



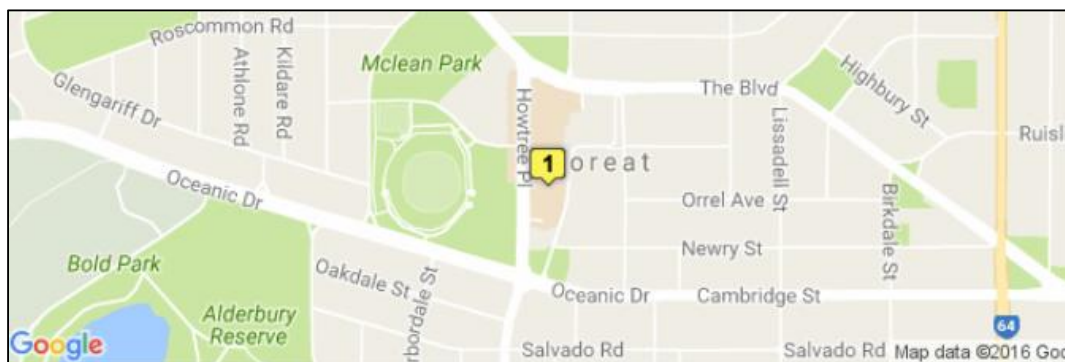
Our Ref: 4062

7 October 2016

The President
Floreat Park Primary School Parents & Citizen's Association
38 Chandler Avenue West
FLOREAT WA 6014

Dear Sir,

Vodafone Hutchison Australia – Proposal to install a Mobile Phone Base Station
Site No: 640097: JP3221 **Site Name: Floreat Forum**
Site Address: Floreat Forum Shopping Centre 5 Howtree Place Floreat WA 6014



Planning Solutions acts on behalf of Service Stream Mobile Communications for its client, Vodafone Hutchison Australia (**VHA**) with respect to the deployment of its mobile phone network.

We are writing to inform you that under a joint venture agreement with Optus, VHA proposes the installation of a new mobile phone network facility (base station) at the above address.

The purpose of this base station is to provide improved mobile network coverage to the Floreat

Details about the proposed facility and its emissions can be found on the website www.rfnsa.com.au Site ref: 6014009 or by contacting Planning Solutions directly. The proposed facility will be in compliance with the ACMA EMR regulatory arrangements. All contact details are provided on the attached sheet.

As part of VHA's consultation process, we invite you to provide us with your feedback on this proposal. You can do this by contacting us by letter, email or through our website. We will accept comments on the proposal until 1 November 2016. We will then prepare a report on the outcomes of the consultation process which will be available on the website by 9 November 2016. If you wish to receive a copy of this report, please contact us directly.

Depending on the outcome of the consultation process, it is our intention to begin construction of the telecommunications facility from December 2016. Any changes to this or other dates in this letter will be advised on the above website.

We trust that you will find the information about this proposal on our website informative and are happy to provide you with more details by phone or email.

We remind you that submissions about this proposal are due by **1 November 2016** and look forward to receiving your feedback.

Yours sincerely



LAURIE CHANTRY
PLANNING CONSULTANT

Attachments;

1. Additional Information
2. Addition Information – Planning and EMR compliance regulations

Additional Information

Further information about this proposal is available from Planning Solutions	www.rfnsa.com.au RFNSA Site No. 6014009 Name: Laurie Chantry Email: admin@planningsolutions.com.au Phone number: 08 9227 7970
You can submit a comment on the proposed facility to Planning Solutions	Address: PO Box 8701 Perth BC WA 6849
	Website: www.planningsolutions.com.au Email: admin@planningsolutions.com.au
Information about this proposal is available in other languages from	Available on request from contact details provided above
Support information about: <ul style="list-style-type: none">• Mobile phone base stations• The Base Station Code (C564)• Your rights• Health• Low impact facilities• State planning laws is available from this website	www.commsalliance.com.au/mobile-phone-tower-information

Planning Regulations

The Carrier considers that this proposed facility does not require council approval because it is a low impact facility or complies with relevant State planning legislation.

Additional Information – Planning and EMR compliance regulations

Site Name: Floreat
Site Number: 640097.

The proposed site at 5 Howtree Way Floreat is considered to be a Low Impact Facility in accordance with the *Telecommunications (Low-impact Facilities) Determination 1997*.

The reasons for this conclusion are based on the classification of the following components of the proposed facility in relation to the Determination.

