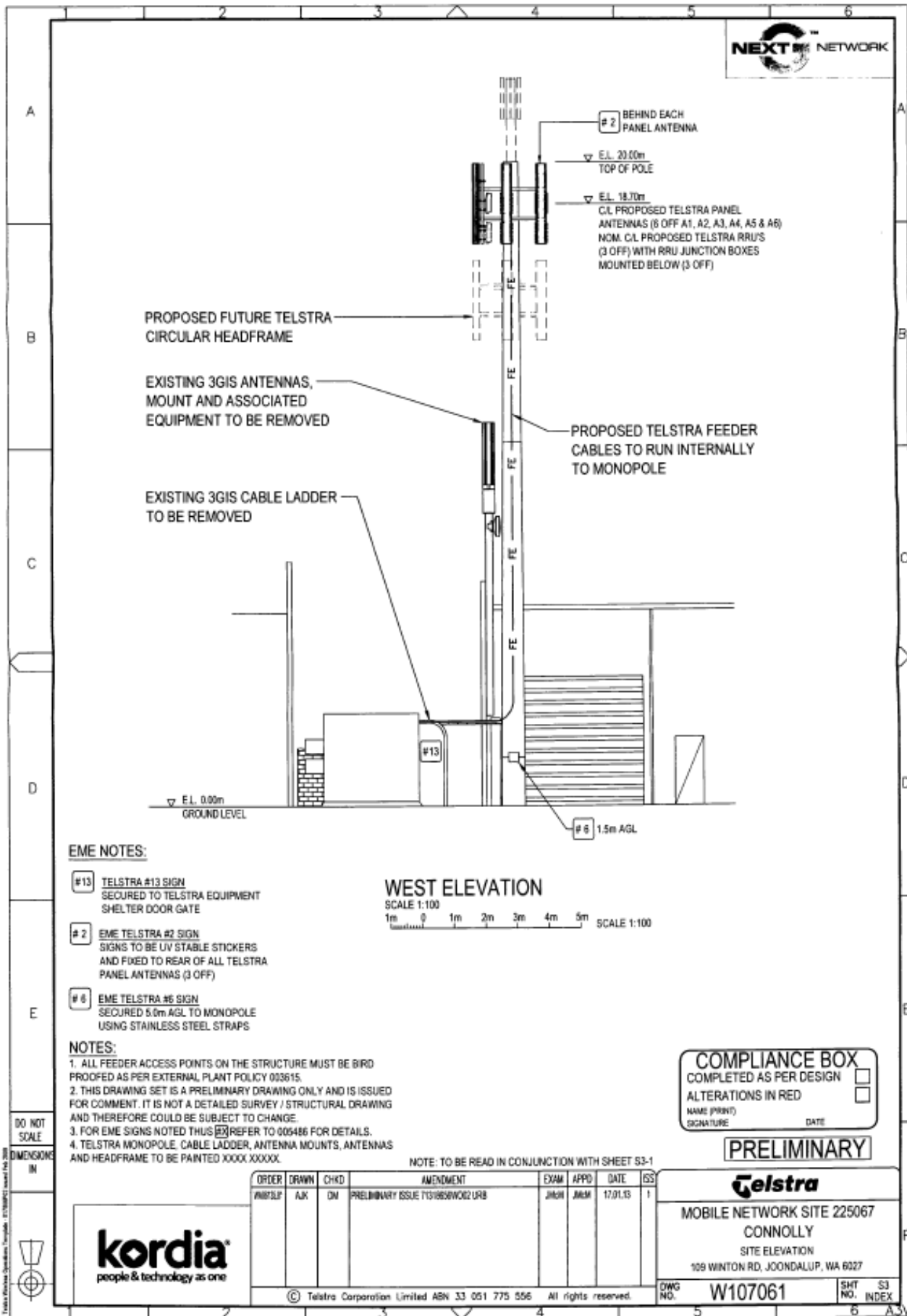


Location plan

ATTACHMENT 1







VIEW 1 – FROM WINTON ROAD LOOKING WEST,
EXISTING BUILT FORM – LOT 83 (NO. 109) WINTON ROAD

DATE: 08/03/2013 DWG NO: 001
CONNOLLY TELCO SITE REV A SCALE: HTB



VIEW 2 – FROM SOUTH BOUND FREEWAY ON RAMP,
PROPOSED BUILT FORM

DATE: 08/03/2013 DWG NO: 004
CONNOLLY TELCO SITE REV A SCALE: HTB



VIEW 3 – FROM NORTH BOUND FREEWAY EXIT TO SHENTON AVENUE,
PROPOSED BUILT FORM

DATE 08.06.2013 DWG NO 008
CONNOLLY TELCO SITE REV A SCALE M15



VIEW 4 – FROM WESTERN SIDE OF MITCHELL FREEWAY, ADJACENT TO RESIDENTIAL AREA,
PROPOSED BUILT FORM

DATE 08.06.2013 DWG NO 008
CONNOLLY TELCO SITE REV A SCALE M15



Installation of Telecommunications Facilities Policy

City Policy

Responsible Directorate: Planning and Community Development

Objective: To outline the City's position on the installation of telecommunications facilities in the district.

1. Application:

This Policy shall apply to all telecommunications facilities which are proposed to be installed in the City of Joondalup.

2. Definitions:

"telecommunications facility" means any facility as described in the *Telecommunications (Low-impact Facilities) Determination Act 1997*, (e.g.: mobile phone towers); does not include facilities covered by the City's *Satellite Dishes, Aerials and Radio Equipment Policy*.

"low impact facility" means a facility used for telecommunications as described in Section 3.1 — Facilities of the *Telecommunications (Low-impact Facilities) Determination Act 1997*. This Policy shall apply to all telecommunications facilities which are proposed to be installed in the City of Joondalup.

Note: Under the *Telecommunications Act 1997* certain facilities cannot be low impact facilities. Namely, designated overhead lines, a tower that is not attached to a building, a tower attached to a building and more than 5 metres high, an extension to a tower that has previously been extended, and/or an extension to a tower if the extension is more than 5 metres high.

"carrier" means a telecommunications company that is licensed by the Australian Communications and Media Authority as a carrier.

3. Statement:

Wherever practicable, the City does not support the installation of telecommunication facilities unnecessarily close to schools, childcare establishments, hospitals and general residential areas.

The City will take into consideration the comments of the local community, if required to consider a Development Application for telecommunications facilities.

4. Details:

4.1. Installation of Low Impact Telecommunications Facilities:

The City recognises that it is bound by Federal legislation relating to telecommunication facilities and that it has no jurisdiction over the location or installation of “low impact” facilities. Notwithstanding the above, the Policy Statement remains applicable.

