aviation safety and the need to minimise the number and optimise the use of sites, masts and other apparatus by sharing facilities. This clearance procedure is not a pre-requisite for planning approval and it is usually initiated after such approval is obtained.

Other Interests

Building Control

- 2.12 Free standing telecommunications masts, cabling and equipment housings are not subject to building regulations. Where however masts or equipment are attached to or placed on a building, building control approval may be required to cover any alterations to the building (for example if the roof structure has to be strengthened, or access is provided). Where telecommunications equipment is housed in a building containing other accommodation, building control approval may also be required. In either case the building control department of the local district council should be consulted.

Health and Safety Executive

- 2.13 Under the Health and Safety at Work (Northern Ireland) Order 1978 the Health and Safety Executive for Northern Ireland (HSENI) seeks to ensure that risks to people's health and safety arising from work activities and the way work is carried out are properly controlled (for example, during the installation and maintenance of antennas).
- 2.14 It is not for the planning system to replicate controls which exist under the health and safety regime. The enforcement of health and safety at work legislation is a matter for HSENI. If, once a particular telecommunications development is in operation, there is evidence that an operator is not meeting their statutory health and safety responsibilities in a particular case, HSENI may investigate and, if necessary, require action to be taken. Accordingly, following consultation, the Department and the HSENI have agreed that it is not necessary for the HSENI to be consulted on individual proposals for telecommunications development.

The National Radiological Protection Board

- 2.15 The National Radiological Protection Board (NRPB) was established under the Radiological Protection Act 1970 to provide information and expert advice to

Government and others in relation to protection from radiation hazards, to undertake supporting research and to provide technical services to those concerned with radiation hazards. Drawing upon the most up-to-date research worldwide the NRPB has produced a number of leaflets and other publications on the health implications of electromagnetic fields, including advice on mobile phone emissions. This information is available at www.nrpb.org.uk and advice can also be obtained by ringing their public enquiry line (01235 831600).

Health Issues

2.16 In 1999, the Government asked the National Radiological Protection Board to set up the Independent Expert Group on Mobile Phones (IEGMP). This Group, under the chairmanship of Sir William Stewart FRS FRSE, considered concerns about health effects from the use of mobile phones, base stations and transmitters. They conducted a rigorous and comprehensive assessment of existing research and gathered a wide range of views. The Group published its Report, 'Mobile Phones and Health' (The Stewart Report) HealthHH on 11 May 2000³.

2.17 In respect of base stations, the report concluded that "the balance of evidence indicates that there is no general risk to the health of people living near to base stations on the basis that exposures are expected to be small fractions of the International Commission on Non-Ionising Radiation Protection (ICNIRP) public exposure guidelines. However, there can be indirect adverse effects on their well-being in some cases". The report also advised that the possibility of harm could not be ruled out with confidence and that the gaps in knowledge were sufficient to justify a precautionary approach.

2.18 The IEGMP recommended a precautionary approach, comprising a series of specific measures, to the use of mobile phone technologies until there is more detailed and scientifically robust information on any health effects. The Government's response to the IEGMP report⁴ includes acceptance of the recommended precautionary approach advised by the Group. Specific recommendations in the report (*italics*) and up-to-date responses include the following:

- *that emissions from mobile phone base stations should meet the ICNIRP guidelines for public exposure as expressed in the EU Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300GHz)*⁵.

The mobile phone operators have now assessed and where necessary adjusted their existing base station sites to ensure that they meet the ICNIRP public exposure guidelines, which are more stringent than the

³ A copy of the IEGMP report is available at www.iegmp.org.uk or by post from the IEGMP Secretariat c/o the National Radiological Protection Board, Chilton, Didcot, Oxon OX11 0RQ

⁴ The Government's response to the IEGMP report is available at www.doh.gov.uk/mobile.htm

⁵ Off J Eur Commun, L199, 59 (199/519/EC)

former guidelines. All new base stations will meet the ICNIRP guidelines.

- *that an independent random audit of base stations should be carried out to give the public confidence that emissions to which the public are exposed do not exceed the ICNIRP public exposure guidelines.*

During 2001 surveys were undertaken by the Radiocommunications Agency (RA). The initial focus of the audit has been schools with base stations on their premises. Over 100 surveys have now been completed, including 6 school sites in Northern Ireland, with all measurements so far showing emissions to be hundreds of times below the ICNIRP guidelines. Full results are published on the RA website at www.radio.gov.uk. These results are currently being considered and a decision will shortly be taken on how to progress the audit.

- *that a national database be set up giving details of all base stations and their emissions.*

The Radiocommunications Agency has recently established and will now be maintaining a single co-ordinated database giving information on all operational, externally sited, cellular base stations in the UK. The database is an INTERNET based resource called Sitefinder. It can be accessed at www.sitefinder.radio.gov.uk and will be updated every three months.

- *that, in relation to macrocell base stations, the zone where the concentration of radio waves is higher than elsewhere⁶, should not fall on any part of a school's grounds or buildings without agreement from the school and parents; and that, if for an existing base station, agreement could not be obtained, the antennas may have to be readjusted.*

The Network operators have agreed to provide schools with information on the level of radio wave emissions on request.

- *that clear exclusion zones should be in place around all base station antennas to protect the public from areas where emission levels may exceed the ICNIRP public exposure guidelines.*

These exclusion zones, which relate to an area directly in front of and at the height of the antennas, should already be in place around all base stations. The mobile operators are developing and will be deploying common signage for sites where there is access to exclusion zones.

- *that a substantial research programme, overseen by a demonstrably independent panel, should be financed by the mobile phone companies and the public sector.*

A joint Government/industry research programme, the Link Mobile Telecommunications and Health Research Programme, was set up during 2001. The Programme has an independent programme management committee led by Sir William Stewart and a budget of some £7 million. It will

⁶ This concept was referred to by the IEGMP as "the beam of greatest intensity"

carry out further research into the effects of mobile phone technology on health. This will ensure that this area is kept under review and that Government and the public are kept up to date with new research findings. The first fifteen research projects to be funded under the programme and representing £4.5m of the research monies were announced in January 2002 by the Mobile Telecommunications and Health Research Committee. For more information see www.mthr.org.uk

- *that the effects of mobile phone technology should be the subject of a further review in three years time, or earlier if circumstances demand it.*

The NRPB will review further research in this area and report on progress in 2003 or whenever significant new information becomes available.