Land Use Classification	Commercial
EME/EMR compliance	This facility is designed to comply with the ACMA EMR regulatory arrangements. Further information is available at www.rfnsa.com.au
Facility	Complies with item in the <i>Telecommunications (Low-impact Facilities) Determination 1997</i>
Antenna – Six (6) new panel antennas [2680mm (l) x 620mm (w) x 160mm (d)] in size to be mounted behind a shroud on the roof of the shopping centre at a height of 16.34m Φ ,	<p>Schedule Part 1 – Radio Facilities Item 3</p> <p>Panel, yagi or other like antenna:</p> <ul style="list-style-type: none"> (a) not more than 2.8 metres long; and (b) if the antenna is attached to a structure – protruding from structure by not more than 3 metres; and (c) either: (d) colour-matched to its background; or (e) in a colour agreed in writing between the carrier and the relevant authority. <p>In Residential, Commercial, Industrial and Rural area</p>
Equipment shelter – One (1) new outdoor equipment unit [33900mm (l) x 840mm (w) x 2125(h)] to be installed on the roof of the shopping centre.	<p>Schedule Part 3 – Above Ground Housing Item 5</p> <p>Equipment shelter:</p> <ul style="list-style-type: none"> (a) used solely to house equipment used to assist in providing a service by means of a facility mentioned in Part 1; and (b) not more than 3.0 metres high; and (c) with a base area of not more than 7.5 square metres; and (d) either: <ul style="list-style-type: none"> (i) colour-matched to its background; or (ii) in a colour agreed in writing between the carrier and the relevant local authority. <p>In Residential, Commercial, Industrial and Rural Areas</p>
Associated Infrastructure -	Ancillary facilities such as antenna mounts, remote radio units, tower mounted amplifiers, cable trays, feeders and other related items are deemed to be low impact facilities in pursuant to Part 3.1(4) of the Determination.

Environmental EME Report

5 Howtree PI, FLOREAT WA 6014

This report provides a summary of Calculated RF EME Levels around the wireless base station

Date 26/8/2016

RFNSA Site No. 6014009

Introduction

The purpose of this report is to provide calculations of EME levels from the existing facilities at the site and any proposed additional facilities.

This report provides a summary of levels of radiofrequency (RF) electromagnetic energy (EME) around the wireless base station at 5 Howtree PI FLOREAT WA 6014. These levels have been calculated by Radhaz Consulting using methodology developed by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

The maximum EME level calculated for the proposed systems at this site is 5.11% of the public exposure limit.

The ARPANSA Standard

ARPANSA, an Australian Government agency in the Health and Ageing portfolio, has established a Radiation Protection Standard specifying limits for general public exposure to RF transmissions at frequencies used by wireless base stations. The Australian Communications and Media Authority (ACMA) mandates the exposure limits of the ARPANSA Standard.

How the EME is calculated in this report

The procedure used for these calculations is documented in the ARPANSA Technical Report "Radio Frequency EME Exposure Levels - Prediction Methodologies" which is available at <http://www.arpansa.gov.au>.

RF EME values are calculated at 1.5m above ground at various distances from the base station, assuming level ground.

The estimate is based on worst-case scenario, including:

- wireless base station transmitters for mobile and broadband data operating at maximum power
- simultaneous telephone calls and data transmission
- an unobstructed line of sight view to the antennas.

In practice, exposures are usually lower because:

- the presence of buildings, trees and other features of the environment reduces signal strength
- the base station automatically adjusts transmit power to the minimum required.

Maximum EME levels are estimated in 360° circular bands out to 500m from the base station.

These levels are cumulative and take into account emissions from all mobile phone antennas at this site.

The EME levels are presented in three different units:

- volts per metre (V/m) – the electric field component of the RF wave
- milliwatts per square metre (mW/m²) – the power density (or rate of flow of RF energy per unit area)
- percentage (%) of the ARPANSA Standard public exposure limit (the public exposure limit = 100%).

Results

The maximum EME level calculated for the proposed systems at this site is 11.099 V/m; equivalent to 326.76 mW/m² or 5.11% of the public exposure limit.

Radio Systems at the Site

There are currently no existing radio systems for this site.

It is proposed that this base station will have equipment for transmitting the following services:

Carrier	Radio Systems
Vodafone	WCDMA900 (proposed), LTE850 (proposed), WCDMA2100 (proposed), LTE1800 (proposed)
Optus	LTE700 (proposed), WCDMA900 (proposed), WCDMA2100 (proposed), LTE1800 (proposed), LTE2300 (proposed), LTE2600 (proposed)

Calculated EME Levels

This table provides calculations of RF EME at different distances from the base station for emissions from existing equipment alone and for emissions from existing equipment and proposed equipment combined.