4.2. Installation of Other Telecommunications Facilities:

The City recognises the right of landowners/applicants to submit Development Applications for telecommunication facilities deemed to be other than low impact under the *Telecommunications Act 1997*. The City also acknowledges its obligation to make a recommendation to the Western Australian Planning Commission or determine the Application in its own right.

Upon receiving a Development Application for a telecommunication facility, the City will advertise the proposal for a 30-day period and consult with the local community surrounding the proposed site. Owners and occupiers of property within a radius of 400 metres from the location of the proposed facility will be advised in writing, at the cost of the applicant, and afforded an opportunity to make comment prior to the matter being considered at a Council Meeting.

In making a recommendation to the Western Australian Planning Commission or in determining the Application, the Council will have regard to:

- the comments and concerns of the local community;
- the merits of the particular proposal;
- compliance with the *Telecommunications Code of Practice 1997*;
- compliance with matters required to be considered under the *City of Joondalup District Planning Scheme No. 2*;
- the general concerns of the Council regarding the potential effects of telecommunication facilities; and
- the topography of the site and surrounding area, the size, height and type of the proposed facility, the location and density of surrounding vegetation, and the nature and density of adjacent development.

Creation Date: December 2002

Formerly:

- *Telecommunications Facilities*

Amendments: CJ166-08/12

Related Documentation:

- *City of Joondalup District Planning Scheme No. 2*
- *Telecommunications Act 1997*
- *Telecommunications Code of Practice 1997*
- *Telecommunications (Low-impact Facilities) Determination Act 1997*

**WESTERN AUSTRALIAN PLANNING
COMMISSION**

STATEMENT OF PLANNING POLICY No. 5.2

**TELECOMMUNICATIONS
INFRASTRUCTURE**

PREPARED UNDER SECTION 5AA OF THE TOWN PLANNING AND
DEVELOPMENT ACT 1928 (AS AMENDED) BY THE WESTERN AUSTRALIAN
PLANNING COMMISSION AND ISSUED WITH THE APPROVAL OF THE MINISTER
FOR PLANNING AND INFRASTRUCTURE AND HIS EXCELLENCY THE
GOVERNOR

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1. CITATION

This is a Statement of Planning Policy made under Section 5AA of the *Town Planning and Development Act 1928* (as amended). It may be cited as Statement of Planning Policy No. 5.2 Telecommunications Infrastructure.

2. INTRODUCTION AND BACKGROUND

2.1 Telecommunications Services

Before 1991, telecommunications services in Australia were provided by a single carrier, Telecom. Its activities were governed only by Commonwealth legislation. Deregulation of the industry followed with the introduction of the *Telecommunications Act 1991*. This legislation gave carriers the right to construct telecommunications facilities on any land or attach a facility to a building or other structure for the purpose of supplying a telecommunications service. Although carriers were subject to consultation and environmental assessment procedures they were immune from State planning and environmental legislation.

On 1 July 1997 the original Telecommunications Act was repealed and replaced by the *Telecommunications Act 1997*. The main effect of the new legislation was that it required the installation of telecommunications facilities, *except those that are exempted specifically by the legislation*, to comply with State (and local) planning and environmental approval procedures.

The importance of telecommunications services in Western Australia is recognised in the Western Australian Planning Commission's *State Planning Strategy* (1997), which advocates the provision of an effective state-wide telecommunications network in a manner consistent with the State's economic, environmental and social planning objectives.

Modern telecommunications are an essential and beneficial element in the life of communities and in the State and national economy. New communications technology is rapidly advancing and being developed to meet the growing demand for better communication at home, in business, health and welfare and in public services. For opportunities and benefits to be realised it is important that appropriate and adequate telecommunications infrastructure is provided and that it is available to all on a cost-competitive basis.

The expansion and installation of telecommunications networks usually involves the physical development of land and/or alteration to the appearance of buildings or structures, which may have impacts on the character and amenity of local environments. It is important therefore that planning policies ensure that facilities are designed and installed in a manner that protects the visual character and amenity of local areas. It is also desirable that they provide for the effective and efficient roll-out of networks and avoid lengthy and litigious approval procedures.

2.2 Aerial Cables

In the Perth Metropolitan Region, it is the State Government's policy that all new electricity and telecommunications cables be placed underground. Exceptions to the policy are likely to be where there is no option other than for the installation of overhead cabling as a consequence of unsuitable ground conditions.

In regional areas aerial cabling will be considered where it can be demonstrated that there are long-term benefits to the community of greater value than the disadvantages of overhead cabling.

In such instances it will be necessary for any aerial cabling proposal to be widely canvassed in the affected community and for statistically valid evidence of support for the proposal to be produced prior to approval.

In the event that it is necessary and accepted for telecommunications cables to be placed overhead, there is a State Government expectation that the cables should be removed and placed underground (at the carrier's expense) when it can be demonstrated and agreed by the carrier that it is technically feasible and practical to do so.

2.3 Mobile Telephone Networks

Due to the rapid expansion of the telecommunications industry, and the increasing demand for mobile telephone services in particular, the location, siting and development of facilities can become an issue of particular interest in local communities, with debate focusing on visual amenity and public health.

Mobile telephone networks operate through base stations, which incorporate a radio transmitter, a receiver and an antenna. The base stations provide coverage to a geographic area known as a "cell", which may vary in size but generally has a radius of between 0.5 (or less) and 10 kilometres. Each cell has its own transceiver which sends and receives radio signals throughout its specified zone.

Mobile phone base stations need to be carefully located in relation to each other so each cell in the network functions efficiently to ensure minimal network congestion and good signal quality. Mobile phone antennas generally need to be mounted clear of surrounding obstructions like trees and buildings to avoid loss of reception and allow the mobile phone base station to cover its intended cells with minimum transmitter power. They must also be sited where they will not interfere with neighbouring cells. The more base stations of a particular carrier there are in an area, the smaller the cells, which means the power and energy levels of each are generally lower. In areas of high mobile use, where there are many small cells to meet traffic demands, antennas do not need to be very high and can be installed on building roofs or small poles. In low-usage areas the cells are larger and the antennas are mounted on taller masts and towers.

In an area of increasing mobile phone use the number of cells needed to maintain service quality and capacity increases. Often this means one or more additional base stations are needed, even in areas where mobile network coverage already exists.

Use of mobile phones has raised public interest in possible health issues associated with exposure to electromagnetic emissions. All carriers are required to comply with the Australian Communications Authority's *Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard (2003)*. This incorporates substantial safety margins to address concerns for potentially sensitive groups in the community such as children, pregnant women, the infirm and aged.

