Radio Frequency Radiation Assessment

AMP Capital

Bourke Place
600 Bourke Street, Melbourne VIC

August 2019

RISKTECH

Radio Frequency Radiation Assessment Report

Report For	AMP Capital
Address	Bourke Place 600 Bourke Street, Melbourne VIC
Prepared By	Matthew Hyde, Consultant (RiskTech Pty Ltd)
Date of Inspection	13 August 2019
Conferred With	Darren Hynes, Facilities Manager Support

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Document Revision Record

File Name	Prepared By	Reviewed By	Issue No.	Issue Date
AMP RFR Assessment 600 Bourke St, Melbourne VIC Aug19	Matthew Hyde Senior Consultant	Bernard Day General Manager	1	23/08/19

Contents

1. Executive Summary

Scope

RiskTech Pty Limited were engaged by AMP Capital to undertake an assessment of the radio frequency radiation (RFR) hazards at Bourke Place located at 600 Bourke Street, Melbourne VIC. The assessment was carried out by Matthew Hyde, Senior Consultant of RiskTech on 13 August 2019.

Key Findings

- Radio frequency antennas were observed on the following roof areas at 600 Bourke Street, Melbourne VIC:
    - Lower North Roof
    - Lower South Roof
    - Level 52 & 53 Roof Areas.
- Access to the radio frequency antennas on the roof levels were secured against unauthorised access at the time of inspection.
- Appropriate RFR hazard warning signage was installed at the entrance to the Lower Roof Areas (North & South) at the time of inspection. Appropriate chains have been installed as exclusion zone areas around the antennas, however the chains were not highlighted.
- No RFR signage was present at the entrance to the Level 52 & 53 Roof Areas. No exclusion zones have been marked on any of the roof areas or walkways where required. It is noted that access to the RFR equipment on the Level 52 & 53 Roof Areas were appropriately secured to prevent unauthorised access.
- The exclusion zone maps installed at the entrance to the Lower Roof Areas (North & South) are from the EME guide version No. 4 which has been updated to Version No.5 which makes the current exclusion zone plans obsolete. It is noted that the general public areas on the Ground Level are not affected by EME exclusion zones.
- The fall arrest system installed (Sala Railok & attachments) to access the tower on the Level 53 Roof appears to be last inspected in June 2011 as indicated by the markings on the information plate adjacent the ladder.
- RiskTech was advised that planned works (e.g. removal of antennas and refurbishment of the tower) on the Level 52 Roof Area is being proposed for the future.
- Electromagnetic Energy (EME) Site Safety Documentation such as a Limited Site Compliance Certificate, Environmental EME Report and Limited EME Guide was available for 600 Bourke Street, Melbourne VIC (NSA Site No: 3000136).
- RiskTech obtained the latest Limited EME Guide (Issue No: 05) dated 24/11/2017 for the site and provided this to the Building Manager. The Limited EME Guide states that there are unidentified antennas located on the site (Level 52 Roof Area) which are registered on ACMA #11591, however is not included in this EME Guide.
- The Site Limited Compliance Certificate states that the site includes both mobile telecommunications equipment configured as a mobile base station and other frequency transmitting equipment, some of which is unable to be identified (Level 52 Roof Areas) and therefore has not been included in the compliance assessment.

Key Recommendations

- Engage a suitable qualified AMTA RF Assessor to attend the site to identify the unidentified carrier equipment, collect the required information and take EME measurements of the equipment installed on the Level 52 & 53 Roof Areas. Once the assessment has been undertaken, obtain an updated full unconditional copy of the EME Guide with appropriate exclusion zones mapped out prior to any works that may be required on the roof. Refer to **Appendix 4** for list of AMTA accredited RF Assessors.
- Ensure a full unconditional compliance certificate is issued for the site following the RF assessment.

(Note: AMTA provide a login access for facility manager/owners or carrier subcontractor of antennas. **Refer to Appendix 3 RFNSA Login Access Form**. Download the current document from www.rfnsa.com.au, which is the best way to ensure you have the most up to date documentation).

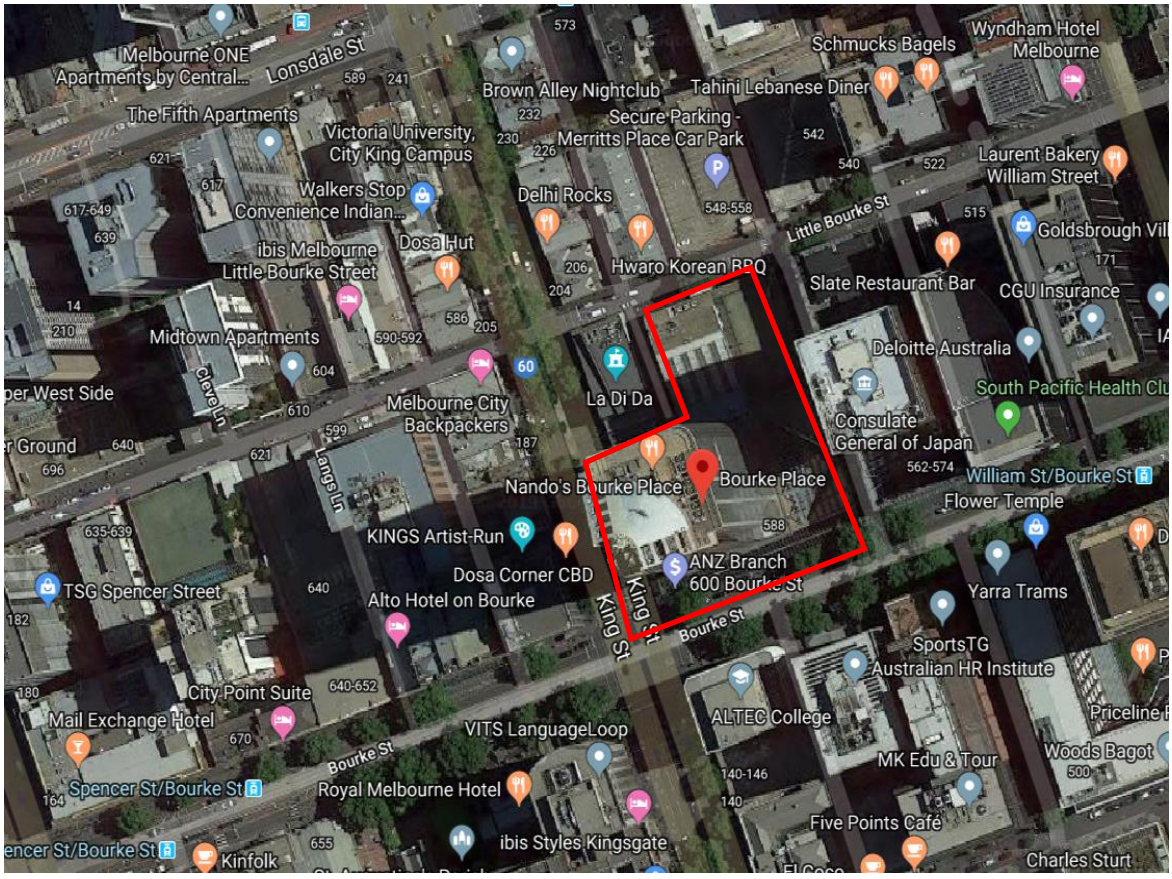
- Consider installing RF warning signage and exclusion zones (if required following the RF Assessment) on the Level 52 & 53 Roof Areas to warn contractors accessing the roof area of the potential hazards associated with the antennas. Refer to **Section 3.5** safety signage.
- Consider updating / replacing the exclusion zone maps installed at the entrance to the Lower Roof Areas (North & South) with the updated versions from the EME Guide Version No. 5 included in Appendix 1 of this document.
- Consider highlighting the exclusion zone chains around the RF equipment on the Lower Roof Areas (North & South) to highlight and make clearly visible the exclusion zone area.
- Ensure the fall arrest system installed (Sala Railok & attachments) to access the tower on the Level 53 Roof is inspected and maintained prior to any works that require the use of the system.

2. Introduction

RiskTech Pty Limited were engaged by AMP Capital to undertake an assessment of the radio frequency radiation (RFR) hazards at Bourke Place located at 600 Bourke Street, Melbourne VIC. The assessment was carried out by Matthew Hyde, Senior Consultant of RiskTech on 13 August 2019.

2.1 Site Description

Site Address	Bourke Place 600 Bourke Street, Melbourne VIC
Construction Date	1990
Site Type	Commercial
Levels	53 Levels (including roof levels & basement car park levels)
Description	The site consists of a 53 Level commercial building located on the corner of Bourke & William Streets in Melbourne's CBD. The Roof Level is located on Level 53. Undercover parking is provided in the basement of the building which is accessed via Little Bourke Street. Retail / food outlets are located on the Ground Level.



Site Location: 600 Bourke Street, Melbourne VIC

Image courtesy Google Maps 2019

2.2 Scope

The assessment was undertaken using the following methodology:

- A walk-through inspection of common areas of the site to:
  - Identify RFR equipment such as mobile phone base station antennas, radio and television broadcast transmitters and radar systems present on site;
  - Evaluate the controls in place on site;
  - Confirm if a site radiation folder(s) such as the Electromagnetic Energy (EME) Guide or Radio Communications Site Management Book (RCSMB) is present; &
  - Confirm if radiation areas are appropriately signposted and secured against unauthorised access.
- Preparation of the report including a list of observations and recommendations aimed at controlling areas of concern, or suggested improvements to the existing systems.

It is noted that this is a qualitative report only and no radiation measurements were taken. The telecommunications carriers that own and control the installations are responsible for providing detailed RFR field assessment reports.

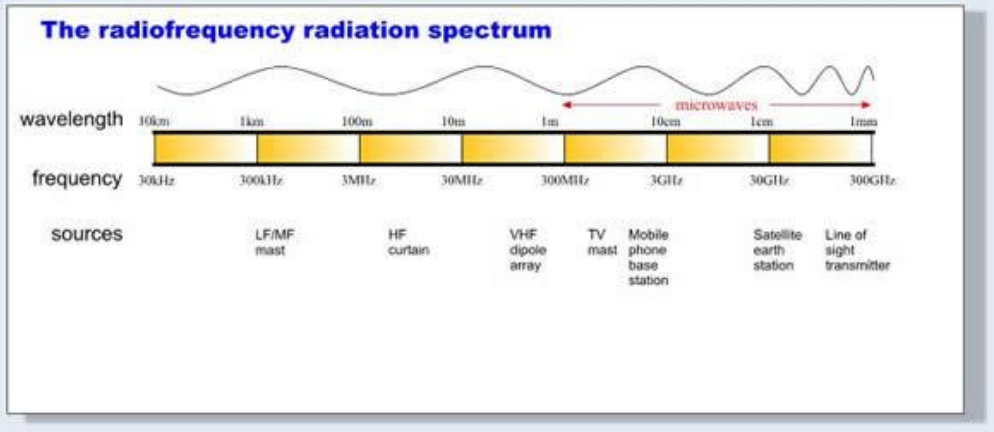
3. Background Information

3.1 Radio Frequency Radiation

What is Radiofrequency Radiation

Radiofrequency (RF) electromagnetic radiation (EMR) is the transfer of energy by radio waves. RF EMR lies in the frequency range between 3 kilohertz (kHz) to 300 gigahertz (GHz). Mobile phones are low-powered radiofrequency transmitters, operating at frequencies between 450 and 2700 MHz. FM radio and television broadcasting operate at frequencies around 100 MHz and 300 to 400 MHz respectively.

RF EMR is non-ionising radiation, meaning that it has insufficient energy to break chemical bonds or remove electrons (ionisation).



Sources of Radiofrequency Radiation

RF EMR is produced by both natural and artificial sources. Natural sources like the sun, the earth and the ionosphere all emit low level RF fields. Artificial sources of RF EMR are mainly used for telecommunications purposes such as mobile phone base stations. Mobile phones communicate by transmitting radio waves through a network of fixed antennas called base stations.

Radio and television broadcasting, mobile phones, pagers, cordless phones, police and fire department radios, point-to-point links and satellite communications all produce RF EMR. Other sources of RF fields include microwave ovens, radar, industrial heaters and sealers, and various medical applications.

Radiofrequency Radiation Exposure

RF EMR exposures from mobile phone base stations range from 0.002% to 2% of the levels of international exposure guidelines depending on various factors such as proximity to the antenna and the surrounding environment. RF exposure from telecommunications facilities is generally less than from radio or television broadcasting transmitters.

Relatively high levels of exposure to RF fields can occur to workers in the broadcasting, transport and communications industries when they work in close proximity to RF transmitting antennas and radar systems. Some industrial processes that use RF fields to heat materials can produce high exposure to workers.

Health Effects of RFR Exposure from Mobile Phone Base Station Antennas

Current research indicates that there are no established health effects from low exposure to RF EME from mobile phone base station antennas. ARPANSA concluded that "*no adverse health effects are expected from continuous exposure to the RF EME emitted by antennas on mobile phone base stations*". (ARPANSA Fact Sheet dated August 2016 – **Appendix 2**).

RFR Exposure from Mobile Phone Base Station Antennas

In 2002 ARPANSA published the standard: Radiation Protection Standard - Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz. The ARPANSA RF Standard sets limits for human exposure to RF EMR in the frequency range 3 kHz to 300 GHz. The Standard also includes requirements for protection of the general public and the management of risk in occupational exposure, together with additional information on measurement and assessment of compliance.

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

3.2 Radio Frequency National Site Archive

The Australian Mobile Telecommunications Association (AMTA) is the industry body representing Australia's mobile telecommunications industry. The AMTA host the Radio Frequency National Site Archive (RFNSA), which outlines information about selected mobile phone towers.

The AMTA Radio Frequency Safety Program (RFSP) is developed by AMTA and the Mobile Carriers to gather, record and share information so that all parties involved can have visibility of the site's compliance. The information is stored on the National Site Archive database (RFNSA) website which includes information for the management of EME compliance for any site including (but not limited to):

- National Association of Testing Authorities (NATA) accredited Independent RF Assessors;
- Standard EME Site Safety Documents:
    - Site Compliance Certificate;
    - EME Guide, which will replace the RCSMB over time;
    - EME Safe Work Information; &
    - Site Compliance Report.
- Standard Site Signage.
- All EME levels are disclosed to the site owner and/or manager for management of WHS on their sites.