Distance from the antennas at 5 Howtree PI in 360° circular bands	Maximum Cumulative EME Level – All carriers at this site					
	Existing Equipment			Proposed Equipment		
	Electric Field V/m	Power Density mW/m ²	% ARPANSA exposure limits	Electric Field V/m	Power Density mW/m ²	% ARPANSA exposure limits
0m to 50m				8.21	178.75	2.11%
50m to 100m				10.66	301.48	4.91%
100m to 200m				11.099	326.76	5.11%
200m to 300m				6.87	125.27	1.84%
300m to 400m				4.67	57.73	0.85%
400m to 500m				3.5	32.44	0.48%
Maximum EME level				11.099	326.76	5.11
				105.22 m from the antennas at 5 Howtree PI		

Calculated EME levels at other areas of interest

This table contains calculations of the maximum EME levels at selected areas of interest that have been identified through the consultation requirements of the Communications Alliance Ltd Deployment Code C564:2011 or via any other means. The calculations are performed over the indicated height range and include all existing and any proposed radio systems for this site.

Additional Locations	Height / Scan relative to location ground level	Maximum Cumulative EME Level All Carriers at this site Existing and Proposed Equipment		
		Electric Field V/m	Power Density mW/m ²	% of ARPANSA exposure limits
Two storey dwelling	0m to 6m	11.57	354.97	5.21%
Floreat Bowling Club	0m to 3m	4.53	54.32	0.88%
Floreat Primary School	0m to 3m	4.97	65.56	1.0061%
Two storey dwelling	0m to 6m	3.99	42.3	0.64%

RF EME Exposure Standard

The calculated EME levels in this report have been expressed as percentages of the ARPANSA RF Standard and this table shows the actual RF EME limits used for the frequency bands available. At frequencies below 2000 MHz the limits vary across the band and the limit has been determined at the Assessment Frequency indicated. The four exposure limit figures quoted are equivalent values expressed in different units – volts per metre (V/m), watts per square metre (W/m²), microwatts per square centimetre (µW/cm²) and milliwatts per square metre (mW/m²). Note: 1 W/m² = 100 µW/cm² = 1000 mW/m².

Radio Systems	Frequency Band	Assessment Frequency	ARPANSA Exposure Limit (100% of Standard)
LTE 700	758 – 803 MHz	750 MHz	37.6 V/m = 3.75 W/m ² = 375 µW/cm ² = 3750 mW/m ²
WCDMA850	870 – 890 MHz	900 MHz	41.1 V/m = 4.50 W/m ² = 450 µW/cm ² = 4500 mW/m ²
GSM900, LTE900, WCDMA900	935 – 960 MHz	900 MHz	41.1 V/m = 4.50 W/m ² = 450 µW/cm ² = 4500 mW/m ²
GSM1800, LTE1800	1805 – 1880 MHz	1800 MHz	58.1 V/m = 9.00 W/m ² = 900 µW/cm ² = 9000 mW/m ²
LTE2100, WCDMA2100	2110 – 2170 MHz	2100 MHz	61.4 V/m = 10.00 W/m ² = 1000 µW/cm ² = 10000 mW/m ²
LTE2300	2302 – 2400 MHz	2300 MHz	61.4 V/m = 10.00 W/m ² = 1000 µW/cm ² = 10000 mW/m ²
LTE2600	2620 – 2690 MHz	2600 MHz	61.4 V/m = 10.00 W/m ² = 1000 µW/cm ² = 10000 mW/m ²
LTE3500	3425 – 3575 MHz	3500 MHz	61.4 V/m = 10.00 W/m ² = 1000 µW/cm ² = 10000 mW/m ²

Further Information

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).

Information about RF EME can be accessed at the ARPANSA website, <http://www.arpansa.gov.au>, including:

- Further explanation of this report in the document "Understanding the ARPANSA Environmental EME Report"
- The procedure used for the calculations in this report is documented in the ARPANSA Technical Report; "Radio Frequency EME Exposure Levels - Prediction Methodologies"
- the current RF EME exposure standard
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]

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>

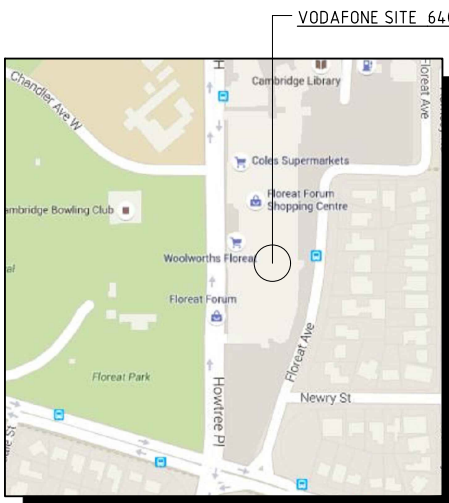
The Communications Alliance Ltd Industry Code C564:2011 'Mobile Phone Base Station Deployment' is available from the Communications Alliance Ltd website, <http://commsalliance.com.au>.