- *that a leaflet be circulated by Government throughout the UK providing clearly understandable information on mobile phone technology and related health aspects.*

Two leaflets (a) Mobile Phone Base Stations and Health and (b) Mobile Phones and Health, have now been issued by the Department of Health / Northern Ireland Executive. These are available at www.doh.gov.uk/mobile.htm or copies can be obtained from Planning Service Offices.

- 2.19 Making sure that these steps are taken is the responsibility of the Government, the telecommunications regulating authorities and the mobile telecommunications industry. They are not matters for action by the planning system but are included here for information. The role of the planning system regarding health considerations is dealt with in paragraphs 6.28 – 6.34.
- 2.20 The Department will continue to liaise closely with the Department of Health, Social Services and Public Safety and other government departments and agencies concerning the public health issues associated with telecommunications development and shall keep this whole area under review in the light of further research and advice.

3.0 Background Information

Growth of Telecommunications

- 3.1 The UK is one of the world leaders in mobile telecommunications, with different network operators offering innovative and competitive services. The industry is set to grow significantly as existing services are expanded, new services provided and consumer demands increase. Growth is likely to be driven by a range of factors including the increased capacity of digital broadband technology (including 3G, fixed wireless and satellite systems), the growth in demand for communications of all kinds, especially mobile, non-voice or data services, more diverse services, continued growth of the internet, and greater competition. Change will also be driven by convergence, the integration of telecommunications, broadcasting and information technology sectors, and between fixed and mobile networks.

Economic Importance

- 3.2 To maintain and improve our position in an increasingly competitive global market, Northern Ireland will need a telecommunications infrastructure of the highest quality. In particular advanced telecommunications can help reduce the disadvantages of a peripheral location in Europe and assist in opening up new markets. These benefits could be particularly important in facilitating business development in disadvantaged rural areas in Northern Ireland.
- 3.3 The Programme for Government has identified the use of information technology as one way of improving the efficiency and productivity of the economy. New technology allows companies to download and transmit substantially greater amounts of data, reduce their costs, satisfy more customers and gain access to new markets. This is producing many new job and business opportunities and more are expected. To benefit fully from the significant advantages that new technology can provide, Northern Ireland must embrace the change now underway.

Social and Educational Benefits

- 3.4 Modern telecommunications offer a number of valuable social and educational benefits. They can help to promote social inclusion by providing opportunities to participate in work, learning and society generally. The growth in mobile phone usage, including text messaging, has enabled people to keep in touch more easily with friends and family. Mobile phones also have an important role in enhancing personal safety, for example, by facilitating contact with the emergency services, who themselves rely on mobile communications. Both mobile and fixed radio services can be of particular benefit in some rural areas where landlines may not be practical or commercially viable.
- 3.5 The educational, shopping, entertainment and information services available through the Internet are already popular. The introduction of the new 3G mobile and broadband radio systems will allow far more data to be transmitted quickly

and facilitate the introduction of a new range of services both to mobile and fixed link customers, such as video conferencing and multi-media applications.

Environmental Issues

- 3.6 The significant increase in telecommunications development witnessed in recent years has resulted in growing concern about its impact on the environment. This has often been expressed by those who have found equipment erected on land or buildings near their homes, but has also arisen due to the multiplicity and layout of equipment at certain roof-top locations and the introduction of prominent new structures into rural areas.
- 3.7 While it is acknowledged that badly sited or poorly designed telecommunications equipment can have a negative impact on the environment, it should also be noted that modern telecommunications can bring environmental benefits. They can help reduce the need to travel and hence reduce vehicle emissions and congestion, for example by enabling 'home working'. They have also enabled the development of 'real time' driver information systems which can lead to better use of roads and reduced congestion.

Implications for Planning

- 3.8 With continued growth in demand for the use of telecommunications and anticipated changes to the nature of the industry, it is envisaged that the following trends will have specific and general implications for planning:
- demand for additional 2G base stations will continue – in order to facilitate the continuing roll-out of the 2G mobile networks and as existing cells are divided to provide additional capacity, typically with smaller lower powered antennas;
 - demand for 3G base stations will increase significantly – in order to facilitate the roll-out of the 3G mobile networks. It is estimated that 3G may require potentially 3-4 times as many base stations as 2G services (possibly in excess of 60,000 sites throughout the UK). A proportion of the 3G apparatus will be accommodated by sharing existing 2G structures;
 - demand for Fixed Radio Access (FRA) base stations may increase significantly – particularly following the recent auction of the spectrum by the Government. Similar to the 3G networks this will require many more base stations; and
 - demand for other radio systems may increase requiring the provision of base stations.
- 3.9 New base station development is likely to be concentrated in urban areas and along main transport corridors. Given the potential for advances in technology it is also envisaged that the design and appearance of telecommunications apparatus (including masts, antennas, equipment housing etc) will improve over time.

4.0 Policy Objectives

4.1 The main objectives of this Statement are to:

- facilitate the continuing development of telecommunications infrastructure in an efficient and effective manner;
- ensure that where appropriate new telecommunications development is accommodated by mast and site sharing;
- ensure that the visual and environmental impact of telecommunications development is kept to a minimum;
- minimise, as far as practicable, undue interference that may be caused to terrestrial television broadcasting services by new development; and
- encourage appropriate provision for telecommunications systems in the design of other forms of development.

5.0 Development Plans

5.1 During the process of development plan preparation, telecommunications operators may wish to discuss with the Department the likely extent of the network coverage for the particular plan area.

5.2 In certain circumstances, subject to technical limitations on location and siting, the Department may allocate particular sites in the development plan for major telecommunications developments, such as tall masts, in order to encourage site sharing.

6.0 Planning Policies

In exercise of its responsibility for planning control in Northern Ireland the Department assesses development proposals against all planning policies and other material considerations that are relevant to it.

The planning policies of this Statement must therefore be read together and in conjunction with the relevant contents of the Department's development plans and other planning policy publications, including the Regional Development Strategy. The Department will also have regard to the contents of published supplementary planning guidance documents.

The following policies set out the main planning considerations that the Department will take into account in assessing proposals for telecommunications development and proposals likely to result in radio interference. The provisions of these policies will prevail unless there are other overriding policy or material considerations which outweigh them and justify a contrary decision.

Policy TEL 1 Control of Telecommunications Development

The Department will permit proposals for telecommunications development where such proposals, together with any necessary enabling works, will not result in unacceptable damage to visual amenity or harm to environmentally sensitive features or locations.