Research undertaken by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has reported that environment radiofrequency levels near base stations for the digital mobile phone network are extremely low. The ARPANSA study reported that the highest daily average level was well below one per cent of the Australian Communications Authority's public exposure limits and concluded that *"given the very low levels recorded and the relatively low power of these types of transmitters, it is unlikely that the radiofrequency radiation from base stations would cause any adverse health effects, based on current medical research"*.

2.4 Planning for Telecommunications Infrastructure

The Telecommunications Act resulted in the installation of telecommunications facilities, apart from specified facilities and activities, being required to comply with State planning and environmental legislation. This means that, unless exempted by legislation, telecommunications facilities in Western Australia require planning approval prior to installation.

Exemptions under the Telecommunications Act include:

- a low-impact facility described in the *Telecommunications (Low-Impact Facilities) Determination 1997 and Amendment No. 1 1999* when installed by a carrier;
- inspection and maintenance;
- a temporary defence facility; and
- a facility authorised by a Facilities Installation Permit issued under the Telecommunications Act.

The Low-Impact Determination uses the zoning of land to ascertain whether a particular facility is determined as low impact. For example, a radio communications dish is defined by the Determination as low impact in a residential or commercial zone if it is not more than 1.2 metres in diameter and is colour-matched to its background or is of a colour agreed to in writing by the carrier and the relevant local government, whereas a radio communications dish in an industrial or rural area is defined as low impact if it is not more than 1.8 metres in diameter and is colour-matched to its background or is of a colour agreed to. The Determination also specifies that no facilities are low impact in an "an area of environmental significance".

Facilities which are listed in the *Telecommunications (Low-Impact Facilities) Determination* fall outside State and local government control but are required to comply with the *Commonwealth Telecommunications Code of Practice 1997*. Obligations under the Code include requiring the carrier to:

- give notice to the owner and occupier;
- gain agreement with affected public utilities;
- notify road authorities and utility service providers if the carrier needs to close or divert roads or other infrastructure to install facilities; and
- take all reasonable steps to find out whether it is able to co-locate its facility with an existing facility.

All other facilities constitute "development" under the *Town Planning and Development Act 1928* and planning approval is required from the relevant planning authority before development is commenced.

This Statement of Planning Policy provides a policy framework for the preparation, assessment and determination of applications for planning approval of telecommunications facilities within the context of the planning system of Western Australia. Separate approval may be required from other Government agencies under other legislation.

2.5 Planning Approval Required for Telecommunications Infrastructure

Planning approval is required from the relevant planning authority before development of telecommunications infrastructure can be commenced. In most cases local government is the responsible authority because local government town planning schemes provide the basis for planning controls within a local area.

Applications to commence development for telecommunications facilities are to be lodged with the local government that will determine the application.

In the Perth Metropolitan Region and in other areas where regional planning schemes apply, approval to commence development may be required either from the Western Australian Planning Commission or from both the Commission and local government in accordance with the development control arrangements under the region scheme.

An application to commence development should be submitted on the relevant form to the local government in whose area the development is proposed. The form is to be countersigned by the owner of the land and, where relevant, the owner of the infrastructure upon which the facility is to be

installed. Where the development is on Crown land or on a road reserve, the application should be countersigned by the Department for Planning and Infrastructure on behalf of the owner.

3. OBJECTIVES

The objectives of this Policy are to:

- facilitate the provision of telecommunications infrastructure in an efficient, cost-effective and environmentally responsible manner to meet community needs;
- facilitate the development of an effective state-wide telecommunications network in a manner consistent with the economic, environmental and social objectives of planning in Western Australia as set out in the *Town Planning and Development Act 1928* and the *State Planning Strategy*;
- assist community understanding of the issues involved in the design and installation of telecommunications infrastructure and provide opportunities for community input to decision-making;
- promote a consistent approach in the preparation, assessment and determination of applications for planning approval of telecommunications infrastructure;
- minimise disturbance to the environment and loss of amenity in the provision of telecommunications infrastructure; and
- ensure compliance with all relevant health and safety standards in the provision of telecommunications infrastructure.

4. APPLICATION

This Policy applies to the zoning, subdivision and development of land throughout Western Australia in respect of all telecommunications infrastructure other than those facilities exempted under the Telecommunications Act.

5. POLICY PROVISIONS

5.1 Guiding Principles for the Location, Siting and Design of Telecommunications Infrastructure

Telecommunications infrastructure should be located, sited and designed in accordance with the following Guiding Principles:

- There should be a co-ordinated approach to the planning and development of telecommunications infrastructure, although changes in the location and demand for services require a flexible approach.
- Telecommunications infrastructure should be strategically planned and co-ordinated, similar to planning for other essential infrastructure such as transport networks and energy supply.
- Telecommunications facilities should be located and designed to meet the communication needs of the community.
- Telecommunications facilities should be designed and sited to minimise any potential adverse visual impact on the character and amenity of the local environment, in particular, impacts on prominent landscape features, general views in the locality and individual significant views.

- Telecommunications facilities should be designed and sited to minimise adverse impacts on areas of natural conservation value and places of heritage significance or where declared rare flora are located.
- Telecommunications facilities should be designed and sited with specific consideration of water catchment protection requirements and the need to minimise land degradation.
- Telecommunications facilities should be designed and sited to minimise adverse impacts on the visual character and amenity of residential areas.
- Telecommunications cables should be placed underground, unless it is impractical to do so and there would be no significant effect on visual amenity or, in the case of regional areas, it can be demonstrated that there are long-term benefits to the community that outweigh the visual impact.
- Telecommunications cables that are installed overhead with other infrastructure such as electricity cables should be removed and placed underground when it can be demonstrated and agreed by the carrier that it is technically feasible and practical to do so.
- Unless it is impractical to do so telecommunications towers should be located within commercial, business, industrial and rural areas and areas outside identified conservation areas.
- The design and siting of telecommunications towers and ancillary facilities should be integrated with existing buildings and structures, unless it is impractical to do so, in which case they should be sited and designed so as to minimise any adverse impact on the amenity of the surrounding area.
- Co-location of telecommunications facilities should generally be sought, unless such an arrangement would detract from local amenities or where operation of the facilities would be significantly compromised as a result.
- Measures such as surface mounting, concealment, colour co-ordination, camouflage and landscaping to screen at least the base of towers and ancillary structures, and to draw attention away from the tower, should be used, where appropriate, to minimise the visual impact of telecommunications facilities.
- Design and operation of a telecommunications facility should accord with the licensing requirements of the Australian Communications Authority, with physical isolation and control of public access to emission hazard zones and use of minimum power levels consistent with quality services.
- Construction of a telecommunications facility (including access to a facility) should be undertaken so as to minimise adverse effects on the natural environment and the amenity of users or occupiers of adjacent property, and ensure compliance with relevant health and safety standards.