3.3 EME Guide & RCSMB

The EME Guide and RCSMB are designed to help anyone who is required to work near radio telecommunications equipment installed on this property and to do so safely. They describe areas that should not be accessed (exclusion zones), and provides details of the equipment installed at the site and the operator of the equipment. The facility manager, building manager or carrier will provide a login to access the EME Guide or RCSMB.

3.4 Safety Requirements

The following safety requirements should be considered when working near antennas (source: www.MobileSiteSafety.com.au website):

- Personnel must be appropriately trained;
- Provision of safety briefing/ induction;
- Do not work directly in front of or around RF transmitter antennas;
- Observe safety signage;
- View online site safety documentation;
- Refer to Electromagnetic Energy Guide (EME Guides will replace RCSMBs over time);
- Check site EME Exclusion Zone drawings noting any exclusion zones;
- Check for site updates - see Caution Sheets for any warnings of site changes;
- Use of safe work method statement; &
- Use of a personal RF monitor.

3.5 Safety Signage

- Radiation Safety signage should be installed at the entrance to the areas housing the RF equipment on site.

Example RF hazard warning signage

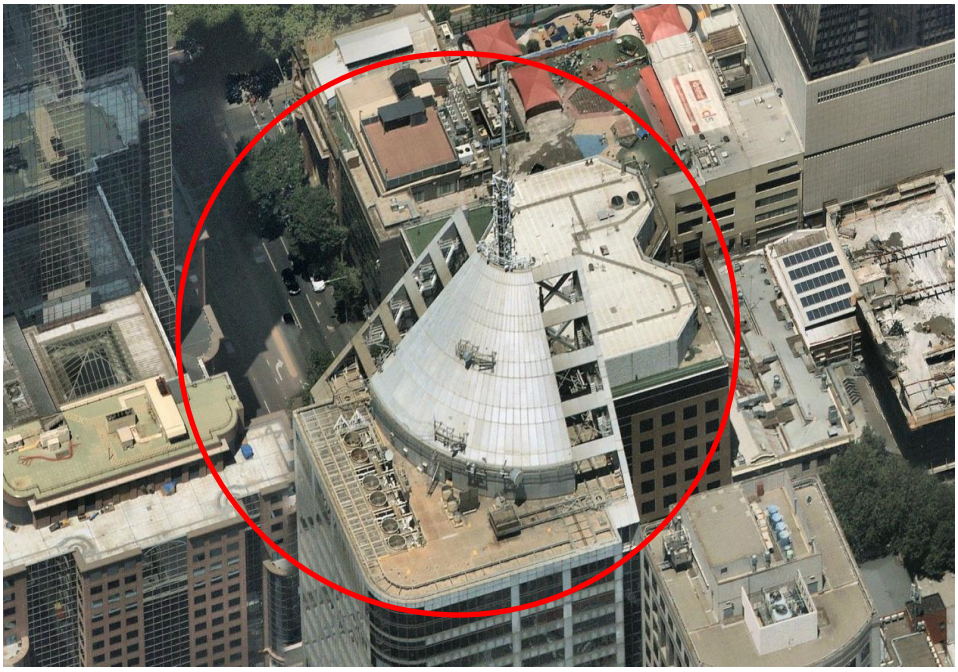
3.6 Limitations/Areas Not Accessed

- The assessment is limited to those physical aspects that could be observed during the assessment of common areas of the site.
- No detailed testing or no radiation measurements were undertaken.
- We have generally used and relied upon information supplied as being regarded as authoritative and reliable. Review of reports and certification documentation is limited to those that were present on site at the time of the assessment or available in the public domain (eg; RFNSA website).

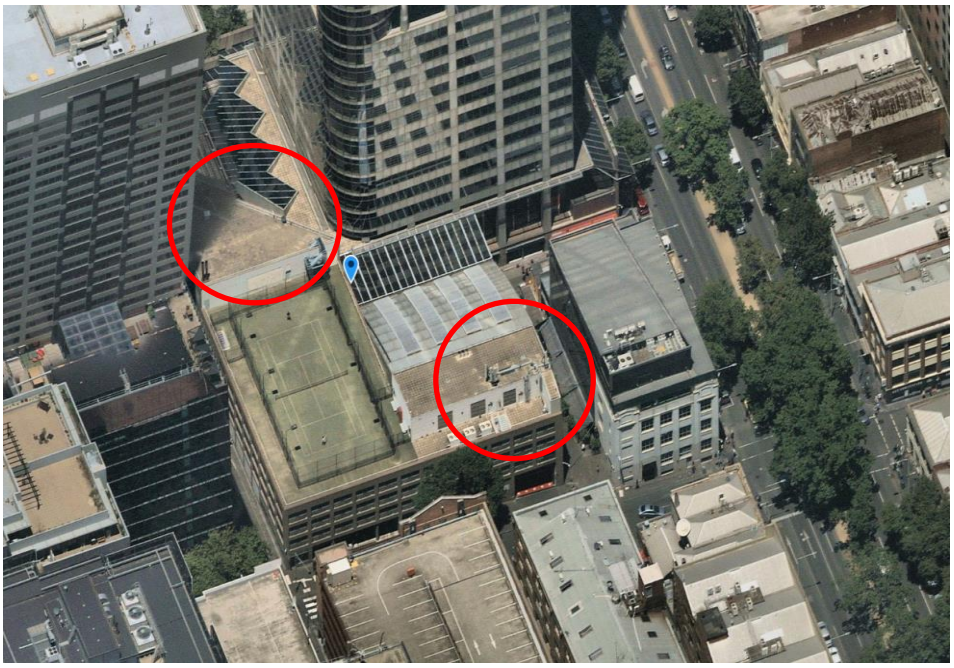
4. Findings

4.1 Site Observations

- Radio frequency antennas were observed on the following roof areas at 600 Bourke Street, Melbourne VIC:
  - Lower North Roof
  - Lower South Roof
  - Level 52 & 53 Roof Areas.



Level 52 & 53 Roof Areas



Lower Roof North & Lower Roof South

- Access to the radio frequency antennas on the roof levels were secured against unauthorised access at the time of inspection.
- Appropriate RFR hazard warning signage was installed at the entrance to the Lower Roof Areas (North & South) at the time of inspection. Appropriate chains have been installed as exclusion zone areas around the antennas, however the chains were not highlighted.
- No RFR signage was present at the entrance to the Level 52 & 53 Roof Areas. No exclusion zones have been marked on any of the roof areas or walkways where required. It is noted that access to the RFR equipment on the Level 52 & 53 Roof Areas were appropriately secured to prevent unauthorised access.
- The exclusion zone maps installed at the entrance to the Lower Roof Areas (North & South) are from the EME guide version No. 4 which has been updated to Version No.5 which makes the current exclusion zone plans obsolete. It is noted that the general public areas on the ground level are not affected by EME exclusion zones.
- RiskTech was advised that planned works (e.g. removal of antennas and refurbishment of the tower) on the Level 52 Roof Area is being proposed for the future.
- The fall arrest system installed (Sala Railok & attachments) to access the tower on the Level 53 Roof appears to be last inspected in June 2011 as indicated by the markings on the information plate adjacent the ladder.

4.2 EME Site Safety Documentation Search & Review

4.2.1 Site Compliance Certificate

- A search of the RFNSA web site identified a Limited Site Compliance Certificate for 600 Bourke Street, Melbourne VIC (NSA Site No: 3000136), which was prepared by Catalyst One Pty Ltd (Limited Site Compliance Report No: 05 dated 24/11/2017). Refer to **Appendix 1**.
- The Site Limited Compliance Certificate states that the site includes both mobile telecommunications equipment configured as a mobile base station and other frequency transmitting equipment, some of which is unable to be identified (Level 52 Roof Areas) and therefore has not been included in the compliance assessment.
- The Limited Site Compliance Certificate states that '*the mobile telecommunications equipment installed and its configuration as a mobile base station has been assessed and has been deemed to comply with the ACMA Licence Conditions (Apparatus Licence) Determination 2015'*.
- Furthermore, the Limited Site Compliance Certificate for 600 Bourke Street, Melbourne VIC also states that '*access control, RF warning signage (Lower Roof Area – North & South) and safe work procedures are in place as detailed in the accompanying Electromagnetic Energy Guide (EME Guide)*'.

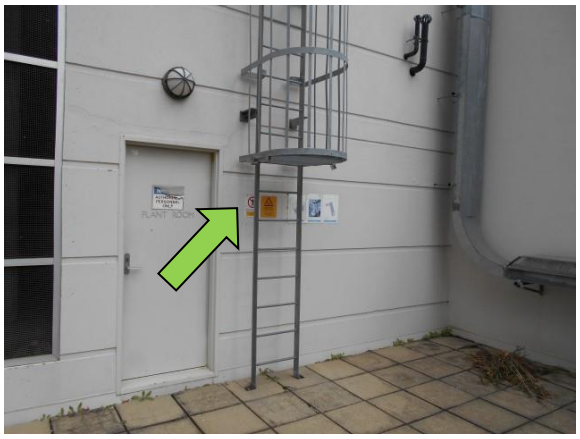
4.2.2 *Environmental EME Report*

- A search of the RFNSA web site identified an Environmental EME Report for 600 Bourke Street, Melbourne VIC (NSA Site No: 3000136), which was dated 3/7/2019. Refer to **Appendix 1**.
- The Environmental EME Report provides a summary of the Calculated RF EME Levels around the antennas at the site. The EME report states that the 'RF EME levels have been estimated from the existing antennas at Kings Parking 558 Little Bourke St, Corner Crombie Lane, Melbourne VIC. *The maximum cumulative EME level at 1.5 m above ground level is estimated to be 2.75 % out of 100% of the public exposure limit, 39 m from the location.*
- The Environmental EME Report notes existing radio systems and carriers installed on the site include Telstra.

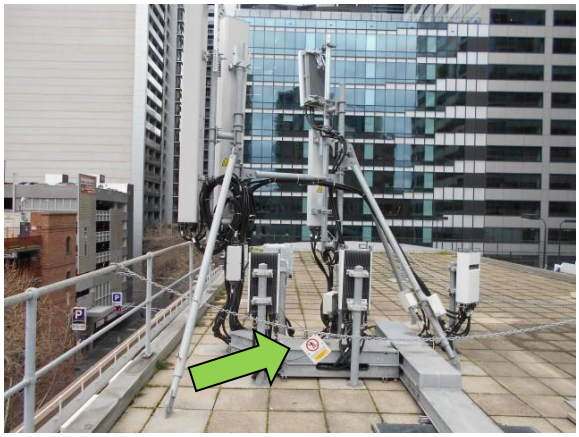
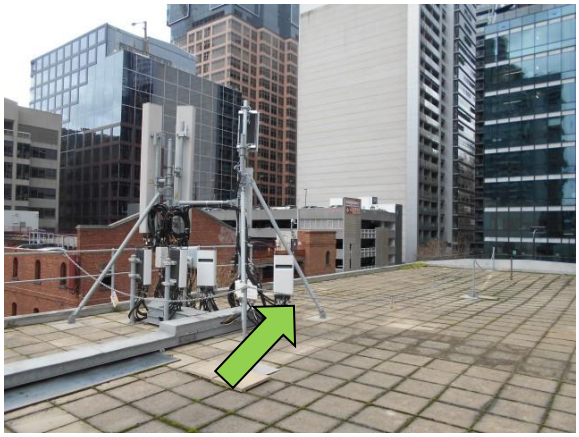
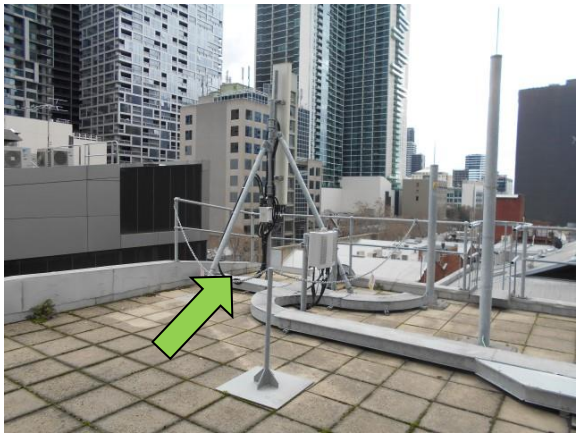
4.2.3 *EME Guide*

- RiskTech obtained the latest Limited EME Guide (Issue No: 05) dated 24/11/2017 for the site and provided this to the Building Manager. The Limited EME Guide states that there are unidentified antennas located on the site (level 52 Roof Areas) which are registered on ACMA #11591, however is not included in this EME Guide. Refer to **Appendix 1.**
- The Limited EME Guide shows equipment installed on the lower roof areas (North & South) with associated exclusion zones maps, however has not included the antennas on the Level 52 & 53 Roof Areas. No exclusion zones have been included for the level 52 & 53 Roof Areas.
- The EME guide also includes the "In Building Coverage (IBC) Distributed Antenna System (DAS)" throughout the building. The section in the EME Guide states the following for this system:
  - The EME exposures do not exceed the general public limits in the 'In Building Coverage (IBC) / Distributed Antenna System (DAS)' at this site.
  - Transmitting power at this site is quite low that no RF Hazards exists. Even at very low levels, non-ionising radiation has the potential to adversely affect the operation of Bio-medical devices. Persons with such devices must ensure all transmitters are powered-off before working in close proximity to transmitting antennas or around the building ceiling.