Developers will therefore be required to demonstrate that proposals for telecommunications development, having regard to technical and operational constraints, have been sited and designed to minimise visual and environmental impact.

Proposals for the development of a new telecommunications mast will only be considered acceptable by the Department where the above requirements are met and it is reasonably demonstrated that:

- (a) the sharing of an existing mast or other structure has been investigated and is not feasible; or
- (b) a new mast represents a better environmental solution than other options.

Applications for telecommunications development by Core System Operators or broadcasters will need to include:

- (1) information about the purpose and need for the particular development including a description of how it fits into the operator's or broadcaster's wider network;
- (2) details of the consideration given to measures to mitigate the visual and environmental impact of the proposal; and
- (3) where proposals relate to the development of a mobile telecommunications base station, a statement:
 - indicating its location, the height of the antenna, the frequency and modulation characteristics, details of power output; and
 - declaring that the base station when operational will meet the ICNIRP guidelines for public exposure to electromagnetic fields.

Where information on the above matters is not made available or is considered inadequate the Department will refuse planning permission.

Justification and Amplification

- 6.1 The Department's policy seeks to enable the telecommunications industry to expand its operations in a manner that keeps the visual and environmental impact of telecommunications equipment to a minimum. The aim is that the equipment should become an accepted and unobtrusive feature of urban and rural areas. This is in the long term interests of the industry, the economy and the people of Northern Ireland.

Technical and Operational Constraints

- 6.2 The Department recognises that telecommunications code system operators are obliged to provide their services to the public at large and have to work within the constraints of the technology to meet their licence requirements. For example, masts and antennas often require a particular operating height to allow signals to clear trees and urban clutter. Telecommunications development may therefore need particular locations in order to work effectively. Certain development may also be significant as part of the overall network. In assessing proposals the Department will therefore take into account the special needs and technical constraints associated with telecommunications development. There is also however a corresponding need for the Department to adequately control telecommunications development so that rural landscapes, urban skylines and townscape character are not unduly spoiled. In bringing forward proposals, applicants will therefore be expected to provide information about the purpose and need for the particular apparatus or equipment.

Minimising Visual and Environmental Impact

- 6.3 In submitting proposals for telecommunications development applicants should seek a solution which minimises visual and environmental impact. Individual circumstances will determine how this can best be achieved. For development by code system operators an approach to reaching an apt solution in site selection and base station design is to consider the series of options set out below. This is a checklist rather than a rigid sequence of steps:
- installing smaller antennas;
 - disguising antennas and equipment, for example as part of a building or street furniture;
 - designing antennas and equipment so that they appear to be an integral part of a building, structure, or landscape;
 - sharing existing sites, masts and other infrastructure;
 - installing antennas on a building or structure not already used; and
 - developing a new mast only when other options are not possible or it represents a better environmental solution than other options.
- 6.4 In all cases applications will need to include details of what measures have been considered to mitigate the visual and environmental impact of the proposal. In addition where existing infrastructure is being replaced, operators should consider the scope for improved designs that would be less visually intrusive than that which it replaces.

Minor Telecommunications Development

- 6.5 Wherever practicable, operators and others should seek to provide telecommunications infrastructure through the use of smaller, more unobtrusive and lower powered equipment. In built up areas such equipment can be integrated into street furniture, CCTV equipment or even placed inconspicuously on shop fronts. This can significantly reduce visual impact.
- 6.6 Installation of the smallest antenna systems may be covered by the normal planning principle of *de minimus*. This term covers minor developments which, in relative terms, will not have a material effect on the external appearance of the building or structure on which they are installed. As a result they may not come within the legal definition of development and hence not require planning permission. Most conventional television aerials and their mountings have long been treated in this way, and the Department will continue to apply this approach to small telecommunications apparatus regardless of who installs it. The installation of some microcell base stations, such as those similar in appearance to burglar alarms, may be treated in this way.

Larger Telecommunications Development

- 6.7 To facilitate the on-going roll-out of modern telecommunications networks the Department acknowledges that there will continue to be a need for larger telecommunications equipment and apparatus, such as masts and roof based antenna systems in appropriate locations.
- 6.8 Where such larger telecommunications infrastructure is required all the components of the proposed development should be considered together. This includes the antennas (even if they will not all be in service initially), mast or other supporting structure, equipment housing, cable runs, fencing, planting, landscaping, access, power supply and land lines. They should all be sited and designed to minimise their visual and environmental impact. In some cases further information on visual impact may be required, such as a photomontage to show the proposed equipment in its wider setting. Exceptionally in designated or other sensitive landscapes a landscape or visual impact assessment may be needed.
- 6.9 There is a range of different design and camouflage techniques for masts, antennas, equipment housing and cable runs which can help to disguise or conceal them. These include apparatus coloured to match building materials and masts designed to look like street furniture. The Department will expect operators to discuss what different design options are available. There may also be opportunities to design a mast and/or antenna as a positive feature.
- 6.10 In built up areas operators should wherever possible seek to locate and disguise larger apparatus on existing buildings and structures so that it is not conspicuous. Design should be sympathetic to the architectural form of the building. Any additional equipment whether on an existing mast, building or other structure should be designed and positioned sensitively in order to complement the visual ensemble already in place.

- 6.11 In the countryside telecommunications development has to be sited and designed carefully. Skylines can be easily broken and habitats and species easily disturbed. If telecommunications infrastructure is located in prominent positions it can change the character of a landscape and detract from its quality. Cumulative impacts can also cause concern. Areas designated for their landscape quality and other sensitive landscapes, such as the undeveloped coast, will pose particular challenges in finding an acceptable solution. The approach to finding the optimum solution may include disguising the antennas, sharing a site or existing infrastructure, minimising the size of a new mast, using stealth designs, and landscaping and appropriate screen planting. Hill-top or skyline sites should only be used as a last resort.
- 6.12 In countryside areas operators should also seek to use existing lanes or tracks to provide access to their sites as a new access road may cause greater visual impact or environmental damage than the actual installation. For example it may open up an otherwise undisturbed area to unwanted visitors. The construction of new access roads and other less formal access arrangements can also be damaging to archaeological sites and nature conservation interests. As a result the Department will only permit new access roads where they are absolutely necessary. Where they are required great care should be taken to ensure that they will not appear as a scar on the landscape through careful siting, choice of surfacing materials and where necessary appropriate planting. In exceptional cases however the Department may require the use of a helicopter for the construction, installation and ongoing maintenance of a base station.
- 6.13 In assessing the requirements for visibility splays at accesses to installations the Department will bear in mind that in many cases these are unlikely to give rise to traffic hazards as maintenance visits should not be more than quarterly. Where it is considered necessary to remove existing hedges to facilitate visibility splays replanting of appropriate species will be required to maintain rural character.