5.2 Matters to be Considered when Determining Planning Applications

Before determining an application for telecommunications infrastructure the Western Australian Planning Commission and/or local government should consider and have regard to the:

- extent to which the proposal contributes to the social and economic benefits of affordable and convenient access to modern telecommunications services for people and businesses throughout the State;
- need to ensure continuity of supply of telecommunications services to people and businesses in the local area or region;

- effect of the proposal on the environment and natural landscape and the extent to which the proposal affords protection of these elements;
- effect of the proposal on any place of cultural heritage significance on or near the land;
- extent to which the proposal enhances or maintains visual amenity including streetscape and minimises adverse visual impacts;
- degree to which the proposal is co-ordinated with other services;
- extent to which the proposal fulfils the requirements of Section 5.3 of this Policy; and
- extent to which the proposal adheres to the Guiding Principles for the Location, Siting and Design of Telecommunications Infrastructure set out in Section 5.1 of this Policy.

5.3 Information Required to be Submitted when Lodging a Planning Application

In addition to the requirements for planning applications under the relevant town planning scheme, applications for planning approval of telecommunications infrastructure are to include such of the following information as is relevant to a description and assessment of the proposal:

- graphic illustrations (including photographs of similar facilities and/or computer-generated simulations) showing the type of facility and its relationship with adjacent development;
- elevations showing the extent, height and appearance of the proposed facility as viewed from any adjacent street, public place and adjacent property;
- proposed materials and colour of the facility, and proposed arrangements for maintenance and/or future modifications in response to changes to any adjacent buildings or structure;
- any screening or fencing proposed in conjunction with the facility, including arrangements for maintenance;
- any external lighting of the proposed facility and/or the facility site;
- details of any existing vegetation to be removed and any proposals for landscaping and/or restoration of any disturbed land;
- details of any significant environmental constraints and, where relevant, commitments stating how these constraints will be managed to prevent an unacceptable impact on the environment; and
- details of the timing of works involved in establishing the facility and any arrangements for temporary access and/or changes to existing access facilities during the course of construction;

The application should also be supported by a written statement or report setting out:

- (i) the maximum power output of the facility and radiofrequency electromagnetic energy levels in accordance with the Industry Code for the Deployment of Radiocommunications Infrastructure 2002. This statement is to demonstrate that the carrier accepts full responsibility for compliance with the Radiocommunications Act;
- (ii) how the proposed facility relates to the existing and proposed network of telecommunications infrastructure, and what (if any) additional facilities are known by the proponent to be under consideration to meet projected future increases in demand;
- (iii) the extent to which the proposed facility complies with any relevant town planning scheme or planning policy adopted under a scheme and (if applicable) justification for any variation from relevant scheme or policy provisions;

- (iv) where the proposed facility (e.g. trenching cables such as optic fibre) is to be located within an easement or corridor, details as to how the facility will affect the capacity for future installations within that easement or corridor; and
- (v) how the proposed facility addresses the Guiding Principles for the Location, Siting and Design of Telecommunications Infrastructure set out in Section 5.1 of this Policy.

5.4 Commission May Prepare Guidelines

The Western Australian Planning Commission may prepare more detailed guidelines on application preparation and assessment procedures, in consultation with local government and industry, to meet the objectives of this Policy and, if prepared, these should be taken into account in the determination of applications.

5.5 Local Planning Scheme and Policy Provisions

When preparing or amending a town planning scheme or planning policy, local governments may include any relevant provision of this Policy to facilitate best practice in the preparation, assessment and determination of applications for planning approval of telecommunications infrastructure.

In giving effect to this Policy, local governments should give consideration to the equitable distribution of facilities to ensure that the provision of telecommunications infrastructure is equally shared among local communities.

6. APPENDIX 1 - DEFINITIONS

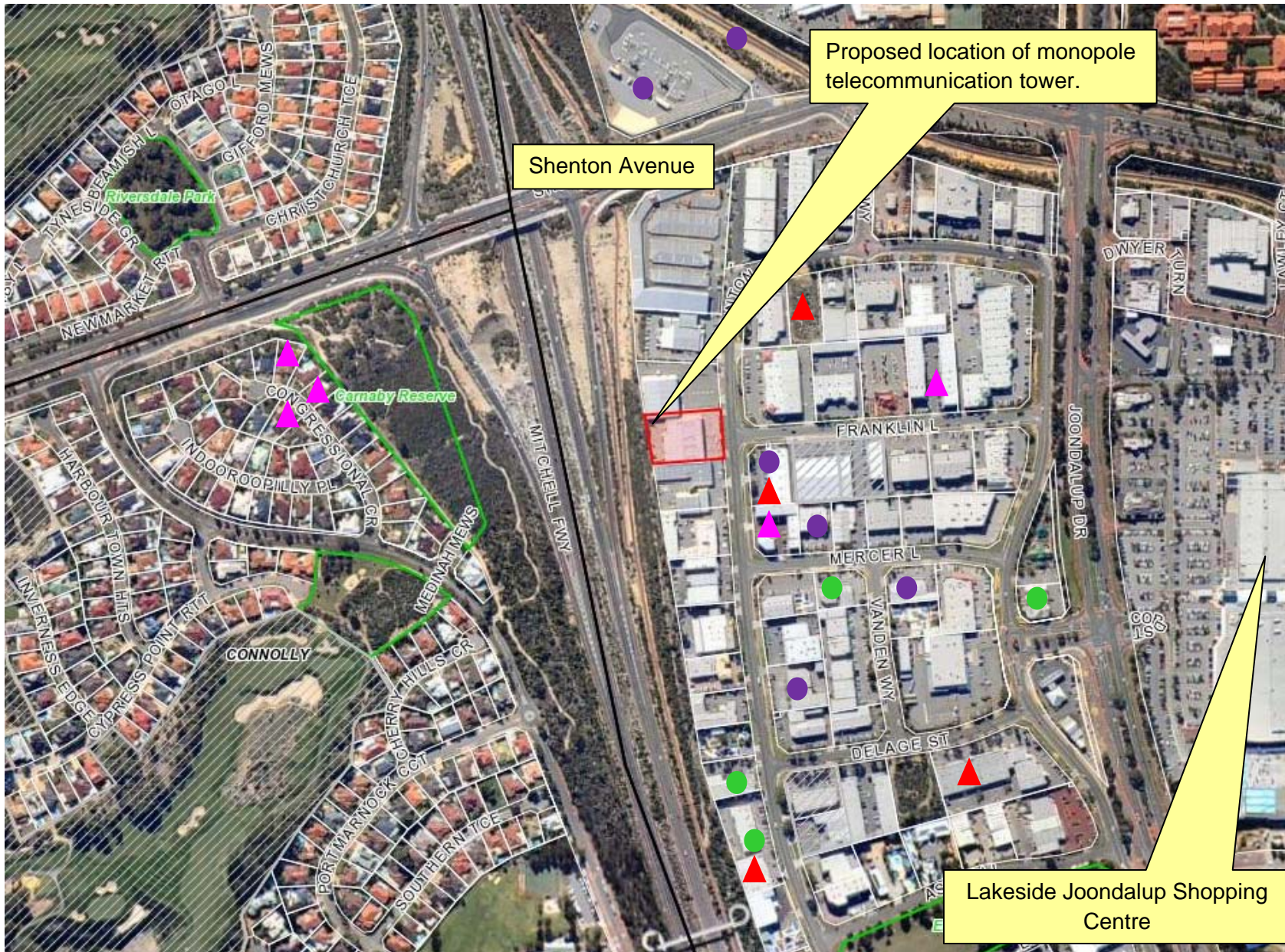
carrier has the same meaning given to the term in the Telecommunications Act.