Contact details for the Carriers (mobile phone companies) present at this site and the most recent version of this document are available online at the Radio Frequency National Site Archive, <http://www.rfnsa.com.au>.

Issued by:
RADHAZ Consulting Pty Ltd
Level 4, 357 Collins Street, Melbourne VIC 3000

Data reference file – 5 Howtree PI - 20160826115939

A3



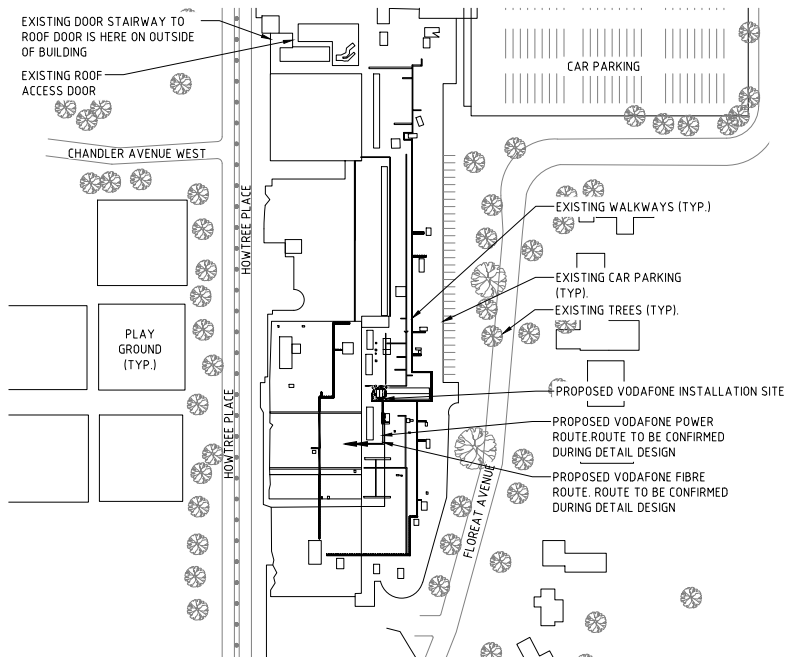
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SITE LOCALITY PLAN