Environmentally Sensitive Features and Locations

- 6.14 Wherever possible telecommunications development should seek to avoid sensitive features and locations of archaeological, built or natural heritage value. This includes archaeological remains, listed buildings and conservation areas, areas of outstanding natural beauty, sites of nature conservation importance, sites where there are protected species, local landscape policy areas and other environmental designations. Applicants should submit suitable evidence to show that alternative locations in less sensitive areas have been investigated and cannot be used. Where such locations cannot be avoided extra care will be required to ensure that the visual and environmental impact of the telecommunications apparatus and any ancillary works, such as an access track or power line, is minimised.

- 6.15 There may be a need to obtain a separate listed building consent, under Article 44 of the Planning (NI) Order 1991, for any internal or external works to a listed building if these are judged by the Department to affect its character. Similarly, any works to, or affecting the site of, a scheduled monument require scheduled monument consent from the Department's Environment and Heritage Service under the Historic Monuments and Archaeological Objects (NI) Order 1995. The Department's current policies for development affecting conservation interests are set out in Planning Policy Statement 6: Planning, Archaeology and the Built Heritage and Planning Policy Statement 2: Planning and Nature Conservation.

Mast and Site Sharing

- 6.16 In order to limit visual intrusion the Department attaches considerable importance to keeping the numbers of radio and telecommunications masts, and the sites for such installations to a minimum, consistent with the efficient operation of the network.
- 6.17 The sharing of masts will be strongly encouraged where it represents the best environmental option in a particular case. Additional equipment should be designed and positioned as sensitively as possible, though technical constraints may limit the possibilities. In some circumstances the shared use of an existing mast might require an increase in the height, and therefore the visibility, of that mast. The Department will therefore seek to ensure that the cumulative visual impact of antennas on masts is kept at an acceptable level. Alternatives to mast sharing will be preferable where additional antennas would lead to undue clutter, detract from the aesthetics of the existing installation, or increase mast height to an unacceptable level.
- 6.18 Depending upon the characteristics of the location, site sharing (both rooftop and ground based sites) as opposed to mast sharing may represent a more appropriate solution. A second installation located alongside or behind the principal installation may, for example, provide a more beneficial solution in environmental and planning terms.
- 6.19 All applications for new masts will need to be accompanied by evidence that the possibility of erecting antennas on an existing building, mast or other structure has been explored and should outline the specific reasons why this course of action is not possible. Where the evidence regarding the consideration of alternative options is not considered satisfactory, planning permission may be refused. In such circumstances the Department will give clear reasons why it considers the evidence to be unsatisfactory. In reaching its decisions, the Department will of course be mindful of the technical constraints on network development.
- 6.20 Where a new ground based mast is considered necessary, the siting and design must have regard to the character of the local landscape or townscape and its sensitivity and capacity to accommodate the proposed development. Where appropriate existing features should be used to help minimise the visual impact, while the boundaries of the site should be drawn large enough to

accommodate any necessary landscape works. Depending on location the Department will also bear in mind that an appropriately designed single operator mast may be less intrusive in the environment than a mast designed to facilitate sharing.

- 6.21 The Department will co-operate with operators in seeking to find the optimum environmental and network solution on a case-by-case basis.
- 6.22 Where it is agreed that the future sharing of a particular mast or site is desirable, the Department will wish to be satisfied that the site can accommodate any additional apparatus that would be required.
- 6.23 Following the introduction of the Telecommunications (Interconnection) Regulations 1997⁷, in any instance where there is a dispute regarding the sharing of an existing mast or site, either party may ask the Director General of Telecommunications to resolve the matter. If the Director General considers it appropriate, he may direct the relevant telecommunications operators to share⁸. The powers available under the Regulations do not, however, cover the refusal by a third party, such as a landowner, to allow shared use of a mast.
- 6.24 As outlined in paragraph 2.18 the Radiocommunications Agency has recently developed a publicly accessible database of all operating externally sited cellular base stations in the UK. This should assist operators in considering possible antenna sites in a particular area. Where an operator makes an application for a new mast which is not on the database, the Department may reasonably expect the applicant to show that no site on the database would present a practicable alternative to the location proposed.
- 6.25 Public bodies, such as Government agencies and local district councils, may be able to reduce planning problems for applicants for telecommunications development and for the community at large by making suitable property in their ownership available to operators. Where such property is not potentially available then the optimum siting and design solutions for apparatus may not be achievable.
- 6.26 Where planning permission is granted for telecommunications apparatus the Department will impose a condition requiring its removal, as soon as reasonably practicable after it is no longer required for telecommunications purposes. The land or site should then be restored to its condition before the development took place, or to any other condition as may be agreed in writing between the Department and the developer.

⁷ SI 1997 No 2931

⁸ For further information, see statement of 6 November 1998 by the Director General of Telecommunications. This is available on the OFTEL website (www.oftel.gov.uk/competition/mast1198.htm) or from the Research and Intelligence Unit, OFTEL, 50 Ludgate Hill, London, EC4M 7JJ (tel 0171 634 8761).

Aerodromes

- 6.27 Applications for masts within 3 kilometres of the perimeter of an aerodrome, will be required to include evidence that the Civil Aviation Authority, the Ministry of Defence or the aerodrome operator, as appropriate, has been notified of the proposal. The Department will take into account any relevant views expressed.

Planning and Health Considerations

- 6.28 Health considerations and public concern can in principle be material considerations in determining applications for development proposals. Whether such matters are material in a particular case is ultimately a matter for the courts. It is for the decision-maker (normally the Department) to determine what weight to attach to such considerations in any particular case.
- 6.29 However it is the Department's firm view that the planning system is not the place for determining health safeguards. It is for the Department of Health, Social Services and Public Safety (DHSSPS) to decide what measures are necessary to protect public health.
- 6.30 As regards health concerns raised about emissions associated with mobile telecommunications, DHSSPS while conscious of the need for further research and contributing financially towards the same, considers that the guidelines of the International Commission on Non-Ionising Radiation Protection (ICNIRP) for public exposure to electromagnetic fields⁹, as accepted by the World Health Organisation¹⁰, are based on the best evidence available to date. Accordingly where concern is raised about the health effects of exposure to electromagnetic fields, it is the view of DHSSPS that if the proposed mobile telecommunications development meets the ICNIRP guidelines in all respects it should not be necessary for the Department to consider this aspect further.
- 6.31 All new mobile phone base stations in the UK are expected to meet the ICNIRP public exposure guidelines. However all applications for mobile telecommunications base stations will be required to be accompanied by a declaration that the apparatus when operational will meet the guidelines. Similarly where it is intended to place additional antennas onto an existing mast or site, the operator will need to confirm in a declaration to accompany the application that the cumulative exposure will not exceed the ICNIRP guidelines.