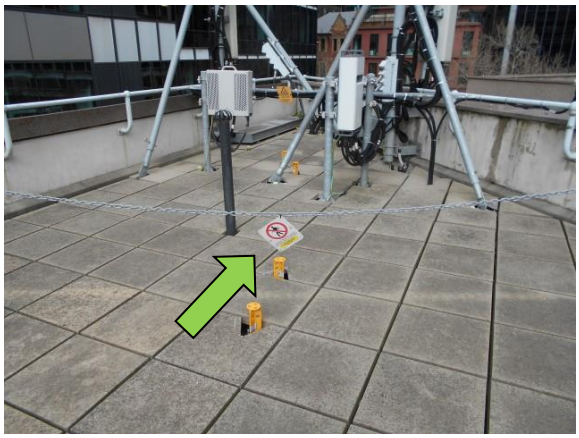
4.3 Photographs – Lower Roof (North)



Access to radio frequency antennas on the Lower North Roof is via a dedicated fixed ladder with cage and was appropriately secured / locked

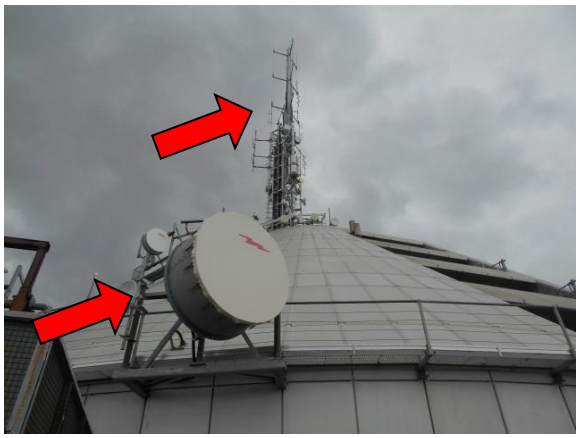
	
RFR hazard warning signage and no pedestrian access signage installed at entrance to Lower North Roof	Exclusion zone maps were outdated. The maps installed were from the EME Guide Issue no. 4 which has been updated
	
Potential trip hazards not highlighted	Appropriate signage installed on exclusion zone chain around RF equipment
	
Appropriate chain installed around RF equipment as an exclusion zone, however the chain was not highlighted	Appropriate chain installed around RF equipment as an exclusion zone, however the chain was not highlighted

4.4 Photographs – Lower Roof (South)

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Access to radio frequency antennas on the Lower South Roof is via a dedicated stairwell and was appropriately secured / locked</td></tr>
<tr><td>  </td><td> 
</td></tr>
<tr><td>RFR hazard warning signage and no pedestrian access signage installed at entrance to Lower North Roof</td><td>Exclusion zone maps were outdated. The maps installed were from the EME Guide Issue no. 4 which has been updated</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Appropriate chain installed around RF equipment as an exclusion zone, however the chain was not highlighted</td><td>Appropriate signage installed on exclusion zone chain around RF equipment</td></tr>
</table>

4.5 Photographs – Upper Roof

<table>
<tr><td> 
</td><td>  </td></tr>
<tr><td>No RFR Hazard warning signage at entrance to roof area
It is noted the access is restricted / locked.</td><td>No RFR hazard warning signage at entrance to access the tower
It is noted the access is restricted / locked.</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>It is unknown when fall arrest systems have been inspected – plate was not filled out</td><td>Ladder to access tower appropriately locked</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>RFR equipment on roof areas and tower not included in the EME Guide for the site</td><td>RFR equipment on roof areas and tower not included in the EME Guide for the site</td></tr>
</table>

	
RFR equipment on roof areas and tower not included in the EME Guide for the site	RFR equipment on roof areas and tower not included in the EME Guide for the site
	
No RFR hazard warning signage at ladder access point to antennas on the roof area It is noted the ladder access is restricted / locked.	Potential exclusion zones not marked or highlighted on the roof areas

5. Recommendations

5.1.1 Mandatory Recommendations

- Nil.

5.1.2 Control Recommendations

- Engage a suitable qualified AMTA RF Assessor to attend the site to identify the unidentified carrier equipment, collect the required information and take EME measurements of the equipment installed on the Level 52 & 53 Roof Areas. Once the assessment has been undertaken, obtain an updated full unconditional copy of the EME Guide with appropriate exclusion zones mapped out prior to any works that may be required on the roof. Refer to **Appendix 4** for list of AMTA accredited RF Assessors.
- Ensure a full unconditional compliance certificate is issued for the site following the RF assessment.

(Note: AMTA provide a login access for facility manager/owners or carrier subcontractor of antennas. **Refer to Appendix 3 RFNSA Login Access Form**. Download the current document from www.rfnsa.com.au, which is the best way to ensure you have the most up to date documentation).

- Consider installing RF warning signage and exclusion zones (if required) on the Level 52 & 53 Roof Areas to warn contractors accessing the roof area of the potential hazards associated with the antennas. Refer to **section 3.5** safety signage.
- Consider updating / replacing the exclusion zone maps installed at the entrance to the Lower Roof Areas (North & South) with the updated versions from the EME Guide Version 5 included in Appendix 1 of this document.
- Consider highlighting the exclusion zone chains around the RF equipment on the Lower Roof Areas (North & South) to highlight and make clearly visible the exclusion zone area.
- Ensure the fall arrest system installed (Sala Railok & attachments) to access the tower on the Level 53 Roof is inspected and maintained prior to any works that require the use of the system.

6. Abbreviations and Acronyms

ACMA	Australian Communications and Media Authority
AMTA	Australian Mobile Telecommunications Association
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
EME	Electromagnetic Energy
EMR	Electromagnetic Radiation
LCD	Licence Condition Determination
NATA	National Association of Testing Authorities
RCSMB	Radio Communications Site Management Book
RFR	Radio Frequency Radiation
RFNSA	Radio Frequency National Site Archive
RFSP	Radio Frequency Safety Program
RF	Radio Frequency
CBD	Central Business District
kHz	Kilohertz
GHz	Gigahertz

7. References

1. Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), August 2016, *ARPANSA Fact Sheet - Mobile Phone Base Stations and Health*, www.arpansa.gov.au
2. ARPANSA (2002), *Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz (2002)*, http://www.arpansa.gov.au/Publications/Codes/rps3.cfm.
3. ARPANSA (nd), Mobile phone base stations and EME, http://www.arpansa.gov.au/pubs/aboutus/collaboration/js_mobilebasestations.pdf .
4. Mobile Carrier Forum (MCF), MCF Fact Sheets – Working Safely Near Antennas, https://www.mobilesitesafety.com.au/Content/MCFFactSheetWorkingSafelyatSites.pdf .
5. MCF, MCF Fact Sheets – Radio Communications Site Management Book, https://www.mobilesitesafety.com.au/Content/MCFFactSheetWorkingSafelyatSites.
6. MCF, MCF Fact Sheets – Reading the Australian Radiation Protection and Nuclear Safety Agency EME Report, https://www.mobilesitesafety.com.au/Content/ReadingARPANSAEMEReport.pdf .
7. World Health Organisation (WHO), May 2006, Fact Sheet No.304 - Electromagnetic fields and public health: Base stations and wireless technologies, http://www.who.int/mediacentre/factsheets/fs304/en.
8. WHO, October 2014, Electromagnetic fields and public health: mobile phones, Fact sheet No.193, http://www.int/mediacentre/factssheets/fs193/en.

Appendix 1 EME Site Safety Documents

LIMITED COMPLIANCE CERTIFICATE

RFNSA Site No: 3000136

Site Address: 600 Bourke Street, MELBOURNE VIC 3000

Issued in accordance with the Radiocommunications Licence Conditions (Apparatus Licence) Determination 2015.

RF Human Exposure Limits

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has produced a standard for exposure to Radio Frequency (RF) transmissions – ARPANSA Radiation Protection Standard 2002 Maximum Exposure Levels to Radio Frequency Fields – 3 kHz to 300 GHz (RPS3).

The Australian Communications and Media Authority (ACMA) has made the Radiocommunications Licence Conditions (Apparatus Licence) Determination 2015 that requires that the general public is not exposed to RF transmission levels exceeding the general public limits specified in the ARPANSA Standard (RPS3).

State and Commonwealth Occupational Health & Safety laws require compliance with the limits and obligations set out in the ARPANSA standard (RPS3).

Limited Compliance Statement

This site includes both mobile telecommunications equipment configured as a mobile base station and other radio frequency transmitting equipment, some of which is unable to be identified and therefore, has not been included in this compliance assessment.

As this certificate relates to the included transmitters in a limited compliance assessment of the site, the total EME levels at that site may exceed that shown in the related limited EME assessment documentation.

Mobile Telecommunications Equipment

The mobile telecommunications equipment installed at this site and its configuration as a mobile base station, has been assessed in accordance with the ARPANSA RPS3 reference limits, and has been deemed to comply with the ACMA Licence Conditions (Apparatus Licence) Determination 2015.

Other Radio Frequency Transmitting Equipment

All identified radio communications services are included in the related compliance documents listed below. The unidentified radio frequency transmitting equipment at this site is to be referred back to the Facility Manager or the licensee of the equipment for confirmation of conformity with the ACMA Licence Conditions (Apparatus Licence) Determination 2015.

Access Controls, RF Warning Signs and Safe Work Procedures

Access Control, RF warning signs (if required) and Safe Working Procedures are in place as detailed in the Related Documents listed below.

Compliance Certificate No:

Accreditation No

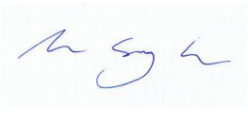
19390

Approved Signatory

Name: Min Lee

Designation: EME Design Manager

Company: Catalyst ONE Pty Ltd

Signature 

Date: 24/11/2017

Related Documents:		
	Site Compliance Report	Ref No 5
	EME Guide for Site Safety	Ref No 5

Environmental EME Report

Location	600 Bourke Street, MELBOURNE VIC 3000		
Date	03/07/2019	**RFNSA No.**	3000136

How does this report work?

This report provides a summary of levels of radiofrequency (RF) electromagnetic energy (EME) around the wireless base station at 600 Bourke Street, MELBOURNE VIC 3000. These levels have been calculated by Ericsson using methodology developed by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).
A document describing how to interpret this report is available at ARPANSA's website:
A Guide to the Environmental Report.

A snapshot of calculated EME levels at this site

The maximum EME level calculated for the **existing** systems at this site is

2.75%

out of 100% of the public exposure limit, 39 m from the location.

The maximum EME level calculated for the **proposed** changes at this site is

2.75%

out of 100% of the public exposure limit, 41 m from the location.

EME levels with the proposed changes

Distance from the site	Percentage of the public exposure limit
0-50 m	2.75%
50-100 m	2.34%
100-200 m	1.83%
200-300 m	0.68%
300-400 m	0.23%
400-500 m	0.11%

For additional information please refer to the EME ARPANSA Report annexure for this site which can be found at *http://www.rfnsa.com.au/3000136*.

Radio systems at the site

This base station currently has equipment for transmitting the services listed under the existing configuration.
The proposal would modify the base station to include all the services listed under the proposed configuration.

	Existing		Proposed	
Carrier	**Systems**	**Configuration**	**Systems**	**Configuration**
Telstra	3G, 4G, 5G	LTE700, LTE2100, LTE2600, WCDMA850, LTE1800, NR3500	3G, 4G, 5G	LTE700, LTE2600, NR3500, WCDMA850, LTE1800, LTE2100

An in-depth look at calculated EME levels at this site

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. All EME levels are relative to 1.5 m above ground and all distances from the site are in 360° circular bands.

	Existing configuration			Proposed configuration		
Distance from the site	Electric field (V/m)	Power density (mW/m²)	Percentage of the public exposure limit	Electric field (V/m)	Power density (mW/m²)	Percentage of the public exposure limit
0-50m	10.14	272.68	2.75%	10.15	273.25	2.75%
50-100m	9.43	236.061	2.39%	9.34	231.27	2.34%
100-200m	7.6	153.38	1.84%	7.59	152.86	1.83%
200-300m	4.59	55.77	0.7%	4.53	54.47	0.68%
300-400m	2.66	18.76	0.24%	2.64	18.47	0.23%
400-500m	1.8	8.6	0.11%	1.79	8.5	0.11%

Calculated EME levels at other areas of interest

This table contains calculations of the maximum EME levels at selected areas of interest, identified through consultation requirements of the Communications Alliance Ltd Deployment Code C564:2018 or other means. Calculations are performed over the indicated height range and include all existing and any proposed radio systems for this site.

Maximum cumulative EME level for the proposed configuration

Location	Height range	Electric field (V/m)	Power density (mW/m²)	Percentage of the public exposure limit
No locations identified				

SITE UPDATE ADVICE

Some alterations and/or additions to the equipment on this radiocommunications facility may not have been incorporated into this EME Site Safety Document and as a result the extent of RF hazards may not be accurately described.

Personal RF exposure meters should be used as appropriate while on this site pending the availability of the updated documentation set. Please also observe EME Safe Work Procedures.

Further information on EME safe work is available at www.radioworksafe.com.au

This document is marked *Limited* as some of the systems at this site cannot be identified

EME Guide

for Site Safety

RFNSA Site No: 3000136
Document Issue No: 5
Document Issue Date: 24/11/2017

Address:
600 Bourke Street
MELBOURNE
VIC 3000

This evaluation <u>does not consider all</u> of the systems operating at this Radiocommunications facility. The mobile carriers equipment however, has been evaluated against the applicable Australian Standard.

LIMITED

This Report was prepared by: Catalyst O.N.E Pty Ltd

An Important Message to people accessing this building or structure

There are radiocommunications antennas operating on this building or structure. The antennas on this building or structure produce a form of energy known as electromagnetic energy (EME).

You should not access Exclusion Zones, which are areas close to the antennas.

The Radiocommunications facility cited below is unable to be declared COMPLIANT with the Australian Standard applicable.