facility has the same meaning given to the term in the Telecommunications Act.

relevant health and safety standard means health and safety standards specified for the installation and operation of telecommunications facilities under the Telecommunications Code of Practice, Radio Communications Act, Industry Code for the Deployment of Radiocommunications Infrastructure 2002, and Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz published by the Australian Radiation Protection and Nuclear Safety Agency as RPS3.

telecommunications infrastructure means any part of the infrastructure of a telecommunications network and includes any line, equipment, apparatus, tower, antenna, tunnel, duct, hole, pit, or other structure used, or for use, in or in connection with a telecommunications network.

tower has the same meaning given to the term in the Telecommunications Act.



- No Objection – Owner only
- No Objection – Occupier only
- No Objection – Owner & Occupier
- ▲ Objection – Owner only
- ▲ Objection – Occupier only
- ▲ Objection – Owner & Occupier

N/B ▲ In addition to the submissions noted on the map, an objection from the Connolly Residents' Association Inc. was also received.



Summary of Estimated RF EME Levels around the Proposed Wireless Base Station at origin of Fixed Point Radial, JOONDALUP WA 6027

Introduction:

Date 23/10/2012

NSA Site No (6027012)

This report summarises the estimated maximum cumulative radiofrequency (RF) electromagnetic energy (EME) levels at ground level emitted from the existing wireless base station antennas at origin of Fixed Point Radial JOONDALUP WA 6027. Maximum EME levels are estimated in 360° circular bands out to 500m from the base station. The procedures for making the estimates have been developed by the Australian Radiation Protection And Nuclear Safety Agency (ARPANSA)¹. These are documented in the ARPANSA Technical Report; "Radio Frequency EME Exposure Levels - Prediction Methodologies" which is available at <http://www.arpansa.gov.au>

EME Health Standard

ARPANSA, an Australian Government agency in the Health and Ageing portfolio has established a Radiation Protection Standard² specifying limits for continuous exposure of the general public to RF transmissions at frequencies used by wireless base stations. Further information can be gained from the ARPANSA web site.

The Australian Communications and Media Authority (ACMA)³ mandates exposure limits for continuous exposure of the general public to RF EME from wireless base stations. Further information can be found at the ACMA website <http://emr.acma.gov.au>

Existing Site Radio Systems There are currently no existing radio systems for this site.

Proposed Site Radio Systems

Telstra / WCDMA850 (proposed)	Telstra / WCDMA2100 (proposed)	Telstra / LTE1800 (proposed)	
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Table of Predicted EME Levels – Proposed

Distance from the antennas at origin of Fixed Point Radial in 360° circular bands	Maximum Cumulative EME Level – All carriers at this site (% of ARPANSA exposure limits ²) Public exposure limit = 100%
0m to 50m	0.075%
50m to 100m	0.99%
100m to 200m	0.99%
200m to 300m	0.4%
300m to 400m	0.18%
400m to 500m	0.1%
Maximum EME level 110.48 m, from the antennas at origin of Fixed Point Radial	0.99%

Note: Estimation for the maximum level of RF EME at 1.5m above the ground from the existing and proposed antennas assuming level ground. The estimated levels have been calculated on the maximum mobile phone call and data capacity anticipated for this site. This estimation does not include possible radio signal attenuation due to buildings and the general environment. The actual EME levels will generally be significantly less than predicted due to path losses and the base station automatically minimising transmitter power to only serve established phone calls and data transmissions³. Where applicable, particular locations of interest in the area surrounding the base station, including topographical variations, are assessed in Appendix A "Other areas of Interest" table on the last page.

Summary – Proposed Radio Systems

RF EME levels have been estimated from the existing and proposed antennas at origin of Fixed Point Radial JOONDALUP WA 6027 . The maximum cumulative EME level at 1.5 m above ground level is estimated to be 0.99 % of the ARPANSA public exposure limits.

Reference Notes:

1. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is a Federal Government agency incorporated under the Health and Ageing portfolio. ARPANSA is charged with responsibility for protecting the health and safety of people, and the environment, from the harmful effects of radiation (ionising and non-ionising).
2. Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), 2002, 'Radiation Protection Standard: Maximum Exposure Levels to Radiofrequency Fields — 3 kHz to 300 GHz', Radiation Protection Series Publication No. 3, ARPANSA, Yallambie Australia. [Printed version: ISBN 0-642-79400-6 ISSN 1445-9760] [Web version: ISBN 0-642-79402-2 ISSN 1445-9760]
3. The Australian Communications and Media Authority (ACMA) is responsible for the regulation of broadcasting, radiocommunications, telecommunications and online content. Information on EME is available at <http://emr.acma.gov.au/>
4. The EME predictions in this report assume a near worst-case scenario including:
 - wireless base station transmitters for mobile and broadband data operating at maximum power (no automatic power reduction)
 - simultaneous telephone calls and data transmission.
 - an unobstructed line of sight view to the antennas.In practice a worst-case scenario is rarely the case. There are often trees and buildings in the immediate vicinity, and cellular networks automatically adjust transmit power to suit the actual user traffic. The level of EME may also be affected where significant landscape features are present and predicted EME levels might not be the absolute maximum at all locations.
5. Further explanation of this report may be found in "Understanding the ARPANSA Environmental EME Report" and other documents on the ARPANSA web site, <http://www.arpansa.gov.au>

MCF Fact Sheets

RF Safety 1:



About RF safety and health

What is Radiofrequency Electromagnetic Energy (RF EME)?