⁹ The public exposure guidelines of the International Commission on Non-Ionising Radiation Protection (ICNIRP), as expressed in EU Council recommendation of 12 July 1999 (Reference: 1999/519/EC) on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz).

¹⁰ WHO Fact Sheet No. 193 - Electromagnetic Fields and Public Health: Mobile Phones and Their Base Stations (www.who.int/inf-fs/en/fact193.html)

- 6.32 In line with the Stewart Group's recommendations applicants should also provide the Department with a statement for each site indicating its location, the height of antenna, the frequency and modulation characteristics, and details of power output.
- 6.33 Mobile phone operators already keep their RF power outputs to the lowest possible levels commensurate with effective service provision. They need to do this to ensure risk of interference within the network and with other radio networks is minimised. Whilst levels of power output are likely to go up and down during the day (depending on factors such as the number of people using their phones at any one time and the distance they are from the base station), the operators have confirmed that the base stations will, at all times, remain within the ICNIRP guidelines for public exposure. Statutory powers to control outputs and ultimately to switch off radio transmitters are exercised on behalf of the Secretary of State for Trade and Industry by the Radiocommunications Agency (RA). The audit of mobile phone base station emissions carried out by the RA has so far indicated that all measurements are hundreds of times below the ICNIRP guidelines (see paragraph 2.18 above).
- 6.34 As noted in Section 2.0 above, the Stewart Group's Report suggested a number of specific precautionary actions in relation to mobile phone technology, which have been accepted by the Government. The Report does not however provide any basis for precautionary actions beyond those already proposed e.g. the imposition of a ban or moratorium on new telecommunications development or insisting on minimum distances between new telecommunications development and existing development.

Electromagnetic Interference by Telecommunications Development

- 6.35 In any development, significant and irremediable interference with other electrical equipment of any kind can be a material planning consideration. Electromagnetic interference may be caused by a radio transmitter or by unwanted signals emitted by other electrical equipment. The Radiocommunications Agency has statutory powers for dealing with this type of interference under the Wireless Telegraphy Act 1949 (see Annex B). Only if there is clear evidence that significant electromagnetic interference will arise, or will probably arise as a result of a telecommunications development, and that no practicable remedy is available, will there generally be any justification for the Department taking it into account in determining a planning application.
- 6.36 In instances where concerns are raised regarding the potential interference of telecommunications development with medical devices the Department will take specific advice from the Medical Devices Agency through the auspices of the Health Estates agency of the Department of Health, Social Services and Public Safety.

Satellite Television Antennas

- 6.37 The Planning (General Development) Order (NI) 1993 includes a range of permitted development rights for the installation of satellite television antennas. In cases however where planning permission is required, the Department, having regard to technical and safety requirements, will seek to ensure that a satellite dish is sited in the least obtrusive position and respects any architectural features and appearance of the building or structure. Where appropriate equipment will be required to be coloured or painted to help it blend in with its background. The installation of dishes in close proximity to the doors or windows of neighbouring houses is likely to lead to complaints and will generally be unacceptable. The Department would encourage the installation of shared systems for apartments and flats as this can help avoid the impact of an otherwise likely proliferation of dishes on walls and roofs. Further details on the permitted development rights for the installation of satellite television antennas on dwelling houses can be found in the Department's guide for householders 'Your Home and Planning Permission'.

Amateur Radio, Taxi Firms and Private Users

- 6.38 Proposals to install the masts often used by amateur radio operators, radio taxi firms and other private and commercial users, usually present few potential planning problems in terms of size and visual impact over a wide area. Such masts need to be high enough for technical efficiency and located as far as possible from other antennas, in order to minimise the possibility of interference. However, they will not normally be of such a scale as to have a serious impact on local amenity. Such applicants will generally have less scope for using alternative sites or for sharing sites, and masts will often need to be located on the premises.

Policy TEL 2 Development and Interference with Television Broadcasting Services

The Department may refuse planning permission for development proposals which would result in undue interference with terrestrial television broadcasting services.

Justification and Amplification

- 6.39 Large, prominent buildings and structures such as tower blocks, sports stadiums, dock cranes and wind turbines can cause disruption to analogue television services by obstructing or reflecting the wanted signals. Digital television signals are far more robust than analogue signals and, as viewers change to digital over time, this offers the prospect of the elimination of problems such as interference caused by reflections from structures. Useful information on this matter is contained in the leaflet 'The Impact of Large Buildings and Structures (including Wind-Farms) on Terrestrial Television Reception' produced by the BBC, the Independent Television Commission and the Radiocommunications Agency.
- 6.40 The Department will wish to be satisfied that the potential for interference has been fully taken into account in the siting and design of large and prominent buildings and structures, since it will be more difficult, costly and sometimes impossible to correct after the event. Developers of wind turbines and any other structure which by virtue of its size, height or finishes is likely to result in undue interference are therefore encouraged seek expert advice on this matter before submitting their proposals.
- 6.41 In cases where evidence is submitted that undue interference is likely to occur as a result of development the Department will consult with the Radiocommunications Agency and the broadcasters or fixed-link operators before reaching a decision, to ascertain whether an engineering solution to the problem of interference in any particular case is feasible. Where potential interference is causing genuine local concern, the Department may also seek the help of these experts to assess the likelihood and degree of interference (see Annex B).
- 6.42 Certain factors can be taken into account at the planning application stage, in particular the height and width of each face of the structure, the material and outside surface finish, and the orientations of the sides of the structure in relation to any local transmitter. If it is clear, by the nature of the development, that disruption to television reception will be a significant problem, the solution may be for the developer to incorporate a television relay (repeater) or cable system. In such a case the developer will need to consult with and obtain the agreement of the broadcasting authorities. Only in extreme cases where there is evidence that no practical remedy exists to overcome or otherwise mitigate

problems of undue interference would the Department be justified in refusing planning permission.