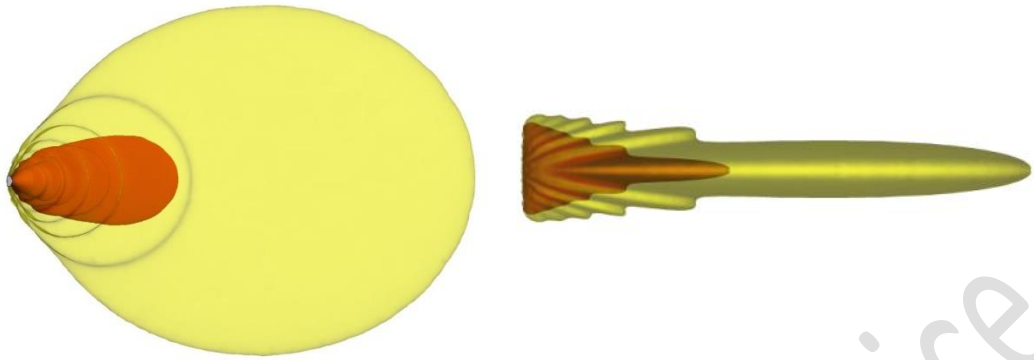
Visitors to this site shall note that EME Safe Work Procedures apply

DO NOT STAND IN FRONT OF ANTENNAS
and
DO NOT Access Red & Yellow Exclusion Zones

This document will show Exclusion Zones around the antennas, don't enter these areas. The latest version of this EME Guide is accessible at www.rfnsa.com.au or from the mobile carrier or building owner.

Exclusion zones are defined by the Australian EME Standard "ARPANSA Radiation Protection Standard - Maximum Exposure Levels to Radiofrequency Fields (RPS3)."

Make sure you view all the Exclusion Zone drawings so you get a complete understanding of the site.



Red Zone = Exclusion Zone. No access without confirmed transmitter power reduction or transmitter shutdown.

Yellow Zone = Exclusion Zone. Limited access to specially trained personnel (RF Workers).

White Zone = General access

Note - This EME Guide replaces the Radio Communications Site Management Book (RCSMB).

1. Be aware of these access controls on site

If you need to access this site contact the site owner, manager or the Carriers and Radio Service Operators occupying the site.

Access Control Procedures at Site

Contact the facilities Manager for site access. All Telstra Antennas are located at a height of 18m above the ground level.

5 of the antennas are located on North part of the roof, which access is restricted via a cage ladder. “RF Hazard Area Beyond This Point” and “General Public RF Hazard Boundary Beyond this Point” signages are install behind the ladder.

2 of the antennas are located on South Part of the roof, which access is restricted via locked stairs. “General Public RF Hazard Boundary Beyond this Point” signage is install behind the ladder.

Part of Northern roof have been restricted with chain link barriers due to RF Hazard Zones.

Before conducting any work on the rooftop, review the EME exclusion zones in the EME Guide to identify the antennas which may need to be powered down for access to the antennas or the structure.

The general public areas on the ground level are not affected by EME exclusion zones.

To verify safe working conditions RF EME monitors should be worn.

2. EME Safe Work Procedures to be followed at this site

1. Be appropriately trained
2. Receive a safety briefing from Site Manager
3. Do not stand in front of antennas
4. Observe safety signs
5. Ensure you view the current version of this EME Guide (www.rfnsa.com.au)
6. Check site drawings & antenna exclusion zones
7. Check for site updates - see caution sheets
8. Use a safe work method statement
9. Use a personal RF monitor
10. Questions - ask for help

3. Carriers and Radio Service Operators on site

Carrier	Antenna	Contact No
Telstra	1, 2, 3, 4, 5, 6, 7	0418 707 000

4. Site owner or manager contact details

Name	Role	Company	Contact Details
Anthony Zammit	Manager	AMP Capital	M: 0423 290060 Anthony.zammit@ampcapital.com

Please Note: The site owner or manager contact information is current at the Issue Date but may change without notice to the Mobile Carriers or Radio Service Operators occupying the site.

Important Information about this EME Guide

Site safety information including exclusion zone diagrams in this EME Guide have an "Issue date" incorporated on each page and are correct for that date.

To ensure that you have the most current site safety information available, check the on-line version of this EME Guide using the RFNSA number reference found on the front cover.

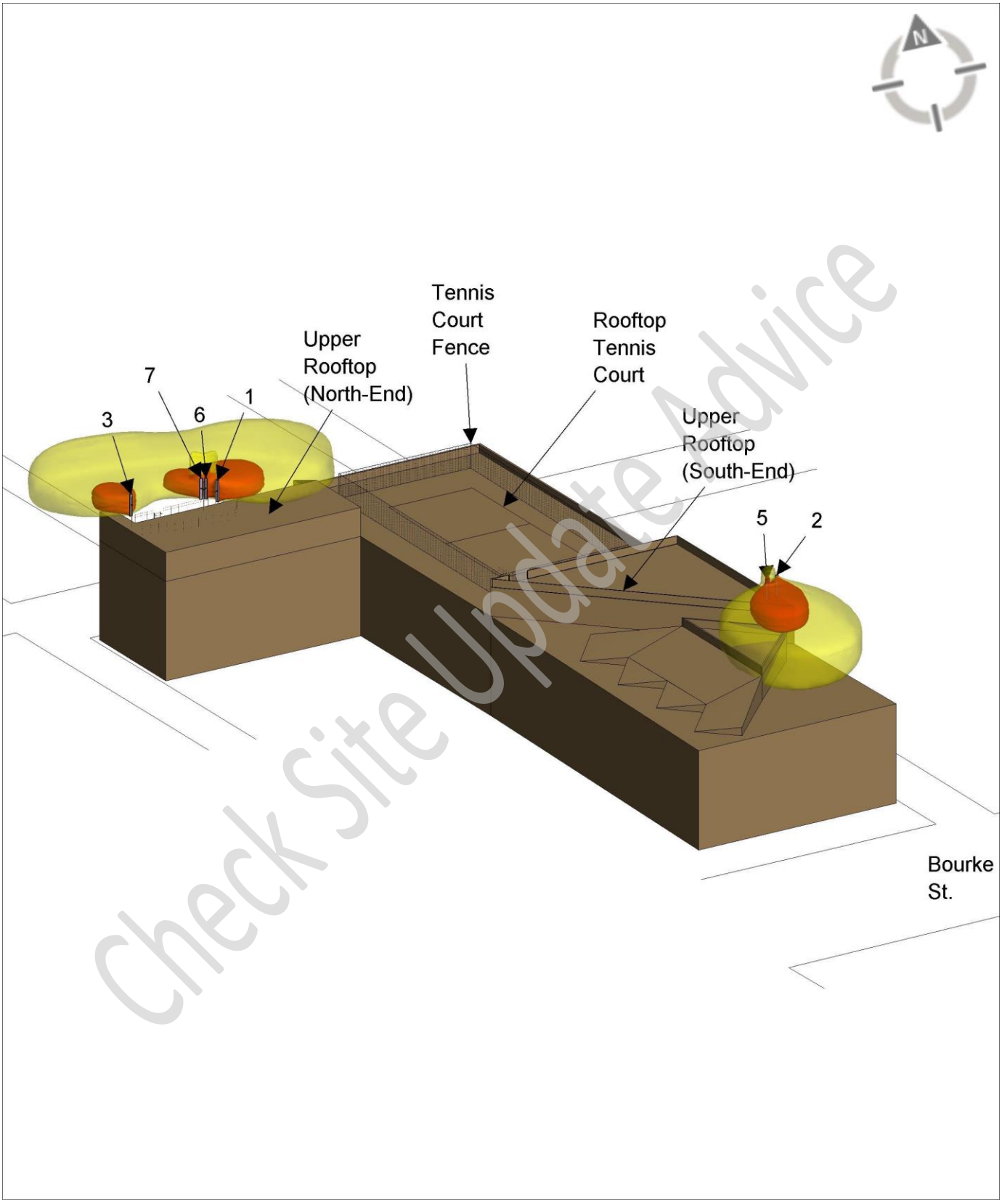
On-line Site Information

MCF National Site Archive www.rfnsa.com.au

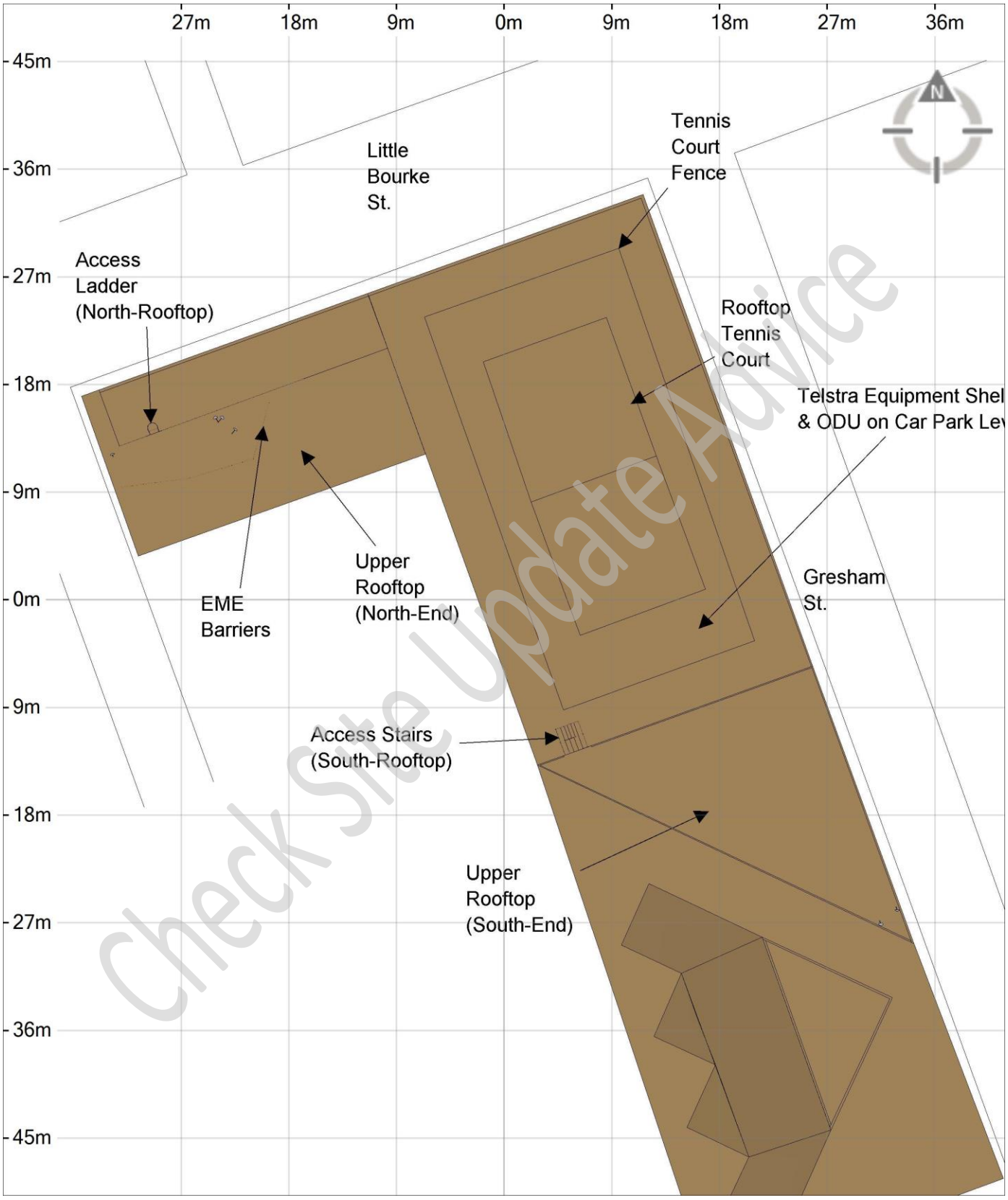
Mobile Site Safety www.mobilesitesafety.com

3D View 1 - With Satellite Overlay

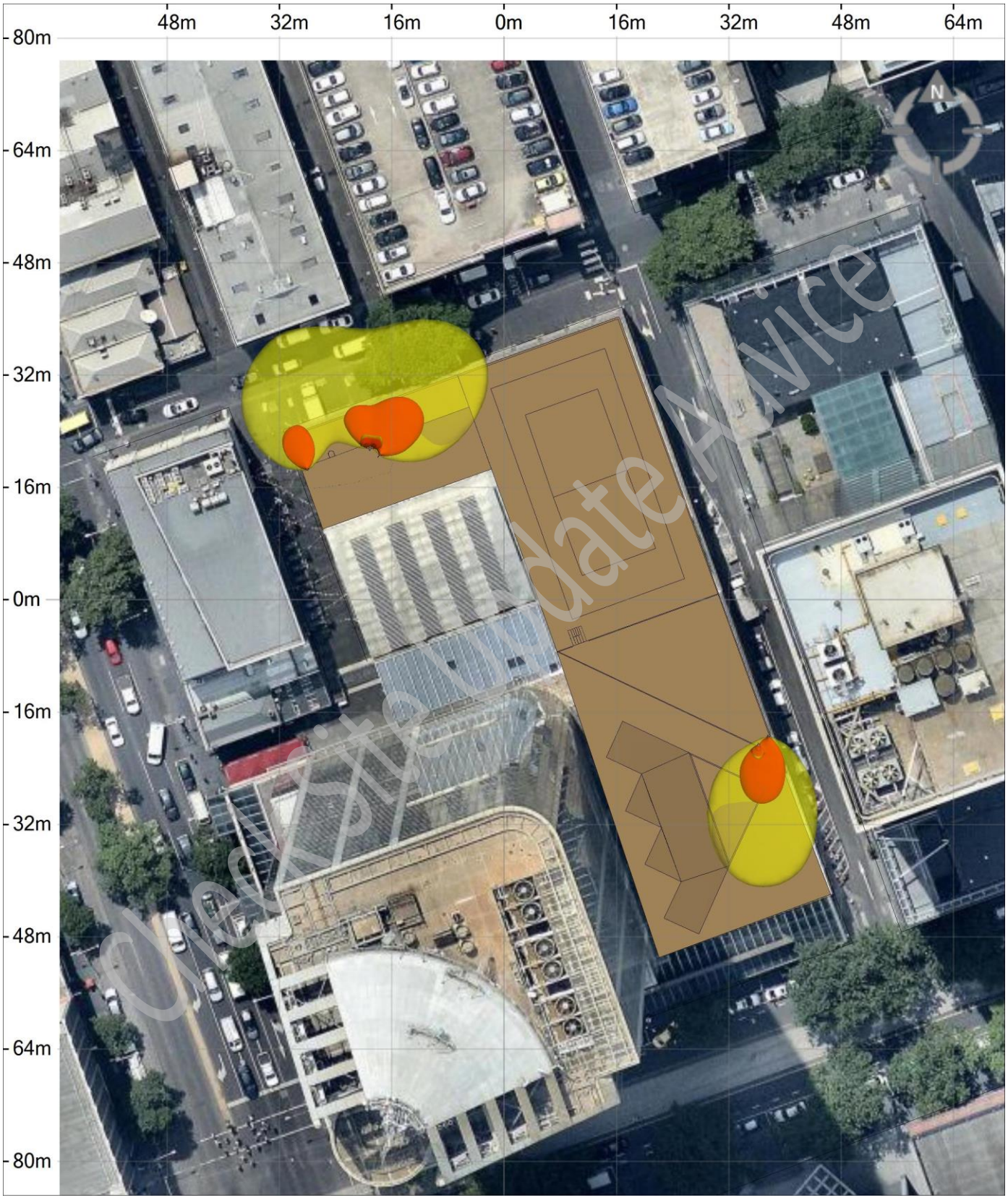
3D View 2


N
Tennis
Court
Fence
Rooftop
Tennis
Court
Upper
Rooftop
(North-End)
Upper
Rooftop
(South-End)
7
6
1
3
5
2
Bourke
St.
Check Site Update Advice