RF EME is the radio waves generated by mobile phone transmission antennas.

EME is the energy stored in an electromagnetic field. Transmission antennas with a frequency from 3 kHz to 300 GHz transmit radio waves. Microwave transmissions are included in this radiofrequency band.

RF EME is a factor of everyday life. It is emitted by natural sources like the sun and the earth, and by man-made sources such as radio, television, mobile telephones and paging transmission antennas.

RF EME is also referred to as RF Radiation, EMR (electromagnetic radiation), RF Fields and EMF (electromagnetic fields).

Can RF EME cause adverse health effects?

Yes, if a person is exposed above maximum recommended exposure levels.

RF EME can heat objects in the same way that microwave ovens heat food although microwave ovens use much higher power in a confined space compared to mobile telecommunications transmitters.

Harmful heating of body tissue is a possibility where there is exposure to RF fields above maximum recommended exposure levels. Damage may result because the human body is unable to cope with excessive heat generated by very high RF exposures and can result in whole body heating, localised heating (in limbs, torso, head), surface heating of the body and auditory clicks. Also, shocks, similar to electric shocks, due to touching or receiving arcs from RF transmitters are also possible from over-exposure to RF radiation. These possible bioeffects are dependent on the frequency, duration or intensity of the exposure.

Heating is generally accepted as the main bioeffect although it is recognised that very high RF exposures, typically much higher than the exposure levels generated from mobile telecommunications transmitters, may lead to the formation of cataracts in the eyes.



*In-Building Antenna
(Dimension 10cm x 5cm)*



*Microcell Mounted
on Traffic Lights*

March 2008

MCF Fact Sheets

RF Safety 1:



About RF safety and health

In relation to adverse health effects the World Health Organisation has released a fact sheet (NO 304, May 2006) which says **"no adverse short or long-term health effects have been shown to occur"** and this includes cancer. This is for continuous exposures at or below the maximum safety limits.

Specifically in relation to any cancer risk associated with base stations and wireless technologies, the World Health Organisation says:

"Over the past 15 years, studies examining a potential relationship between RF transmitters and cancer have been published. These studies have not provided evidence that RF exposure from the transmitters increases the risk of cancer. Likewise, long-term animal studies have not established an increased risk of cancer from exposure to RF fields, even at levels that are much higher than produced by base stations and wireless networks."

Sometimes suspected cancer clusters are reported in the media and the WHO advice is

"Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations merely by chance."

Moreover, the reported cancers in these clusters are often a collection of different types of cancer with no common characteristics and hence unlikely to have a common cause. Scientific evidence on the distribution of cancer in the population can be obtained through carefully planned and executed epidemiological studies."



What RF exposure level is safe?

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) have set the recommended maximum exposure levels for RF fields, being in the range of 3 kHz to 300 GHz.

The recommended RF exposure limits depend on whether the exposure is occupational (i.e. for persons classified as **'RF Workers'**) or non-occupational (i.e. for the general public and persons who are not required to work within electromagnetic fields) (**General Public**).

For RF Workers, the basic exposure restriction for whole-body average Specific Absorption Rate (**SAR**) has been set at 0.4 W/kg averaged over a six minute period. Whole body average SAR is determined by dividing the total power absorbed in the body by the total mass of the body.

For the General Public, the basic exposure restriction for wholebody average SAR 0.08 W/Kg averaged over a six minute period.

The basic restrictions for RF Workers and the general public have included safety margins of 10-fold and 50-fold from the level of the first known adverse health effect (a 1 C rise in core body temperature).

Where can I find more information?

Australian Radiation Protection & Nuclear Safety Agency (ARPANSA)

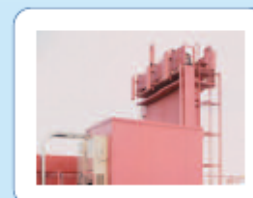
Phone (03) 9433 2211 or 1800 022 333

Web: www.arpansa.gov.au

World Health Organisation

EMF Project Home Page:

Web: www.who.int/peh-emt/



MCF Fact Sheets

Mobile Base Stations and Health



For many of us, mobile phones are an essential part of everyday life. It's the most convenient way to stay connected to people and online information.

In order to work, our phones and wireless broadband devices connect to a network of mobile base stations. You can see antennas and base station equipment in many different places, including building rooftops, roadside poles, and at community facilities.

The mobile phone carriers (Telstra, Optus and Vodafone Hutchison Australia) are responsible for installing and upgrading their base station networks.

These are some of the answers to questions that are frequently asked about mobile networks and safety.

I have heard there's a new base station proposed in my suburb. Are they safe?

Like many other things, base stations are subject to a safety standard regulated by the Australian Federal Government. The regulations cover lots of radio services including AM and FM radio, police, fire and ambulance communications as well as mobile phones, wireless devices and mobile base stations. Mobile base stations must comply with these regulations and information on the compliance and emission levels can be found on the national site database at www.rfnsa.com.au for each site.

Who sets the safety standard?

A government organisation called ARPANSA (Australian Radiation Protection and Nuclear Safety Agency) set the safety standard after careful analysis of national and international scientific studies. The standard is based on guidelines recommended by the World Health Organization (WHO).

What about the increase in wireless laptops and other devices? Does that change the safety of a base station?

As technology evolves and equipment is updated, the fundamental safety regulations must still be met. So, as we saw analogue technology make way for 2G, 3G and now 4th Generation mobile technologies such as LTE (Long Term Evolution), and other high speed data technologies emerging, the safety requirements stay the same – the

Standard is relevant for the radio frequency range that phones and other devices use, regardless of the technology.

What about the effect on children?

The safety standard is set at a level that protects everyone, including children and the elderly.

What do the experts say?

The WHO has a number of fact sheets about mobile phones and health available on their website. In the "[Base Stations and Wireless Networks](#)" fact sheet, the WHO states "*Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak radio frequency (RF) signals from base stations and wireless networks cause adverse health effects*".
<http://www.who.int/mediacentre/factsheets/fs304/en/index.html>

Similarly ARPANSA's latest factsheet updated in 2012 "Mobile Telephone Communications Antennas and Health Effects" concludes that "*No adverse health effects are expected from continuous exposure to the RF radiation emitted by the antennas on mobile telephone base station towers*".
http://www.arpansa.gov.au/radiationprotection/factsheets/fs_antenna.cfm

Where can I get more information?