Annex A

Accommodating Telecommunications Infrastructure in New Development

- A1 The Department wishes to ensure, as far as is practicable, that the telecommunication needs of future occupiers of new developments are accommodated in an appropriate fashion in the design and layout of such development.
- A2 Prospective developers of new housing areas, retail and office developments, community buildings and industrial areas should therefore consider at initial design stage with all relevant telecommunications operators how the future telecommunication needs of future occupiers will be met. Developers should provide adequate ducting for telecommunications cables (and for other services where appropriate) to be installed at the outset both underground and in the structure of the buildings proposed, sufficient to meet foreseeable demand for competitive services likely to be provided to those developments. This will help to minimise the disruption and expense if provision has to be made later, and can reduce the need for new telecommunications apparatus above ground. Provision of such apparatus to serve the occupiers, such as communal or master antenna systems, should normally be the subject of close consultation and co-operation between the developer and the telecommunications operators.
- A3 The development or alteration of tall buildings may provide the opportunity to incorporate antennas as an integral feature of the design of their building and developers are encouraged to consult on this matter with the telecommunications operators.
- A4 In general, it is preferable to locate new cabling underground or along the external surfaces of buildings, but the method of distribution already prevailing in the area may be a relevant factor. Code system operators' licences contain specific provisions about the undergrounding of apparatus (with the exception of service lines), and about the need to service new development in close co-operation with the developer and the other utilities so that underground ducting for a number of undertakings can be provided during development or any existing suitable ducting used.
- A5 Where provision for underground ducting of cables is not made available at the design and construction stage, it may not be possible for future occupiers of land to ensure that future wires are placed underground (that will be a matter for the operator). Even where it is possible, it may involve the occupier in considerable expense. It is therefore better to seek the installation of adequate ducting as part of the development at the outset. Telecommunications operators will normally wish to make use of it, if it is available and suitable for their purpose.

Annex B

The Radiocommunications Agency and the Control of Radio Interference

- B1 All users of radio equipment are required by the terms of wireless telegraphy legislation to avoid creating undue radio interference with other radio users, including domestic television sets, and their equipment must be designed to minimise it. There are also regulations made under the Wireless Telegraphy Act 1949 that set limits for unwanted radio frequency emissions from certain types of non-radio equipment, such as household appliances and some office machinery (but not computers). In addition there are European Regulations governing the compatibility and immunity to electromagnetic interference of electrical devices. Up to date details of the current regulations can be found on the Radiocommunications Agency website (www.radio.gov.uk). In most situations, therefore, questions of potential interference are of no relevance to the determination of planning applications for the masts or antennas needed to operate a transmitter. Other controls will generally be available to deal with radio interference problems.
- B2 However, significant interference can arise despite these controls. For example, the source of the interference may be a type of equipment that is outside the scope of the regulations; or there may be site-specific factors that give rise to interference, even though the legislation is complied with. In addition, interference may be caused by the building itself, perhaps because it physically blocks signals or reflects them, causing 'ghosting'. This type of interference cannot be dealt with under the radio legislation. Whether any such interference is significant enough to warrant treatment as a material planning consideration, and the weight to be attached to it if it is, will be a matter of fact and degree in each individual case and the Department will therefore only be able to form a view in the light of the individual circumstances (see Policy TEL 2).
- B3 In cases in which interference from a transmitter or from non-radio equipment has occurred, it will be necessary to take into account the ability of the affected equipment to resist unwanted signals. Complainants should first approach their service engineer, aerial contractor, equipment supplier or dealer. Experience has shown that, in the majority of cases, the affected equipment has insufficient immunity to interference or there is a defect in its installation. Such interference can often be alleviated by means of suitable technical measures to improve the immunity of affected equipment to unwanted signals.
- B4 Domestic viewers and listeners can also request an interference investigation from the Radiocommunications Agency (RA), which is responsible for enforcing the legislation on radio interference. The RA will not charge for an investigation unless they diagnose the problem as being due to deficiencies in the complainants' own equipment. The RA has produced a leaflet for householders titled 'Television and Radio Interference' (RA leaflet 179) which details their investigation services. This may be obtained by telephoning the RA on 020

7211 0211 and asking for the library, or by accessing the RA website (www.radio.gov.uk). Businesses suffering interference may consult their local office of the RA (contact details available in RA leaflet 206).

B5 Where advice is sought, the following may be able to assist:

The Association of Consulting Engineers
Alliance House, 12 Caxton Street,
London SW1H 0QL
Tel: 020 7222 6557
Website: www.acenet.co.uk

British Broadcasting Corporation
BBC Reception Advice, Television
Centre,
Wood Lane, London W12 7RJ
Tel: 08700 100 123
Website: www.bbc.co.uk/reception

Independent Television Commission
ITC Engineering Information
Staple House
Staple Gardens
Winchester SO23 8SR
Tel: 01962 848647
Website: www.itc.org.uk

The Institution of Electrical Engineers
Savoy Place, London, WC2R 0BL
Tel: 020 7240 1871
Email: postmaster@iee.org.uk.
Website: www.iee.org.uk

The Radio Authority
Holbrook House, 14 Great Queen
Street
Holborn, London WC2B 5DG
Tel: 020 7430 2724
Email: info@radioauthority.org.uk
Website: www.radioauthority.org.uk

The Radio Society of Great Britain
Lambda House, Cranborne Road,
Potters Bar
Hertfordshire EN6 3JE
Tel: 0870 904 7373
Email: postmaster@rsgb.org.uk
Website: www.rsgb.org.uk

The Radiocommunications Agency
Wyndham House, 189 Marsh Wall
London E14 9SX
Tel: 020 7211 0502 or 0505
Email: library@ra.gsi.gov.uk
Website: www.radio.gov.uk

Annex C

Telecommunications Systems

- C1 The following paragraphs describe the principal telecommunications systems and the physical developments associated with them. Each system has different antenna types, siting needs and other characteristics which need to be taken into account in assessing proposals.