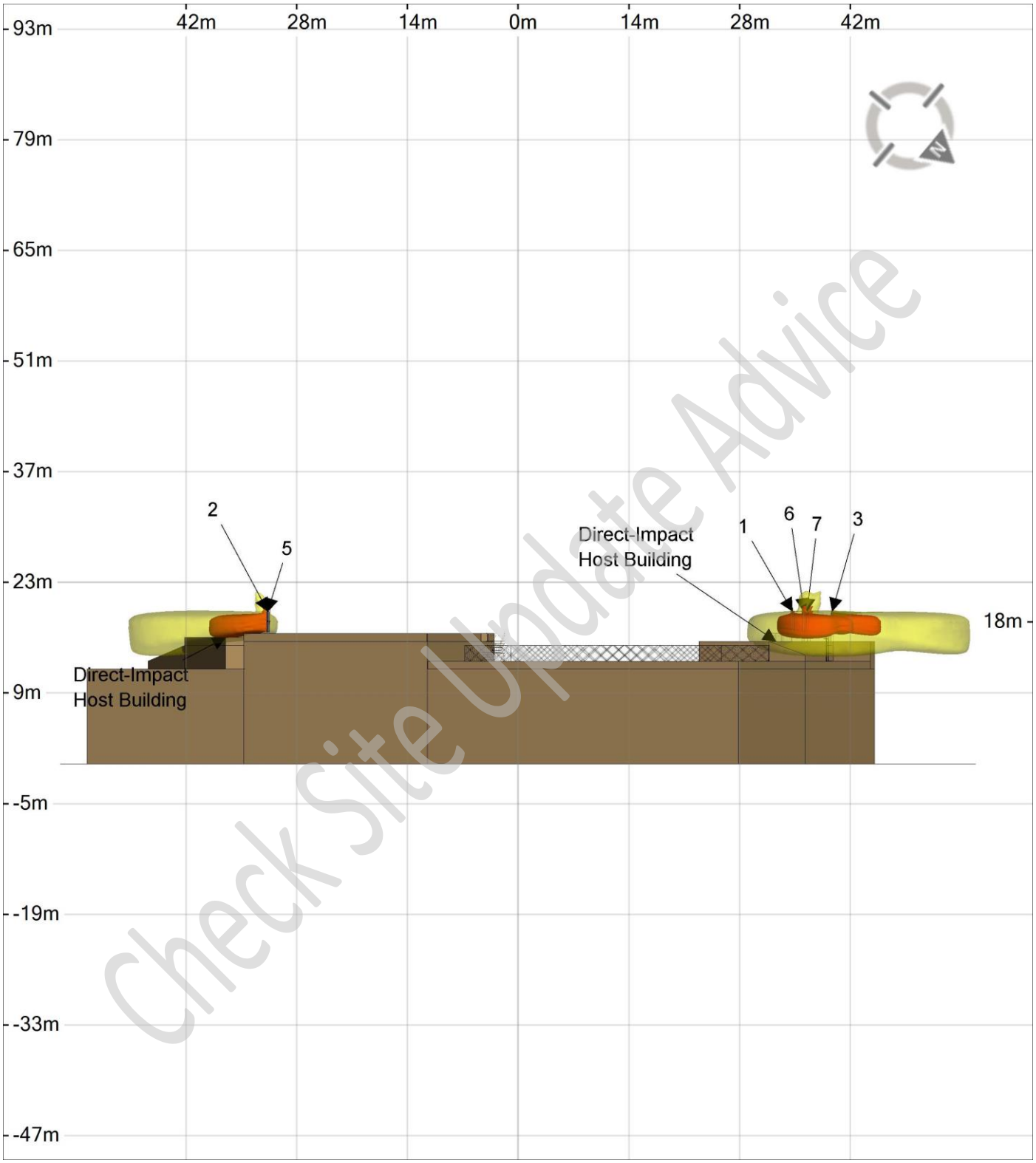
Plan View 2 - Site Layout



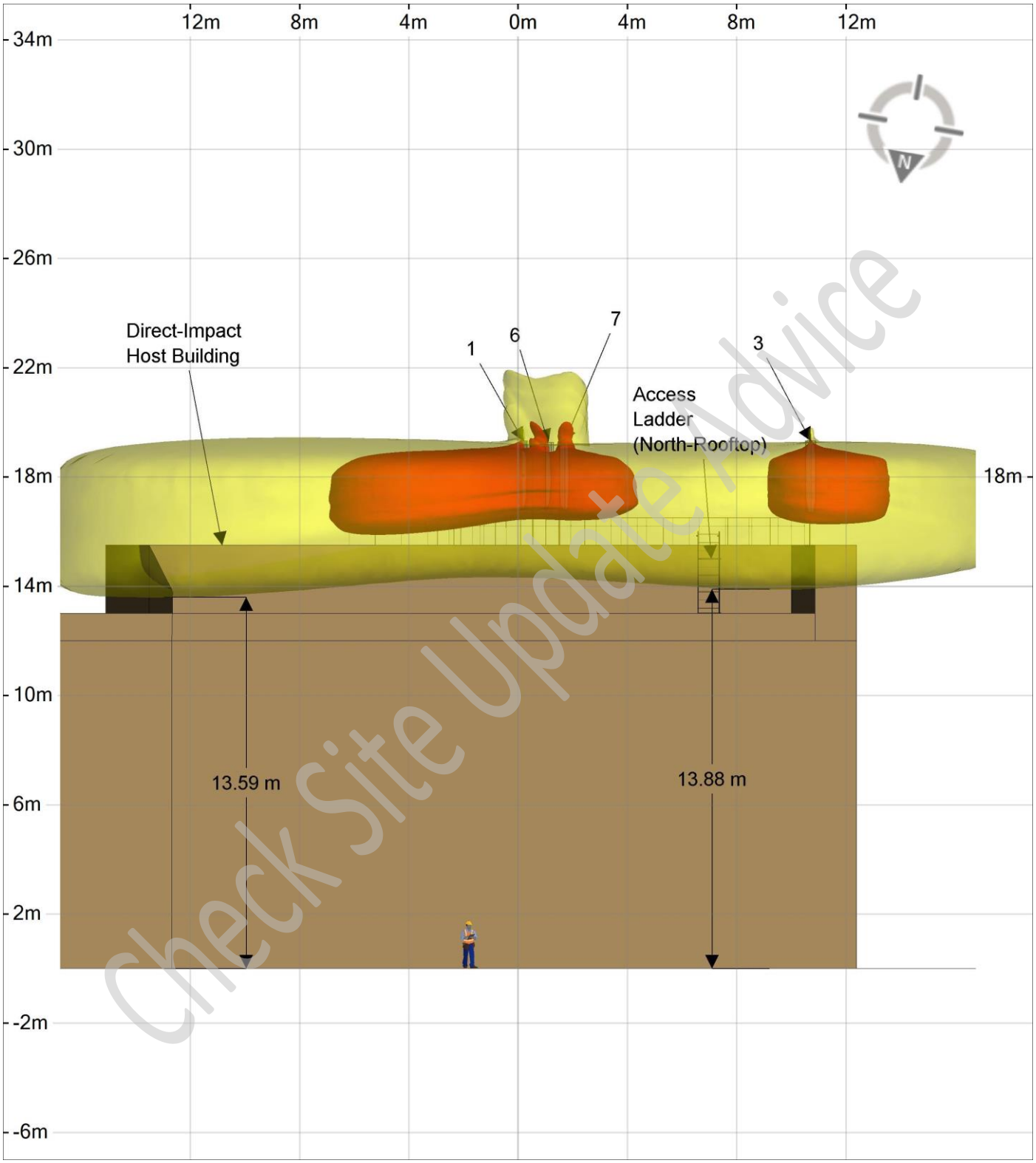
Plan View 1 - Site Overall View



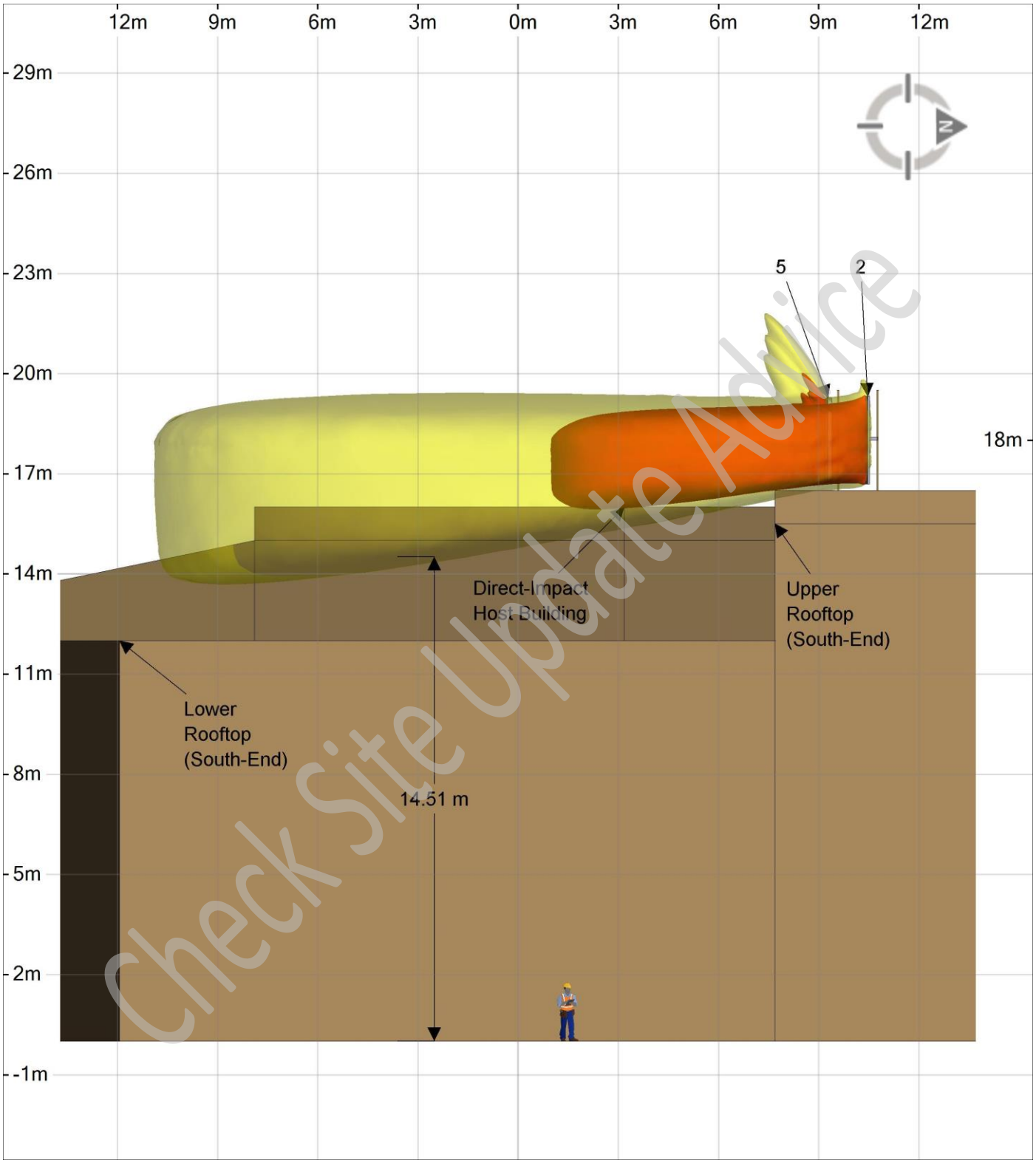
North-East Elevation View - 50 Degrees



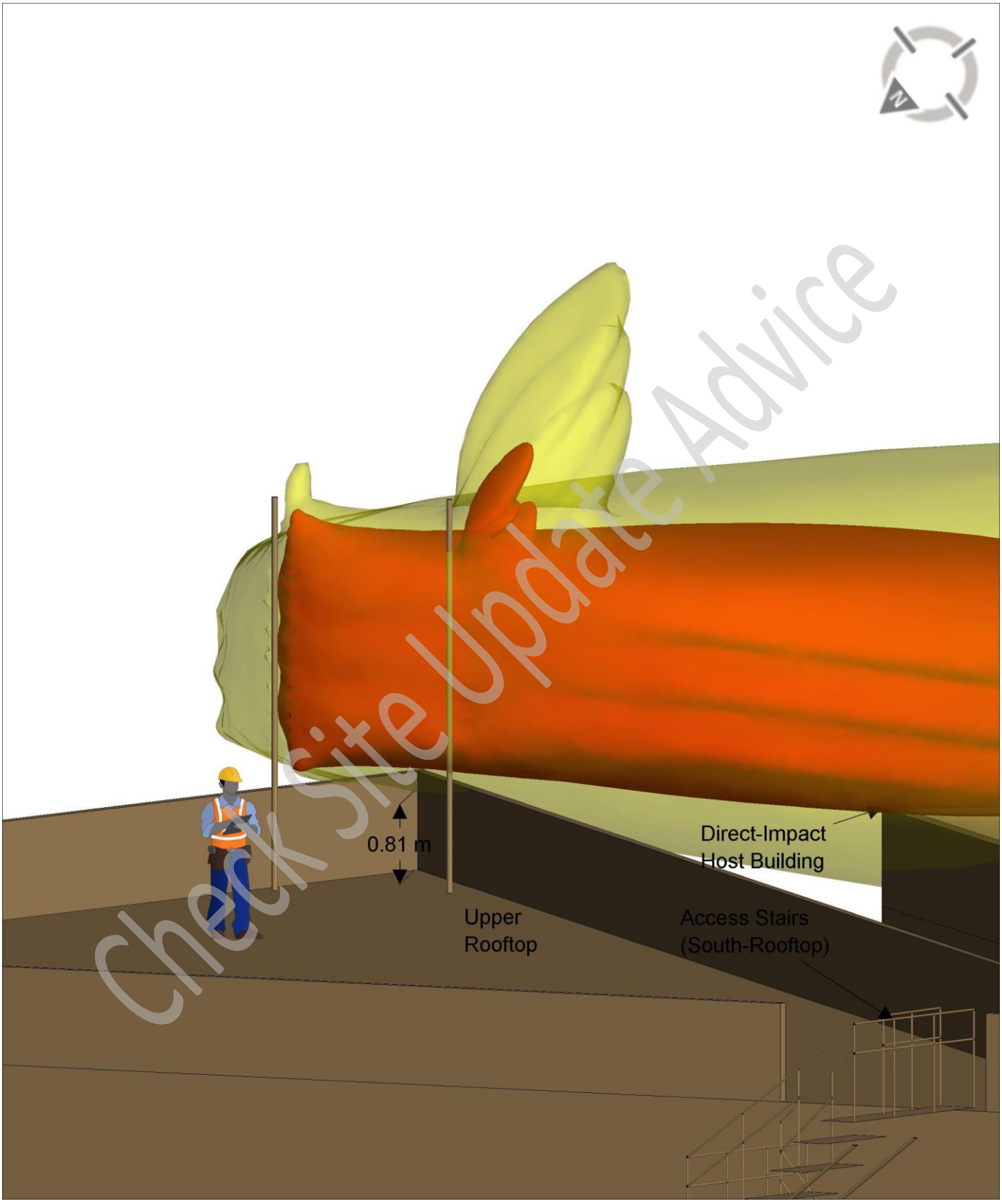
Northern-Elevation View - 360 Degrees



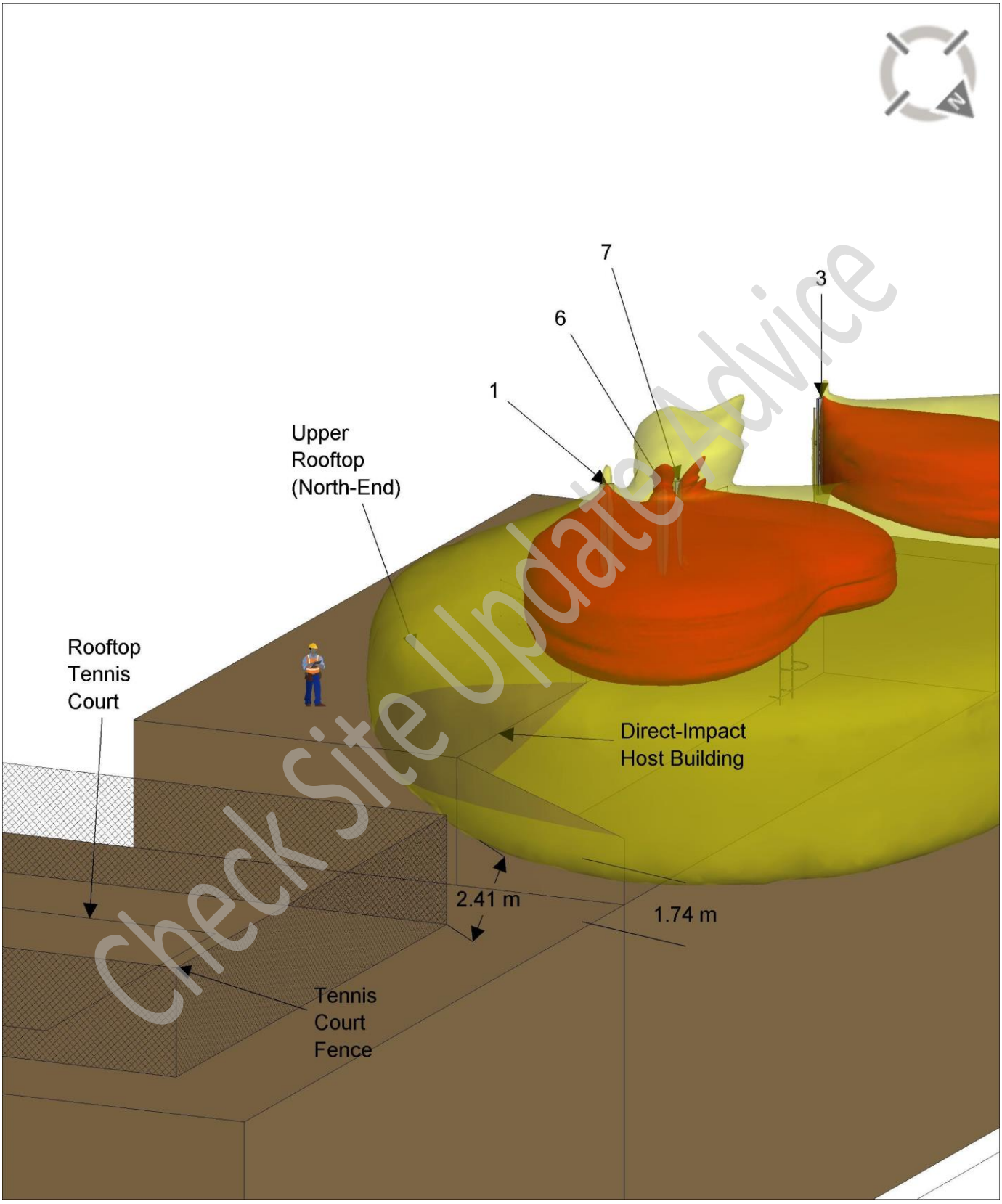
Eastern Elevation View - 90 Degrees



3D View 4 - Exclusion Zones Clearances (South-End Rooftop)



3D View 3 - Exclusion Zones Clearances (North-End Rooftop)



Section 3: Equipment Installed at this Site

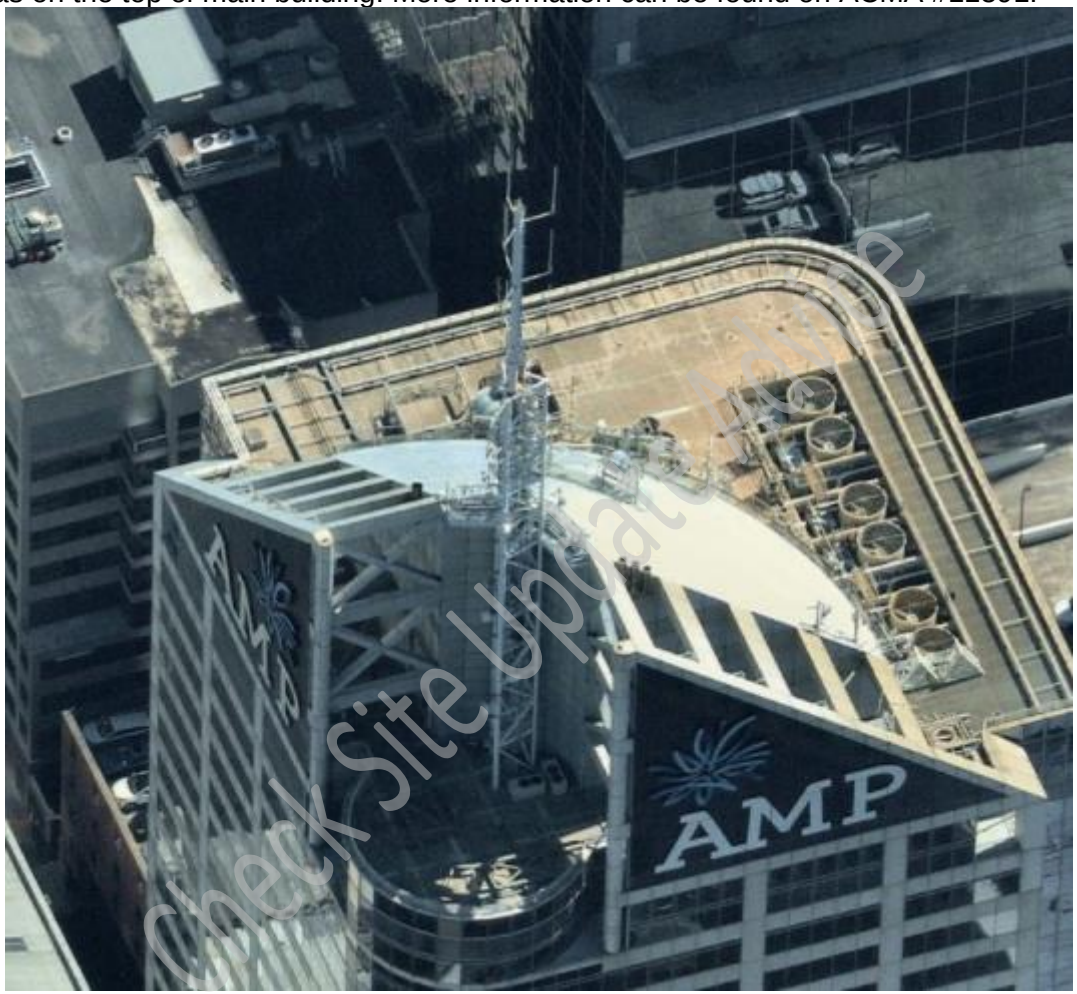
Equipment List

Diagram Ref	Owner Ref	Owner	Type/Make/Model	Height (m)	Bearing (°)	Mech. Tilt (°)	Elec. Tilt (°)	Pol	System/Function /Sector	Power (Watts)
1		Telstra	Panel/Argus/CNNPX310R-6P	18	40	0	0 to10	Cross	WCDMA850	31.62+31.62
									LTE 1800	50.12+50.12+ 50.12+50.12
									WCDMA2100	50.12+50.12
2		Telstra	Panel/Argus/CNNPX310R-6P	18	180	0	0 to10	Cross	WCDMA850	31.62+31.62
									LTE 1800	50.12+50.12+ 50.12+50.12
									WCDMA2100	50.12+50.12
3		Telstra	Panel/Argus/CNNPX310R-6P	18	339	0	0 to10	Cross	WCDMA850	31.62+31.62
									LTE 1800	50.12+50.12+ 50.12+50.12
									WCDMA2100	50.12+50.12

5		Telstra	Panel/Argus/RVVPX310B2	18	180	0	0 to 10	Cross	LTE 700	50.12+50.12
									LTE 2600	50.12+50.12+ 50.12+50.12