Independent information can be obtained from:

- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)
Ph: 03 9433 2211
www.arpansa.gov.au
- World Health Organization:
<http://www.who.int/peh-emf/en/>

Additional information can be obtained from:

- Mobile Carriers Forum
Ph: (02) 6295 8191
www.mcf.amta.org.au
- EMF Explained web site
www.emfexplained.info

Revised April 2013

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How the mobile phone network operates

Mobile phones work by sending and receiving low power radio signals, much like a 2 way radio system. The signals are sent to and received from antennas that are attached to radio transmitters and receivers, commonly referred to as mobile phone base stations. The base stations are linked to the rest of the mobile and fixed phone network and pass the signal/call on into those networks.

What happens when I make a call from my mobile phone?

The first step in the process is for the phone to check that there is coverage in the area that the call is made. Once the phone has verified that there is sufficient signal strength to make the call, the phone establishes a connection with a nearby mobile phone base station. This base station then establishes the call and holds the call as long as the phone user remains on the call and in the range of that base station.

What is a mobile phone base station?

A mobile phone base station provides coverage to a geographic area known as a "cell". Cells are aligned next to each other in a similar pattern to a honeycomb, and it is for this reason that mobile phone networks are sometimes referred to as "cellular" networks.

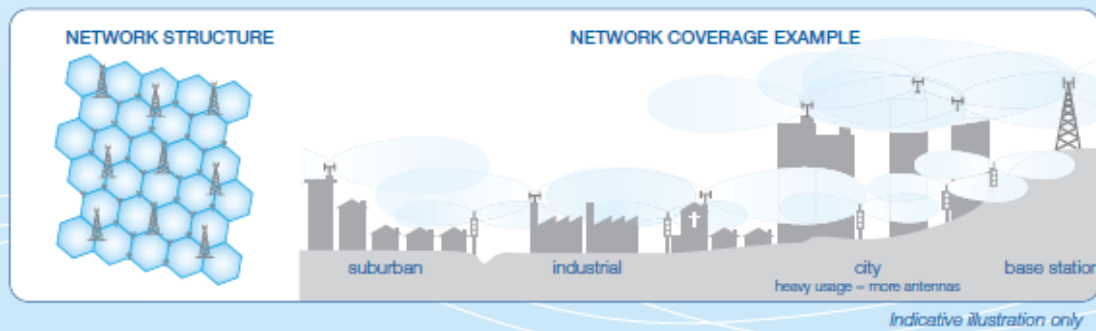
The location of the base station within the cell is determined by a number of factors, including topography and other physical constraints such as trees and buildings, the cell 'capacity' or number of calls expected to be made in the cell, and the radio frequency at which the base station will operate.

Topography and physical constraints

In essence, a mobile phone needs to have 'sight' of a mobile phone base station. In other words, the radio signal from the phone to the base station needs to be uninterrupted. Hills, trees and tall buildings can obscure this line of sight and so base stations need to be very carefully located to maximise the coverage available.

Cell capacity

Each base station can only carry a finite number of calls. In areas of high mobile phone use, such as central business districts and high density areas, more base stations are required to handle the level of call traffic. In high use areas, there are often a range of base stations, from very specific in-building solutions (designed to give quality coverage within a specific building), to very small base stations known as 'microcells'. Microcells cover a small geographic area and are often found at intersections and in heavy pedestrian traffic areas. In rural areas, or areas where mobile phone use is not as high, base stations will often be located on hills or tall structures to maximise the coverage area.



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Radio Frequency

Each base station has a number of radio channels, or frequencies, to communicate with mobile phones. Because this number of frequencies is limited, frequencies are often reused in adjoining cells. This is achieved by reducing the power level of the base station to ensure that there is minimal or no overlap of the coverage between cells.

How does it work if I am moving around?

Calls can be transferred from one base station to another. As you move out of the cell, the phone will automatically look for signal from an adjoining base station. There is usually a smooth transition or 'handover' from cell to cell. During the duration of a call, the phone may have handed over to and from a number of base stations. If there is no adjoining base station, such as on the fringes of the mobile phone network, the call will drop out.

What does a base station do?

A base station connects the call in to the fixed line network. Depending on the type of call, it will be directed to either another mobile phone or to a fixed line phone.

A base station is made up of antennas connected by cable to electronic (radio) equipment usually housed in a room or 'shelter'. Some base stations have radio communications dishes (shaped like a drum) that connect the base station to the rest of the base station network.

What do people mean when they talk about second generation (2G) and third generation (3G) networks?

3G, or third generation networks, operate in a different way to 2G networks. When a call is made on 2G, a line is held open for the user's conversation throughout the duration of the call. With 3G networks, the data sent across them is parcelled up in to little 'packets' which are reassembled in the correct order at the receiving end. This smart encoding means more data can be sent and it is sent more efficiently. In addition, 3G handsets can be in contact with more than one base station at a time and this provides improved performances in voice quality and data rates. Some people call 3G "mobile broadband" because the evolution is similar to the difference between dial up internet and the always available broadband internet services.

Where can I get more information?

Mobile Carriers Forum

Email us at contact@mcf.amta.org.au
MCF Contact Details: www.mcf.amta.org.au/pages/ContactUs
www.mcf.amta.org.au

GSM Association

www.gsmworld.com/health/networks/how.shtml

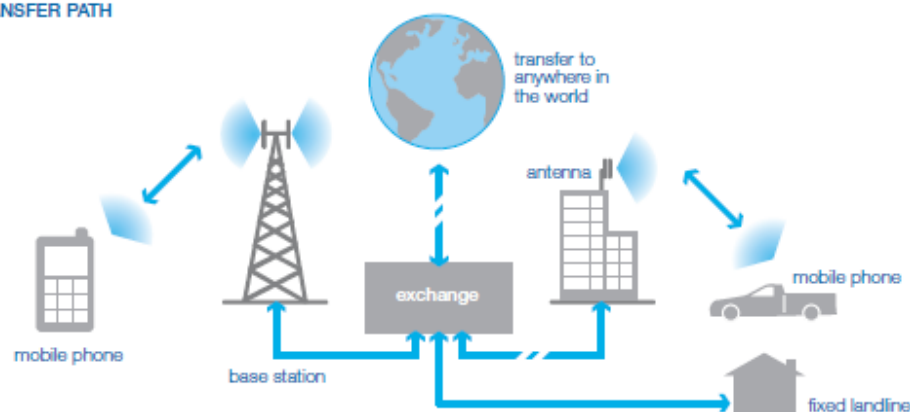
Australian Radiation Protection and Nuclear Safety Agency

Ph: 03 9433 2211
www.arpsa.gov.au/pubs/eme/fact6.pdf

Australian Communications and Media Authority (ACMA)

Ph: 03 9963 6800
www.acma.gov.au/WEB/STANDARD/pc=PC_310377

CALL TRANSFER PATH



Indicative illustration only

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Do exclusion zones actually work?