Public Telecommunications

Fixed-link Systems

- C2 Fixed-link systems operate through cable connections (copper wire or optical fibre), and radio signals transmitted through line-of-sight antennas or satellites.
- C3 The trunk networks may use fixed radio links as well as underground or above ground cables. These radio links require the provision of radio relay stations. A station usually consists of a small building to accommodate the radio equipment and a tower normally of up to 60 metres in height supporting a number of antennas. Antennas can also be located on buildings or other structures. Fixed radio link antennas are round 'dishes', with typical diameters of 0.3, 0.6 and 1.2 metres, although reflectors may be of other shapes and sizes.
- C4 Fixed radio links operate at frequencies which require direct line of site, with range diminishing as frequency increases. The radio links must be free from obstruction, such as hills, buildings, trees or large moving objects. These factors, together with the need to take account of the curvature of the earth and differing atmospheric conditions, affect the siting and height requirements of antennas. To cover long distances, or to circumvent obstacles, intermediate repeater radio stations are often necessary. They require at least two antennas, one to receive and the other to relay the signal; other antennas may be required for additional capacity or for fall-back use.
- C5 Radio links via satellites are also a form of fixed-link communication. A single antenna points towards a satellite in orbit over the earth, or, in the case of a 'satellite earth station', a number of antennas point at a number of satellites.
- C6 The antennas used for transmitting and receiving radio signals via satellite should not be confused with satellite television antennas. Whilst these use the same principles for receiving radio signals from satellites, and look similar, they provide a different function.
- C7 Television broadcasters use fixed links to distribute programmes and to link to studios and some businesses also use them for private commercial networks. Another example of a fixed-link system is the local cable network, which can supply subscribers with a multi-channel service of national and local television material, films, information, inter-active data and voice telephony. The cable is installed underground and requires the erection of usually small junction boxes at intervals, while a large satellite dish is used for television reception for cable

'head-ends'.

Fixed Radio Access (FRA)

- C8 Fixed Radio Access (FRA) provides a different sort of wireless distribution., This is comes in 2 forms of the point to multipoint distribution of information. Instead of connecting residential and commercial properties to the public switched network by wires, like copper cable, it is possible to use radio. New networks for 'Broadband Fixed Wireless Access' (BFWA) services are currently being auctioned deployed in parts of the UK with further spectrum licences to be offered later this year, and are aimed at conveying large volumes of information (e.g. high data rate services) over short distances. Narrowband FRA services are used for local telephony and other services. . Instead of connecting residential and commercial properties to the public switched network by wires, like copper cable, it is possible to use radio.. FRA operators can provide important additional competition in the local loop. They generally need to have line of sight to the served premises and hence there may be less flexibility in choice of location than for mobile services. A typical pattern would be to have a multipoint antenna on a central tall point with a circle of point radios antennas facing the central point. Such transmitters/ receivers do not need large antennnas and most are likely to be very discreet.

First Generation Mobile (Analogue)

- C9 The original analogue cellular networks have now closed down, and have been replaced by GSM (see below). They are therefore not described in this Statement. However, with the closure of the analogue network, the Department would encourage operators to re-use existing sites, wherever practicable, in order to minimise the need for new second and third generation base station sites.

Second Generation Mobile ('GSM' Global System for Mobile)

- C10 Digital Cellular GSM systems are the current generation of mobile networks, introduced in the UK in the early 1990's. They cater for mobile telephone users, and now cover an area encompassing over 98% of the population of the UK. Whilst the operators have met their initial second generation coverage targets required by the conditions of their licence, they are still required to provide a high quality service which includes the need to meet reasonable customer demand.
- C11 Coverage for each cellular system is provided by a network of radio base stations. A base station is a facility that provides transmission and reception for radio systems and each covers a certain area known as a cell.
- *Macrocells* provide the main structure for the base station network. The base stations for macrocells have power outputs of tens of watts and communicate with phones up to about 35 kilometres (22 miles) distant.

- *Microcells* are used to infill and improve the main network, especially where the volume of calls is high. They are sited in places such as airports, railway stations and shopping malls. The microcell base stations emit less power than those for macrocells and their range is a few hundred metres.
- *Picocell* base stations have a lower power output than those of microcells (a few watts) and are generally sited inside buildings.

C12 These systems are demand-led. Increase in the use of mobile phones has meant that operators are continually expanding their networks to accommodate customer requirements of service and quality. The greatest need for base station sites is usually in built-up areas where there is the greatest density of mobile users, and within a mile or two of the main roads, where the demands on network capacity are greatest.

C13 The size of each cell is planned by the network operators. It is determined by a number of factors, but particularly the number of subscribers expected to require access to the system during the peak usage period. In areas where usage exceeds the limits of the network, capacity can be expanded either by introducing new base stations (macrocells or microcells), or by splitting existing cells, thus effectively doubling capacity. Cell splitting requires the erection of additional antennas at an existing base station.

C14 The location of transmitter antennas is important, as signals from one cell will interfere with nearby cells on the same frequency. To avoid blind spots from buildings and hills, antennas must usually be placed high up. In urban areas antennas are often best placed on existing buildings.

C15 Cellular operators typically use vertical multiple pole type antennas about 1-3m in length, some with reflectors attached, mounted on a mast or other supporting structure. In addition, a number of small terrestrial microwave antennas (0.3m-1.2m) may be required, for example to provide links from the base station to the exchange. Associated equipment housing is usually between 4 and 35 cubic metres in volume.

C16 There are four national networks, all four operating at 1800 MHz, with two also using 900 MHz.

Third Generation Mobile

('3G' or 'UMTS' Universal Mobile Telecommunications System)

C17 3G describes a set of digital standards for future mobile telecommunications. UMTS is one of the 3G standards. These standards will enable mobile users to have access to enhanced services via higher data rates than GSM. In April 2000 the Government auctioned five new licences to third generation mobile operators. Each operator is licensed to operate a national 3G network. All 5 operators have a requirement in their licenses to build out a network covering 80% of the population by 2007.

C18 Four of the 3G operators are the UK GSM operators and it is expected that they will be able to re-use their current infrastructure in many cases to accommodate some of their new 3G network requirements. The fifth operator needs to build their 3G network from scratch. They are expected to use existing structures wherever practicable (including those owned by other operators and radio site management organisations) though they will likely also need to develop a substantial number of new sites especially in urban areas.

Terrestrial Trunk Radio System (TETRA)

C19 TETRA is an advanced digital technology standard, promoted by Europe. It is a digital standard ideal for Public Access Mobile Radio or for private network users needing multichannel operation (such as road breakdown services, use at airports or for large construction sites). Two national TETRA systems were licensed for public use in the UK, but these merged into one, which has been in operation for around two years. The UK Emergency Services new network being rolled out is a TETRA standard too and there are a few private services now in operation. TETRA base stations operate in a similar way to mobile phone base stations, in that they can be configured in cellular patterns and operate with similar powers and calling patterns. TETRA has added special features to allow local networking and override features for safety calling.