6		Telstra	Panel/Argus/RVVPX310B2	18	40	0	0 to 10	Cross	LTE 700	50.12+50.12
									LTE 2600	50.12+50.12+ 50.12+50.12
7		Telstra	Panel/Argus/RVVPX310B2	18	339	0	0 to 10	Cross	LTE 700	50.12+50.12
									LTE 2600	50.12+50.12+ 50.12+50.12

Section 4: Site Specific Documents

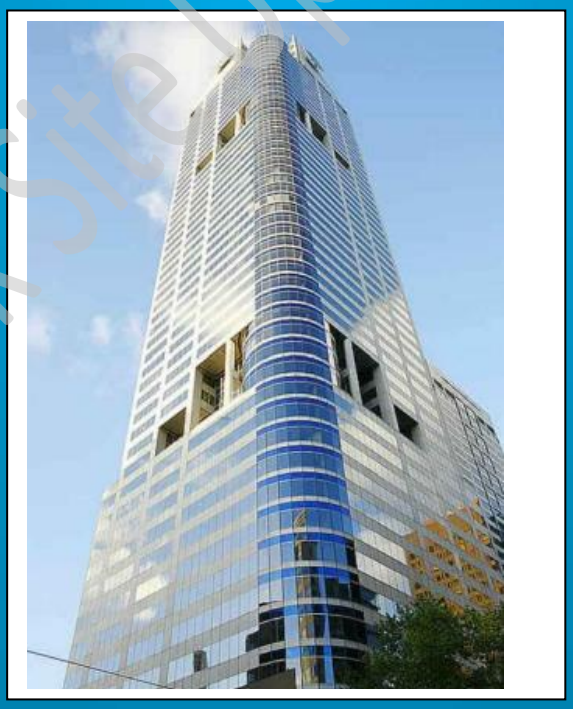
There are unidentified antennas on the top of main building. More information can be found on ACMA #11591.



EME Guide
FOR SITE

RFNSA Site No: 3000136
Document Issue No: 5
Document Issue Date: 24/11/2017

Address:
600 Bourke St
MELBOURNE VIC 3000



This Report was prepared by: Catalyst O.N.E Pty Ltd

An Important Message to people accessing this building or structure

There are radiocommunications antennas operating on this building or structure. The antennas on this building or structure produce a form of energy known as electromagnetic energy (EME).

You should not access Exclusion Zones, which are areas close to the antennas.

DO NOT STAND IN FRONT OF ANTENNAS
and
DO NOT Access Red & Yellow Exclusion Zones

This Guide is designed to help anyone who is required to work within a building with a distributed antenna system installed. This includes site owners, managers, their associates, contractors and staff.

In-Building Coverage/Cell (IBC), Distributed Antenna Systems (DAS) and Pico cells are all names used to describe In-building radiocommunications systems.