There has been some debate in the community over the siting of mobile phone base stations and whether there should be exclusion zones within certain distances of residential areas, schools, hospitals and nursing homes. However, there is no science-based reason to set up exclusion zones around such areas.

All mobile phone networks must comply with regulations set by the Federal Government in relation to exposure to electromagnetic energy (EME) from mobile phone base stations, known as the ARPANSA Standard (RPS3). This Standard has a fifty-fold safety margin built into it and is designed to provide protection for all people (including children and the elderly) for exposure 24 hours a day, 7 days a week. ARPANSA coordinated a survey of environmental radio frequency electromagnetic energy (RF EME) levels arising from mobile phone base station antennas from 2007 to 2013 and the results show that the levels of EME measured were very low in relation to the ARPANSA Standard.

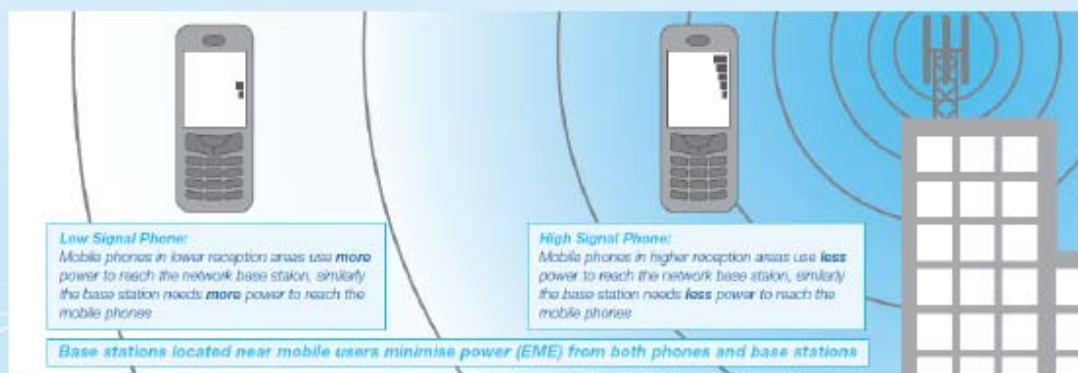
ARPANSA confirms that *"The balance of evidence does not indicate a risk to the health of people, including children, living in the vicinity of base stations where the exposure levels are only small fractions of the ARPANSA Standard"*. (ARPANSA EME Fact Sheet No. 11 "Mobile phones and children" Revised February 2013)

Locating a site for a mobile phone base station

The Communications Alliance (formerly ACIF) Mobile Phone Base Station Deployment Code 2011 (commonly referred to as "the Deployment Code") outlines the steps telecommunications carriers must take when deciding the location of new mobile phone base stations.

The Deployment Code requires carriers to take a precautionary approach and to consider 'community sensitive' locations such as schools, and balance this with other factors such as coverage objectives and engineering requirements when deciding on a base station site. However, the Code does not specify distances at which base stations must be constructed away from locations, because there is no science-based reason to do so.

Mobile phones and base stations are designed to operate at the lowest power to make a quality connection. Base stations adapt their output depending on the number of calls and the distance of handsets from the base station. If a base station is built further away from areas requiring coverage, it needs to operate using more power, which increases exposure to radio frequency electromagnetic fields – although these levels are still low and are compliant with Australia's safety standards. Quite simply the base stations need to be close to users to minimise the power from the base station and the mobile phone.



Indicative illustration only

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ARPANSA states that the standards which protect people from EME exposure do not set any distances between mobile base station locations and areas which may be considered to be sensitive. ARPANSA goes on to say *"Similarly, the Communications Alliance Code does not specify arbitrary distances at which infrastructure must be sited from community sensitive locations, because arbitrary distances do not necessarily reflect a precautionary approach. In fact, infrastructure sited further from a community sensitive area may need to operate at a higher power and may result in higher EME exposures in that sensitive area. Furthermore, it must be remembered that evidence gathered by ARPANSA confirms that exposure levels in public areas are typically hundreds or thousands of times less than the exposure limit set by the ACMA"* (ARPANSA Fact Sheet No. 6 "About mobile phone networks", revised July 2012)

The World Health Organisation

The mobile phone industry relies on the advice of international expert bodies such as the World Health Organisation (WHO). The WHO has also warned that a precautionary policy for EME should be introduced only with great care and deliberation:

A principle requirement is that such policies be adopted only under the condition that scientific assessments of risk and science based exposure limits should not be undermined by the adoption of arbitrary cautionary approaches.

WHO Backgrounder "Electromagnetic Fields and Public Health Cautionary Policies" March 2000

The WHO has said that it is difficult to envisage a consistent precautionary policy that would minimise EME exposures from mobile phone base stations given the presence of far higher powered sources of EME in the same area.

ARPANSA confirms that based on its own measurement surveys, mobile phone networks make up a small fraction of the total level of EME produced by similar services. Other services include TV, AM and FM radio, paging and police, fire, rescue, council and ambulance radio.

Exclusion zones could be problematic for the community

Exclusion zones could create reception black spots or network congestion, which would deny Australians access to the safety, business and personal benefits of mobile

communications when there is no substantiated scientific evidence of adverse health effects from living, working or studying near a mobile phone base station. For example, if exclusion zones were to be placed around kindergartens, schools, day care centres, hospitals and aged care facilities then coverage black spots could be created around these areas where there is a real need for access to communications.

Creating exclusion zones for base stations could restrict community development. The logical implication of an exclusion zone is that new facilities cannot be built within the area covered by the exclusion zone surrounding a base station. This then restricts where new schools, pre-schools, hospitals and nursing homes can be built, and adversely impacts on community development.

Information about EME levels

The mobile phone industry recognises that some people are concerned about the location of mobile phone base stations. Information on the environmental emission levels from base stations is available online at www.rfnsa.com.au where you can search by location name, suburb, or postcode for existing or proposed facilities. The mobile phone industry is committed to making information on EME readily available.

For more information, please contact:

Mobile Carriers Forum Ph: (02) 6295 8191

www.mcf.amta.org.au

EMF Explained web site www.emfexplained.info

Additional independent information can be obtained from:

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Ph: (03) 9433 2211 www.arpansa.gov.au

Fact sheets are available at

<http://www.arpansa.gov.au/eme/index.cfm>

The World Health Organisation – EMF Project

www.who.int/peh-emf

WHO Backgrounder "Electromagnetic Fields and Public Health – Cautionary Policies" can be found at

http://www.who.int/docstore/peh-emf/publications/facts_press/EMF-Precaution.htm