NOT TO SCALE

RFNSA NUMBER: XXXXXX

CARRIER	SITE NAME	SITE ID
VODAFONE	FLOREAT FORUM	640097



SITE ACCESS

SCALE 1:1500

DRAFT

<table border="1"> <thead> <tr> <th>REV</th> <th>DATE</th> <th>REVISION DESCRIPTION</th> <th>DRAWN</th> <th>DESIGNED</th> <th>APPROD</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>21/04/2016</td> <td>PRELIMINARY ISSUE (eJV GREENFIELD PROJECT)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		REV	DATE	REVISION DESCRIPTION	DRAWN	DESIGNED	APPROD	A	21/04/2016	PRELIMINARY ISSUE (eJV GREENFIELD PROJECT)				<p>servicestream MOBILE COMMUNICATIONS 40 Hasler Road, Osborne Park, WA 6017 T +61 8 9355 7500 F +61 8 9355 6100 www.servicestream.com.au</p>	<p>VODAFONE SITE 640097 FLOREAT FORUM 8 FLOREAT AVENUE PERTH, WA 6074</p>	<p>eJV GREENFIELD PROJECT</p>	<p>JOINT VENTURE NO: JXXXXX</p> <p>TITLE SITE AND LOCALITY PLANS</p> <table border="1"> <thead> <tr> <th>DRAWING STATUS</th> <th>DRAWING No.</th> <th>REV</th> </tr> </thead> <tbody> <tr> <td>PRELIMINARY</td> <td>640097 - G1</td> <td>A</td> </tr> </tbody> </table>	DRAWING STATUS	DRAWING No.	REV	PRELIMINARY	640097 - G1	A
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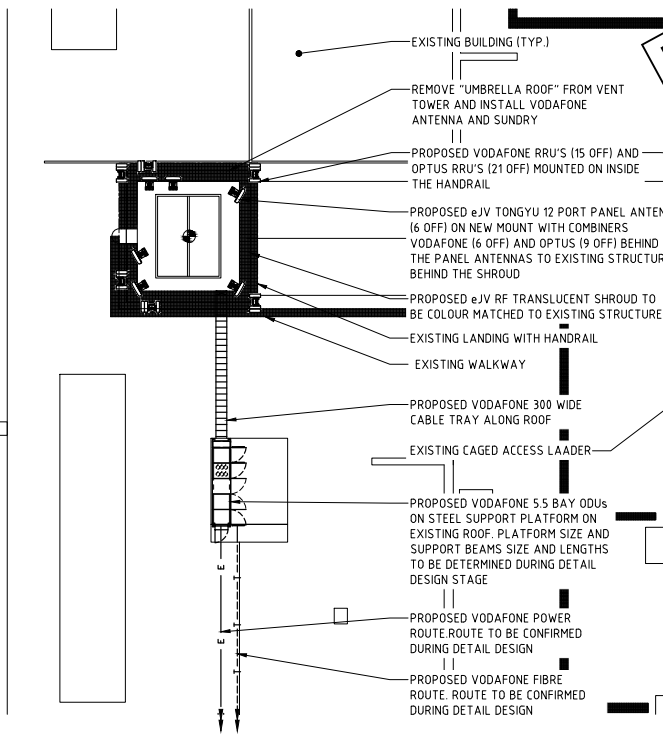
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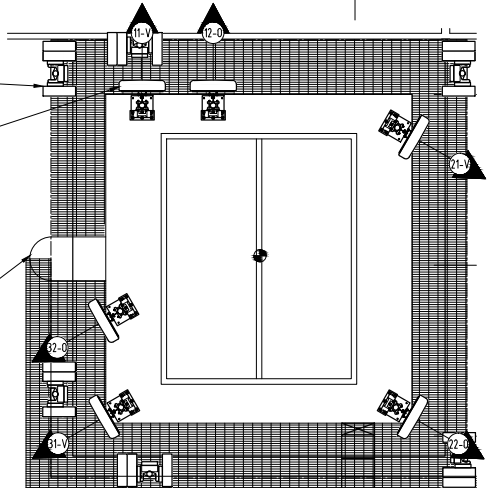
DATUM POINT	GDA94 CO-ORDIANES
LATITUDE	-31.939195
LONGITUDE	115.792805

DRAFT

LEGEND:
 NEW, REPLACE, ETC



SITE SETOUT PLAN
SCALE 1:150



- NOTES:**
1. ALL ORIENTATIONS ARE IN DEGREES RELATIVE TO M.G.A. NORTH.
 2. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
 3. PROPOSED VODAFONE RRU'S (15 OFF) AND OPTUS (21 OFF) MOUNTED ON INSIDE THE HANDRAIL.
 4. REFER DRG 64.0097-G4 FOR ANTENNA CONFIGURATION TABLE.

						VODAFONE SITE 64.0097 FLOREAT FORUM 8 FLOREAT AVENUE PERTH, WA 6074		eJV GREENFIELD PROJECT		JOINT VENTURE NO: JXXXXX	
										SITE SETOUT PLAN	
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REV	DATE	REVISION DESCRIPTION	VENDOR	DRAWN	DESIGNED	APPROD	T +61 8 9355 7500 F +61 8 9355 6100 www.servicestream.com.au		PRELIMINARY	64.0097 - G2	A

A3 NOTES:

1. ANTENNA ACCESS VIA EXISTING CAGE LADDER.

PROPOSED COMBINERS VODAFONE (6 OFF) AND OPTUS (9 OFF) BEHIND THE PANEL ANTENNAS TO EXISTING STRUCTURE BEHIND THE SHROUD

PROPOSED eJV RF TRANSLUCENT SHROUD TO BE COLOUR MATCHED TO EXISTING STRUCTURE

PROPOSED VODAFONE RRU'S (15 OFF) AND OPTUS RRU'S (21 OFF) MOUNTED ON INSIDE THE HANDRAIL

PROPOSED eJV 5.5 BAY ODU'S ON STEEL SUPPORT PLATFORM ON EXISTING ROOF. PLATFORM SIZE AND SUPPORT BEAMS SIZE AND LENGTHS TO BE DETERMINED DURING DETAIL DESIGN STAGE