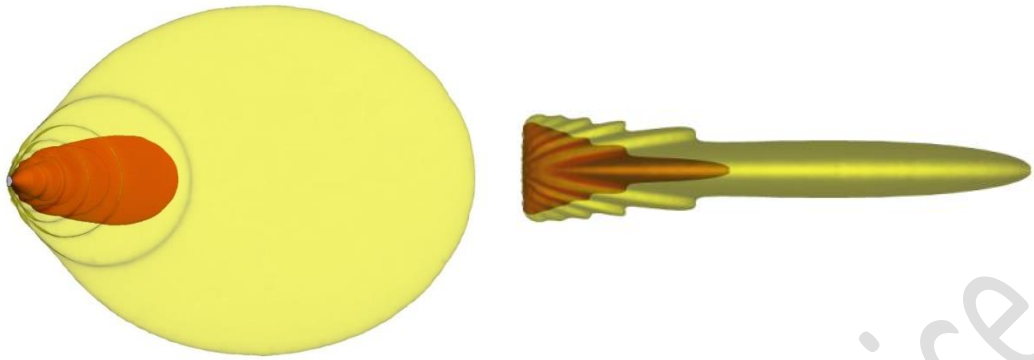
There are no RF hazards associated with the In building Coverage (IBC) Distributed Antenna System (DAS) at this site.

Bio Medical Devices
The transmit powers at this site are quite low and there are no RF Hazard existing. Even at very low levels, non-ionising radiation has the potential to adversely affect the operation Bio-medical devices. Persons with such devices must ensure all transmitters are powered-off before working in close proximity to transmitting antennas or around the building ceiling

This document will show Exclusion Zones around the antennas, don't enter these areas. The latest version of this EME Guide is accessible at www.rfnsa.com.au or from the mobile carrier or building owner.

Exclusion zones are defined by the Australian EME Standard "ARPANSA Radiation Protection Standard - Maximum Exposure Levels to Radiofrequency Fields (RPS3)."

Make sure you view all the Exclusion Zone drawings so you get a complete understanding of the site.



Red Zone = Exclusion Zone. No access without confirmed transmitter power reduction or transmitter shutdown.

Yellow Zone = Exclusion Zone. Limited access to specially trained personnel (RF Workers).

White Zone = General access

Note - This EME Guide replaces the Radio Communications Site Management Book (RCSMB).

5. Be aware of these access controls on site

If you need to access this site contact the site owner, manager or the Carriers and Radio Service Operators occupying the site.

Access Control Procedures at Site

- The EME exposures do not exceed the general public limits in the In Building Coverage (IBC) / Distributed Antenna System (DAS) at this site. No access control procedures are required at this site.

- Transmitting power at this site is quite low that no RF Hazards exists. Even at very low levels, non-ionising radiation has the potential to adversely affect the operation of Bio-medical devices. Persons with such devices must ensure all transmitters are powered-off before working in close proximity to transmitting antennas or around the building ceiling.

6. EME Safe Work Procedures to be followed at this site

1. Be appropriately trained
2. Receive a safety briefing from Site Manager
3. Do not stand in front of antennas
4. Observe safety signs
5. Ensure you view the current version of this EME Guide (www.rfnsa.com.au)
6. Check site drawings & antenna exclusion zones
7. Check for site updates - see caution sheets
8. Use a safe work method statement
9. Use a personal RF monitor
10. Questions - ask for help

7. Carriers and Radio Service Operators on site

Carrier	Antenna	Contact No
Optus	Share Telstra IBC Antenna	1800 505 777
Vodafone	Share Telstra IBC Antenna	1800 683 683
Telstra	A\B1\1, A\B1\2, A\B2\1, A\B3\1, A\B4\1, A\G\1, A\G\2, A\L13\1, A\L37\1, A\L51\1, A\L51\2 A\L52\1 R/L3/1 to R/L50/1	0418 707 000

8. Site owner or manager contact details

Name	Role	Company	Contact Details
Anthony Zammit	Manager	AMP Capital	M: 0423 290060 Anthony.zammit@ampcapital.com

Please Note: The site owner or manager contact information is current at the Issue Date but may change without notice to the Mobile Carriers or Radio Service Operators occupying the site.

Important Information about this EME Guide

Site safety information including exclusion zone diagrams in this EME Guide have an “Issue date” incorporated on each page and are correct for that date.

To ensure that you have the most current site safety information available, check the on-line version of this EME Guide using the RFNSA number reference found on the front cover.

On-line Site Information

MCF National Site Archive www.rfnsa.com.au

Mobile Site Safety www.mobilesitesafety.com

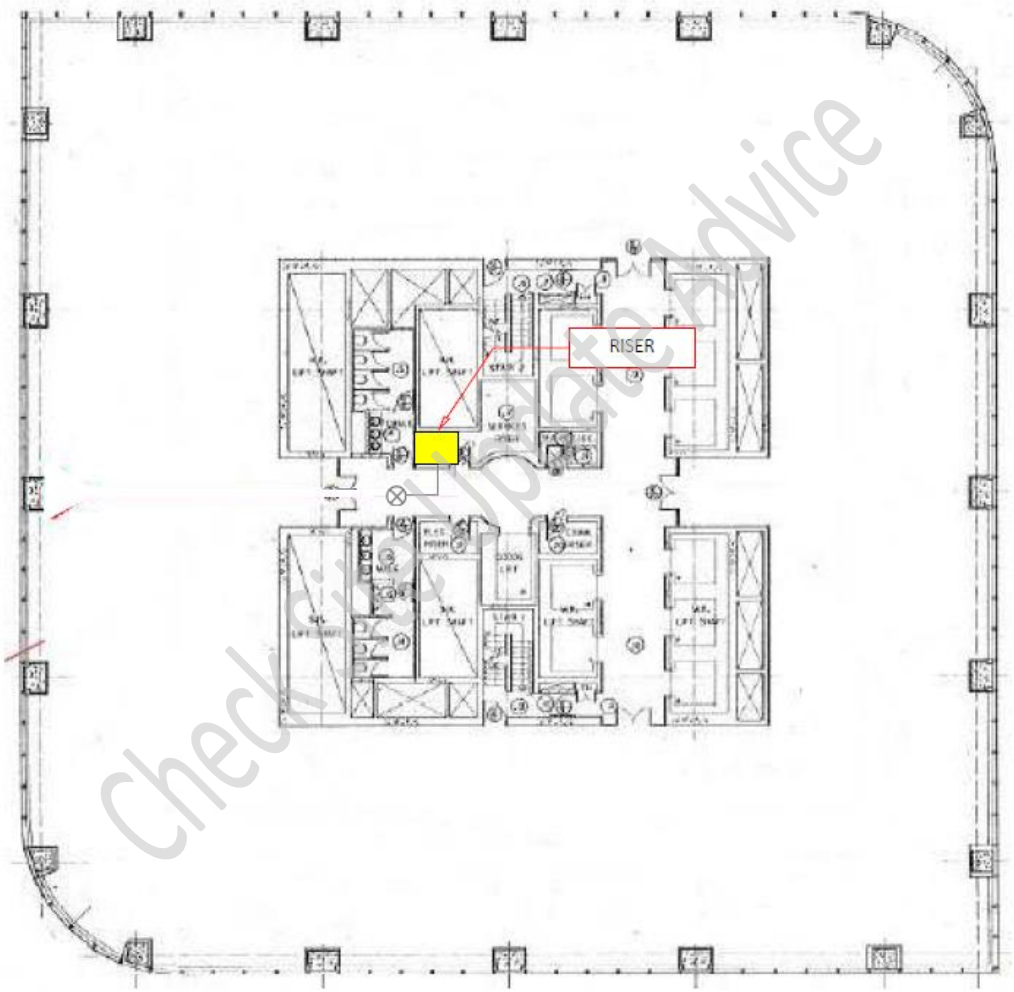
Section 1: Site Layout

600 BOURKE ST IBC

Section 2: Antenna Layout Plan
Basement 2 and 4

Note:

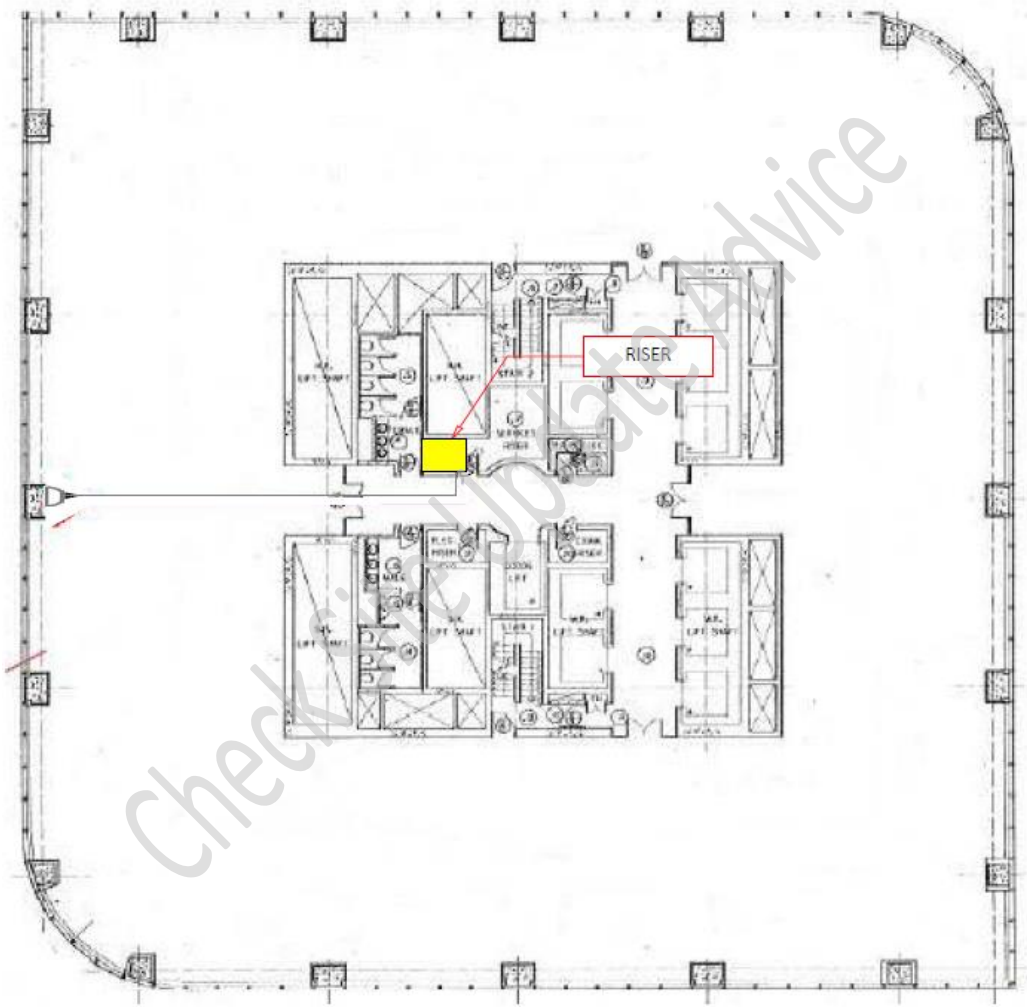
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Basement 3

Note:

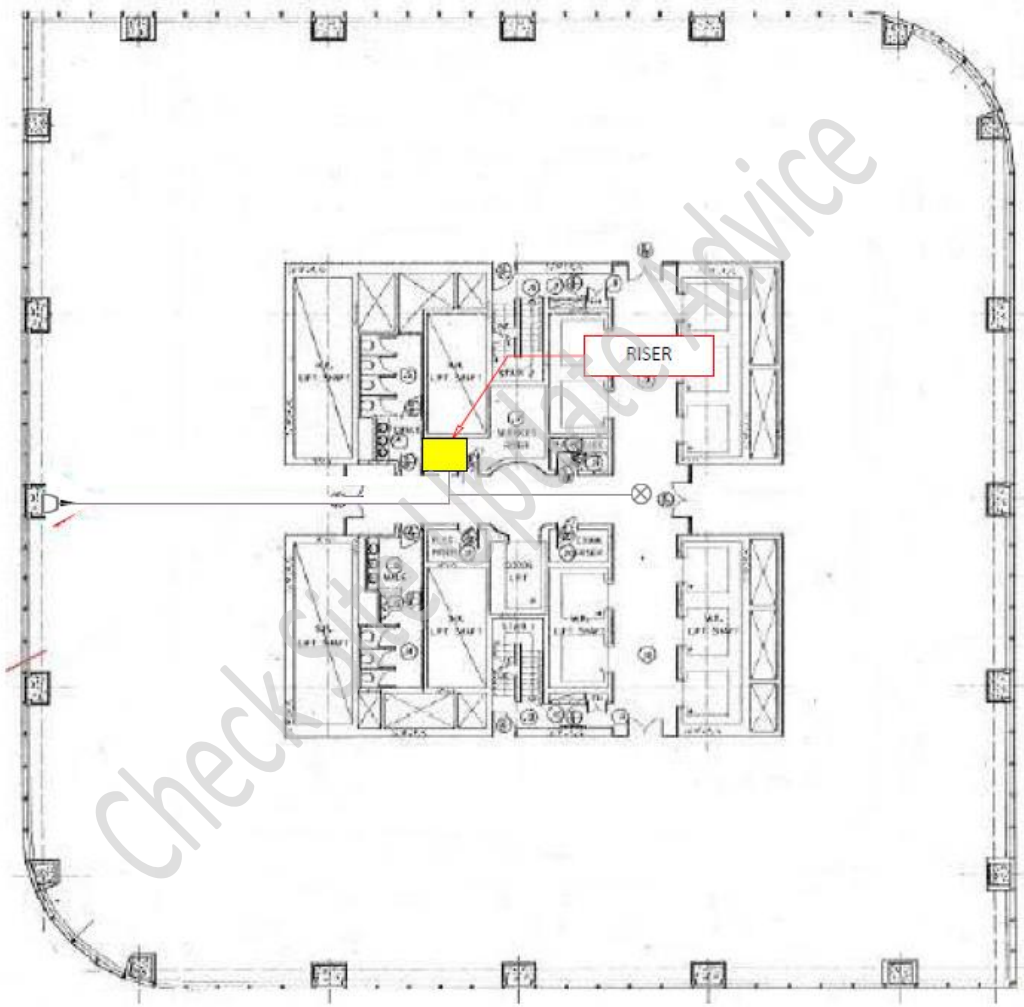
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Basement 1