Other National and Local Networks

C20 In addition to those mentioned above there are national public networks for data and paging, national networks for maritime, aeronautical, defence, police and a number of other official services. There are also public interest national networks for rail, road breakdown, utility support, and regional networks for local health authorities, local government and many private networks (e.g. for road haulage, retail, security, taxis and couriers, agriculture and so on). These services use a variety of both analogue and digital services. Frequency bands range widely, with mobile services needing lower frequencies and fixed services needing higher bands.

C21 Radio is also used for hobby and leisure purposes. Many UK industry participants have learnt about radio through being licensed amateurs, and the Government encourages this interest. Amateurs have to pass examinations to be licensed to operate, but may then install fixed antenna subject to planning rules. Because many want to use low short-wave frequencies, these need long wire type antenna.

Satellite Television Broadcasting

C22 In the field of broadcasting, there has been significant growth in the range and use of satellite television. Satellite television is a multinational activity in view of the very high infrastructure costs. Several broadcasters transmit signals from the UK or other European countries. Television signals are beamed direct-to-home from the satellite to individual receiving antennas, the more common ones known as satellite dishes. Antennas have to be in direct line-of-sight of the geostationary satellite, and almost always have to be mounted outdoors. The satellites for the various services are in different orbital

positions, and have to be received by separate antennas, unless steerable or other specialist antennas are used.

C23 The location of a satellite dish on a building will therefore depend on the direction of the satellite. The size of the dish will depend on the technology used, the strength of the signal and the possibility of interference from transmissions from other satellites that may be located nearby. New developments in antenna technology are bringing to the market new kinds of antennas with different visual characteristics.

C24 Antennas for reception of digital satellite broadcasting signals are generally much smaller and more discrete than their analogue predecessors.

Terrestrial Broadcasting

C25 Digital terrestrial broadcasting uses existing TV rooftop aerials for domestic reception.

Reception of Signals

C26 Licensees providing broadcasting and other telecommunications services generally depend upon good radio signal access to their intended receivers. For example, good television reception needs to be in good range from transmitter to receiving aerial, within the intended service area of a transmitter. While the broadcasters cannot guarantee good reception for everyone, they are required by their licence conditions to provide a high quality of service; they must ensure and maintain a satisfactory signal across each area for reception on recommended equipment. The construction of new buildings or other structures, such as wind turbines, can interfere with broadcast and other telecommunications services, and the possibility of such interference can be a material planning consideration (see Policy TEL 2).

Glossary

Antenna – A passive electrical component which can transmit and receive radio waves.

Attenuation – Reduction in strength of a radio signal as a result of atmospheric absorption, obstruction by buildings etc.

Bandwidth – The physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz) and in digital systems in binary bits per second (Bit/s).

Base Station – A fixed radio transmitter/receiver which electronically relays signals to and from handsets and other data terminals. Generally taken to include all the component of the development - the antenna, mast or supporting structure, equipment housing, cable runs, fencing, planting, landscaping, access, power supply and land lines.

Beam of Greatest Radio Frequency Intensity – (referred to in this PPS in terms of a concentration of radio waves). For an explanation please refer to the leaflet 'Mobile Phone Base Stations and Health' issued by the Department of Health/Northern Ireland Executive.

Broadband Services – Services in which the bandwidth is sufficient to carry large volumes of data.

Code System Operator – An operator of a telecommunications system under Schedule 2 of the Telecommunications Act 1984, known as the 'Telecommunications Code'.

Convergence – Denotes the meeting of separate communications technologies so that they no longer have unique associations with particular functions. For instance, an internet television can combine some of the functions of a radio, television, personal computer and telephone (source DTI).

De Minimis – This term covers minor works which, in relative terms, may not have a material effect on the external appearance of the building or structure on which they are installed. As a result they may not come within the legal definition of development and hence not require planning permission. Where such minor works are proposed to a listed building, however, listed building consent may still be required.

Directional Antenna – Any antenna which picks up or radiates antenna signals better in one direction than another.

Director General of Telecommunications – see OFTEL.

Electromagnetic Field (EMF) – A form of non-ionising radiation which arises from a wide range of natural (e.g. earth's magnetic field) and man-made sources (e.g. domestic wiring, electrical appliances, power lines and radio transmitters).

Fixed Radio Access – A low power (100 milliwatts) radio system for connecting individual subscribers in buildings to a base station.

GSM – Global System for Mobile Communications or Groupe Speciale Mobile - the second generation digital mobile technology used in Europe and other parts of the world.

ICNIRP – International Commission on Non-Ionising Radiation Protection. Responsible for co-ordinating knowledge of protection against the various non-ionizing radiations. It works closely with organisations of the United Nations including WHO, ILO and UNEP. Strong support is received from the Commission of the European Communities. Work encompasses environmental health criteria on different aspects of non-ionizing radiation. Set up by the International Radiation Protection Association (www.icnirp.de/).

IEGMP – The Independent Expert Group on Mobile Phones, commonly referred to as the Stewart Group. Their report, Mobile Phones and Health is available at www.iegmp.org.uk or may be purchased (price £20 or £2 for the summary) from the IEGMP Secretariat, c/o Information Office, National Radiological Protection Board, Chilton, Didcot, OXON, OX11 0RQ. Tel: 01235 822742, Fax: 01235 822746.

Non-ionising radiation – Radiation that does not produce ionisation in matter e.g. light, ultraviolet and radio. When these radiations pass through the tissues of the body they do not have sufficient energy to damage DNA directly. (source NRPB)

OFTEL – Office of Telecommunications (the UK telecommunication watchdog). A government department which acts as telecommunications regulator but is independent of ministerial control. It is headed by the Director General of Telecommunications, who is appointed by the Secretary of State for Trade and Industry. The DTI Communications White Paper proposes the creation of a new regulator called the Office of Communications (**OFCOM**). It will combine the existing functions of the Broadcasting Standards Commission, Independent Television Commission, OFTEL, the Radio Authority, the Radiocommunications Agency and possibly the video classification function carried out by the British Board of Film Classification.

TETRA – Terrestrial Trunked Radio.

Transmitter – Electronic equipment which generates radio frequency electromagnetic energy and is connected to an antenna.

UMTS – Universal Mobile Telecommunications System which is one of the 3G standards.

3G – Third Generation of mobile telephony technology which uses broadband radio to carry large amounts of data.