PROPOSED VODAFONE POWER ROUTE TO BE CONFIRMED DURING DETAIL DESIGN

PROPOSED VODAFONE FIBRE ROUTE TO BE CONFIRMED DURING DETAIL DESIGN

PROPOSED VODAFONE 300 WIDE CABLE TRAY ALONG ROOF

▼ EL 18.00m
TOP OF SHROUD

▼ EL 16.34m
PROPOSED PANEL ANTENNAS (6 OFF CELLS 11-V, 12-O, 21-V, 22-O, 31-V & 32-O) BEHIND THE SHROUD

▼ EL 12.00m
TOP OF STRUCTURE

▼ EL 4.50m
TOP OF ROOF

▼ EL 0.00m
GROUND LEVEL

DRAFT

EASTERN ELEVATION

SCALE 1:100

JOINT VENTURE NO: JXXXXX

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<p>A 2104-2016 PRELIMINARY ISSUE (eJV GREENFIELD PROJECT)</p>		<p>SSHC</p>	<p>VS</p>	<p>ST</p>	<p>CT</p>	<p>DRWING STATUS PRELIMINARY</p>	<p>DRWING NO. 640097 - G3</p>	<p>REV A</p>	

5 (Lot 1) Howtree Place, Floreat Floreat Forum Shopping Centre Telecommunications Infrastructure

DISCOUNTED CANDIDATES REPORT

	Site Address	Candidate Type	Co-Ordinates	Proposed C/I Height	Reasons for selection/discount
A	5 (Lot 1) Howtree Place, Floreat Floreat Forum Shopping Centre	Water cooler tower mount on Roof of shopping centre	-31.938548, 115.792826	Roof top	Commercial site. Selected candidate
B	5 (Lot 1) Howtree Place, Floreat (Same land as Candidate A)	Roof mount on ANZ building adjacent to Caltex Service Station	-31.936763 115.794221	Roof top	RF objectives could not be achieved. Residential in close proximity. Owner not interested.
C	99 (Lot 101) The Boulevard, Floreat Cambridge Library	Roof Mount	-31.936648 115.793365	Roof top	RF objectives could not be achieved. Residential in close proximity. Town of Cambridge not supportive
D	Lot 1774 The Boulevard Floreat McLean Park	New Pole	-31.936327 115.788905	20m	Local Scheme reserve for parks and recreation Town of Cambridge will not support a monopole proposal
E	39 (Lot 1752) Chandler Avenue, Floreat Floreat Oval	New Pole	-31.939724 115.790271	20m	Local Scheme reserve for parks and recreation Town of Cambridge will not support a monopole proposal
F	121 (Lot 720) Alderbury Street, Floreat Alderbury Reserve	New Pole	-31.941561 115.784701	20m	MRS Reserve for Parks and recreation. Bush forever. High environmental and conservation area. Town of Cambridge will not support a monopole proposal
G	5 (Lot 1) Howtree Place, Floreat Floreat Forum Shopping Centre	Alternative water cooler tower mount on roof of shopping centre	-31.939179, 115.792753	Roof top	Structural integrity issues and future plans by Owners



Mobile Phone Base Stations and Health

Based on current research there are no established health effects that can be attributed to the low RF EME exposure from mobile phone base station antennas.

Introduction

There are mobile phone base station antennas on towers and buildings throughout Australia's populated areas. These antennas are part of the mobile phone network and they emit low level radiofrequency (RF) electromagnetic energy (EME). This fact sheet provides information about concern of adverse health effects arising from exposure to RF EME from base station antennas.

How does the mobile phone network operate?

When a call is made from a mobile phone, RF signals are transmitted between its antenna and the antenna at a nearby base station. The phone call is then routed through the phone network to the destination phone. Base station antennas must be elevated and located clear of physical obstruction to ensure wide coverage.

In an area of increasing mobile phone use the number of additional base stations needed to maintain service quality increases, even in areas where mobile network coverage already exists. If this is not done the mobile network will not operate properly and, as a result, mobile phone users may not be able to connect to their network.

Are base stations regulated in Australia?

The RF EME emissions from mobile phone base stations and other communications installations are regulated by the Australian Communications



and Media Authority (ACMA). The ACMA's regulatory arrangements require base stations to comply with the exposure limits in the ARPANSA RF Standard. The ARPANSA Standard is designed to protect people of all ages and health status against all known adverse health effects from exposure to RF EME. The ARPANSA Standard is based on scientific research that shows the levels at which harmful effects occur and it sets limits, based on international guidelines, well below these harmful levels.

The ACMA also requires base stations to comply with an industry code of practice which requires telecommunications carriers to inform and consult with the local community when planning, installing or upgrading base stations.

How much RF EME are people exposed to from base stations?

The maximum levels of exposure of RF EME from base stations may be calculated from details of the equipment installed. These calculations are made available in the ARPANSA EME reports provided by the telecommunications companies on the Radio Frequency National Site Archive website, www.rfnsa.com.au. The base station sites may be located by searching by postcode or town.

EME exposure to the public from base stations is typically hundreds of times below the limits of the ARPANSA RF Standard.

Do base stations cause any health effects?

Health authorities around the world, including ARPANSA and the World Health Organization, have examined the scientific evidence regarding possible health effects from base stations. Current research indicates that there are no established health effects from the low exposure to the RF EME from mobile phone base station antennas.

Conclusion

No adverse health effects are expected from continuous exposure to the RF EME emitted by the antennas on mobile phone base stations.

ARPANSA will continue to review the research into potential health effects of RF EME emissions from mobile phone base stations and other sources in order to provide accurate and up-to-date advice.

Useful Links

ARPANSA fact sheet on RF EME

www.arpansa.gov.au/RadiationProtection/basics/rf.cfm

The ARPANSA RF Standard

www.arpansa.gov.au/Publications/codes/rps3.cfm

WHO fact sheet on base stations

www.who.int/peh-emf/publications/facts/fs304/en/

AMTA information on Australian base stations

www.rfnsa.com.au

www.mobilesitesafety.com.au

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.

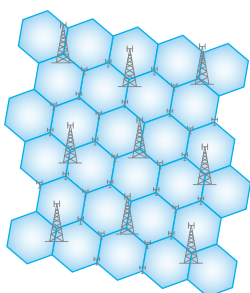
Topography and physical constraints

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.

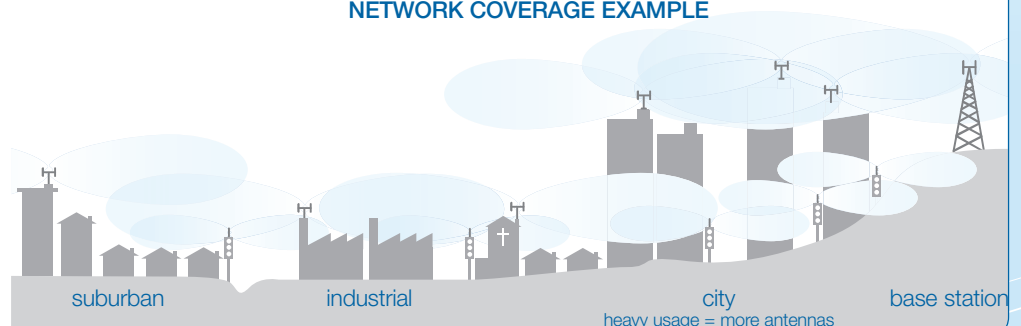
Cell capacity

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.

NETWORK STRUCTURE



NETWORK COVERAGE EXAMPLE



Indicative illustration only

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/Contact.Us

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

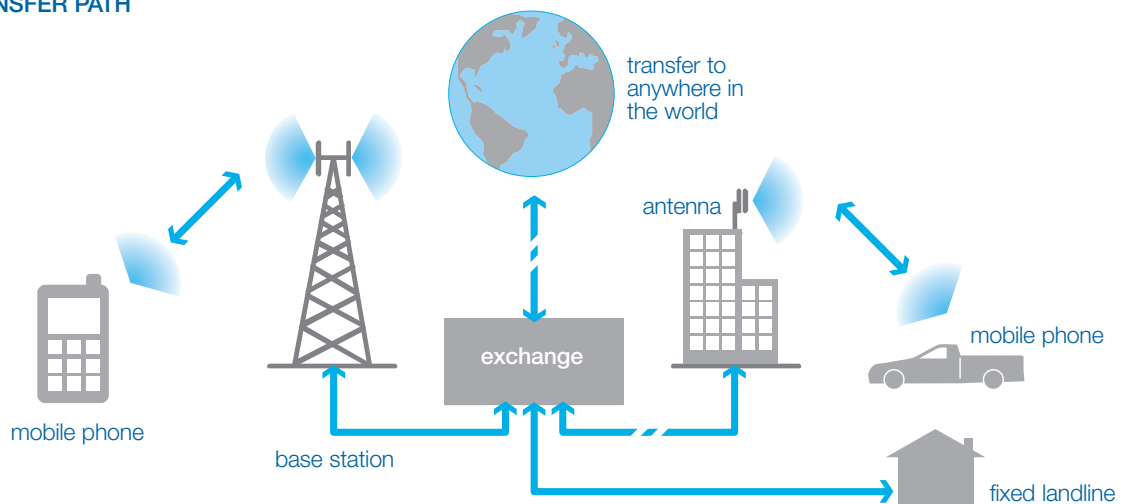
www.arpansa.gov.au/pubs/eme/fact6.pdf

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

Everyday sources of EME



- 1 CB Radios
- 2 TV Stations
- 3 Baby Monitors
- 4 Microwave Ovens
- 5 Fluorescent Lamps
- 6 Burglar Alarms
- 7 Natural Sources:
 - The Earth,
 - People, and
 - The Sun
- 8 Mobile phone antennas

Radio Communications in the Community

How do the transmitter powers compare?

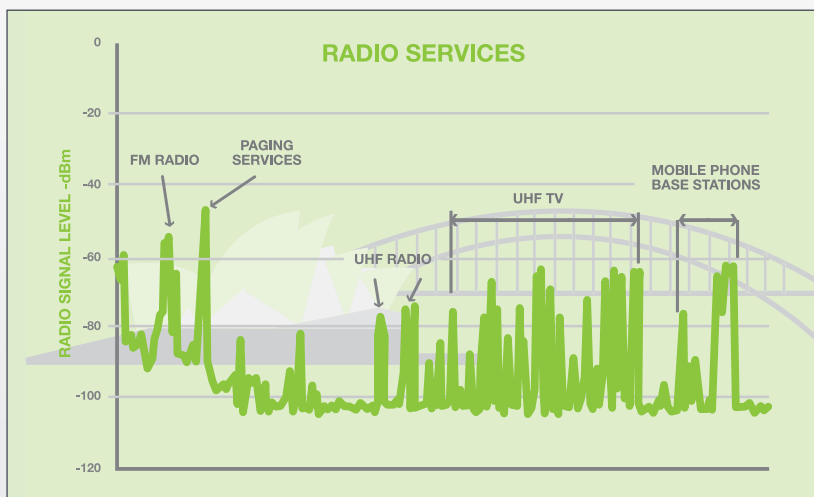
Radio Systems* Typical Transmitter Power (Watts)

TV & Radio broadcast	5,000 – 100,000
Air traffic control radars	5000 – 20,000
Radio paging services	50 – 100
Emergency communications	50 – 100
Government radio systems	50 – 100
Mobile phone base station	2 – 50
Wireless Broadband base station	2 – 50

Radio Devices Typical Transmitter Power (Watts)

Walkie Talkies	0.1 – 5
Mobile phones	0.002 – 0.2
Wi-Fi Modem	0.1
Cordless phones	0.01 – 0.2
Baby monitors	0.01 – 0.1
Car remote control	0.001 – 0.1

* typical power into antenna



Spectrum plot showing typical radio communications signals in a community

This picture is a plot from a spectrum analyser (specialised radio measurement equipment) showing the various radio communications signals measured in a typical community. The plot is taken at one location to illustrate typical radio communication signals present, and to make a comparison of signal level.

The type of radio service is indicated on the plot along the horizontal axis and signal level in dBm (level relative to 1 milli-watt) on the left hand axis. The units are not really important here except to show relative levels. The picture also shows how many radio services are used in a typical community.

How strong are the environmental or background EMF levels in the community?

In a typical community, broadcast television and radio signals are similar in strength to signals from mobile phone networks and other two-way communications systems. These signals are overall very low and well below the established safety guidelines.

The World Health Organisation has reviewed the background EMF levels from wireless systems and says,

"Recent surveys have shown that the RF exposures from base stations range from 0.002% to 2% of the levels of international exposure guidelines, depending on a variety of factors such as the proximity to the antenna and the surrounding environment. This is lower or comparable to RF exposures from radio or television broadcast transmitters"

Specifically on EMF levels in public areas the WHO says,

"Recent surveys have indicated that RF exposures from base stations and wireless technologies in publicly accessible areas (including schools and hospitals) are normally thousands of times below international standards."

What research has been done on radio communications and EMF safety?

There has been a lot of research conducted worldwide to investigate possible health effects of radio communications and wireless technology.

In relation to radio frequency exposures and wireless technology and health, the general conclusion from the World Health Organisation (WHO) is

"Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health"

The WHO also says,

"radio and television broadcast stations have been in operation for the past 50 or more years without any adverse health consequence being established".