Note:

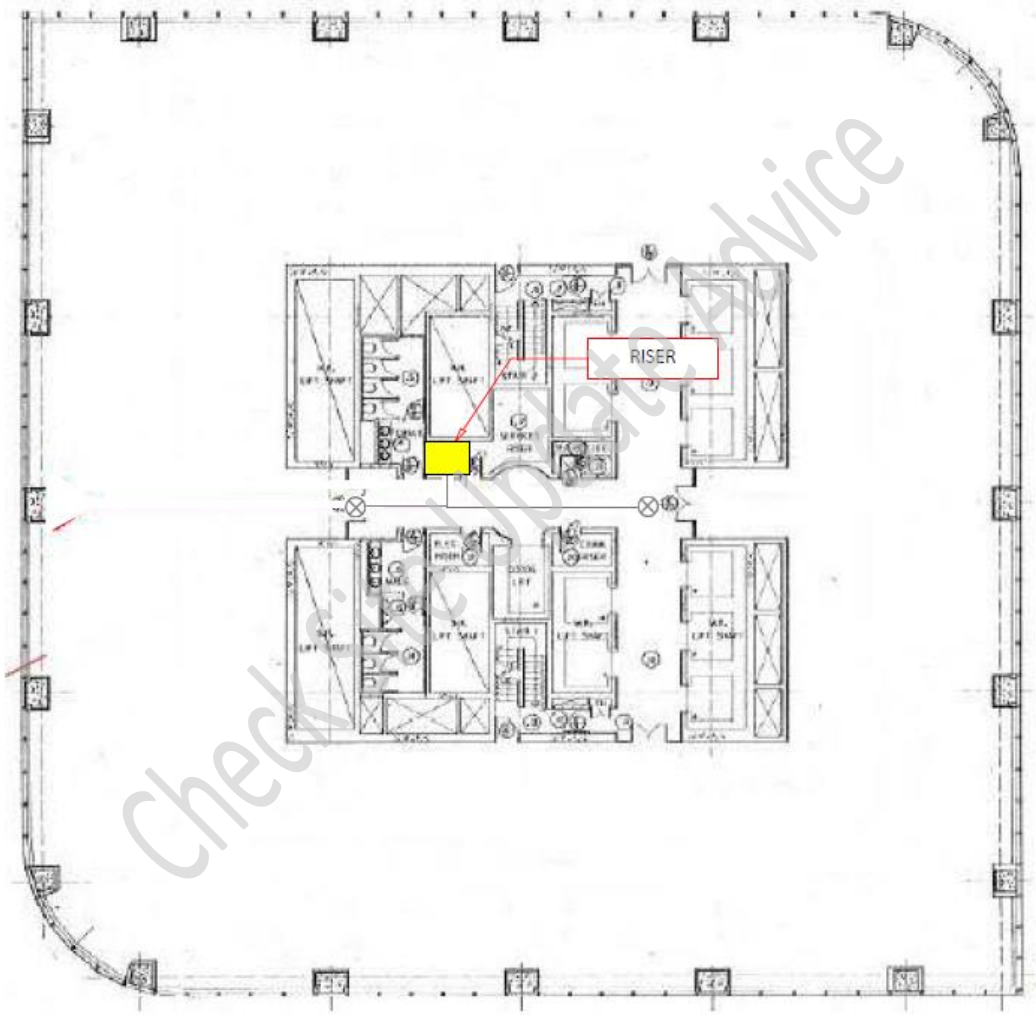
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Ground

Note:

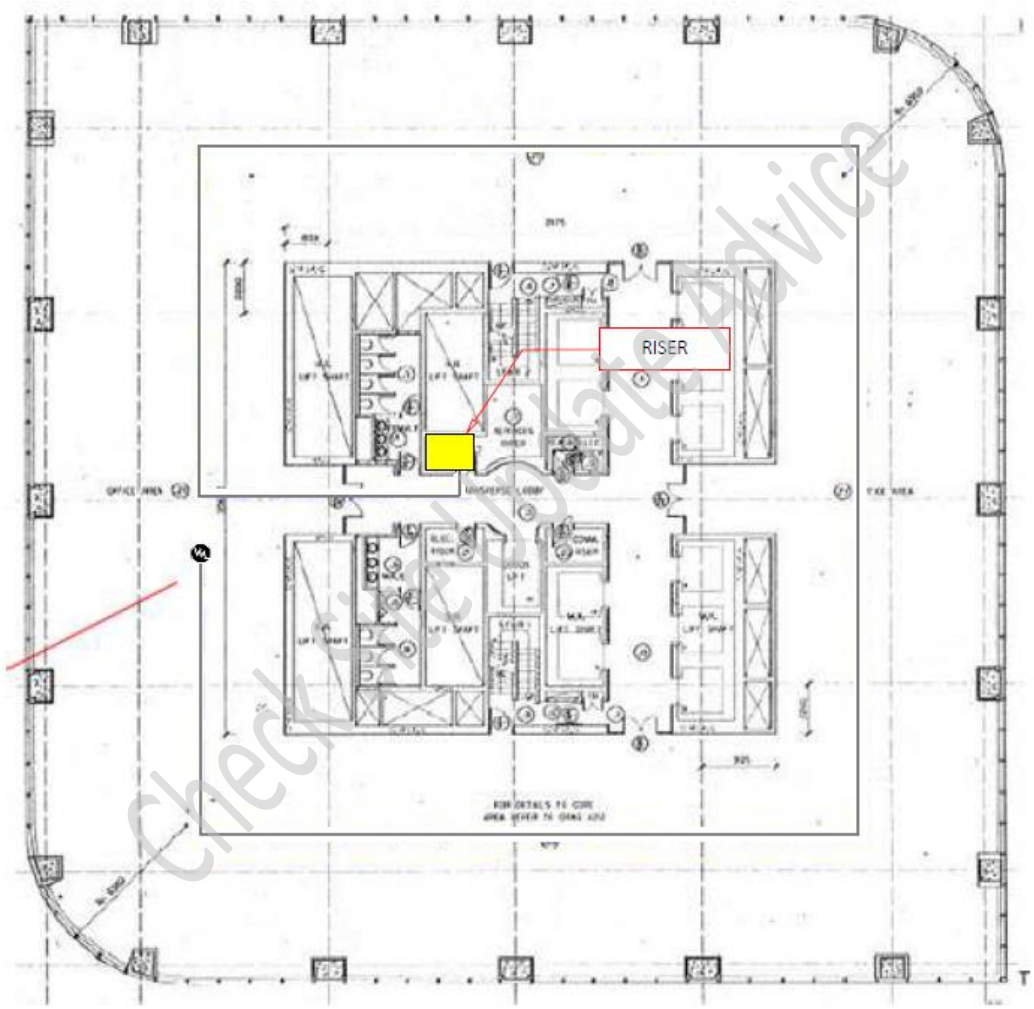
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 3 to 13

Note:

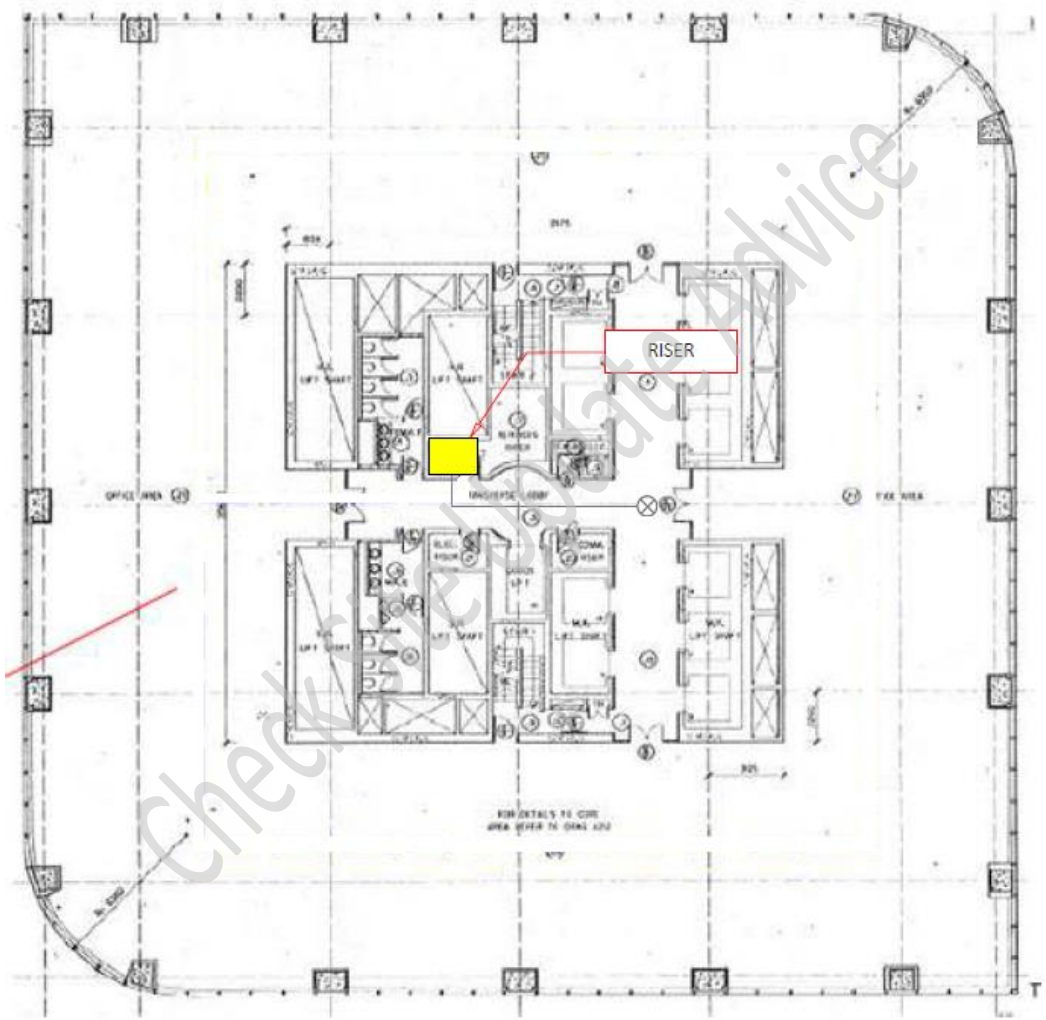
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 14

Note:

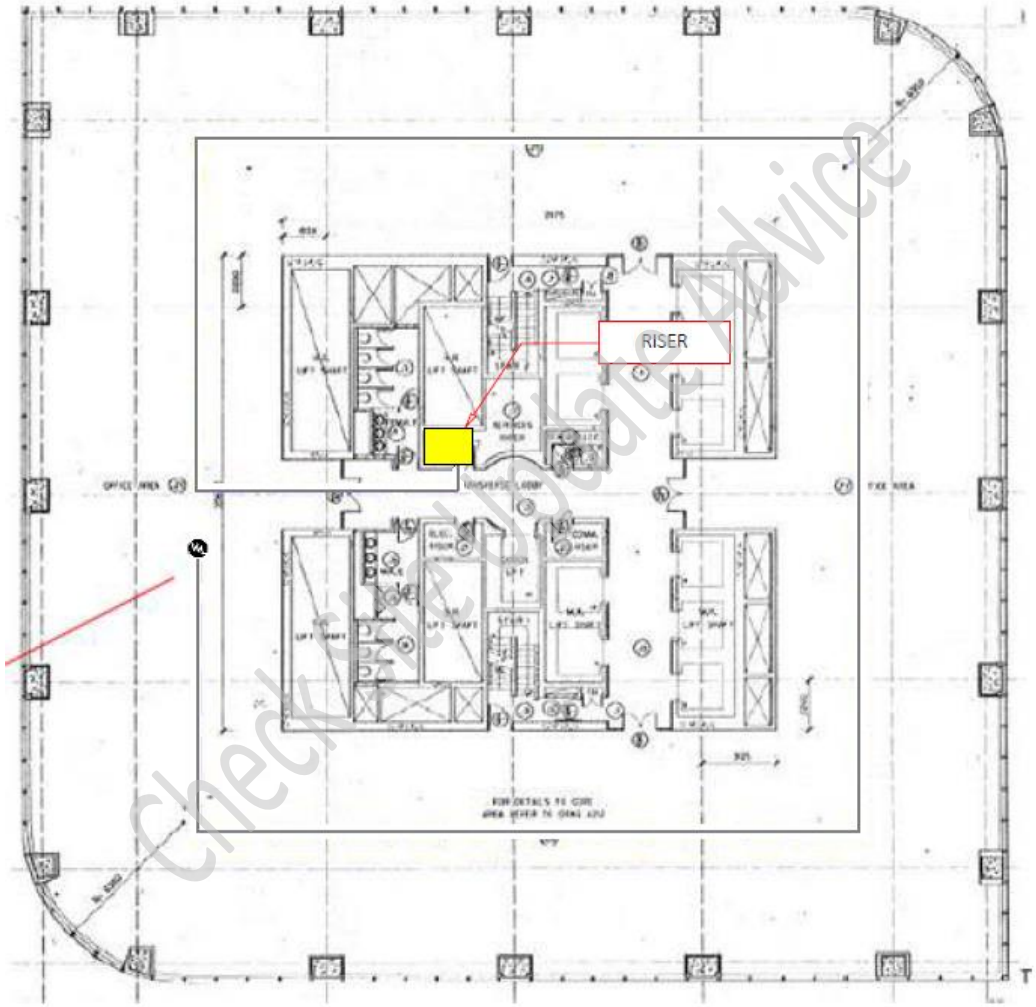
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 15 to 36

Note:

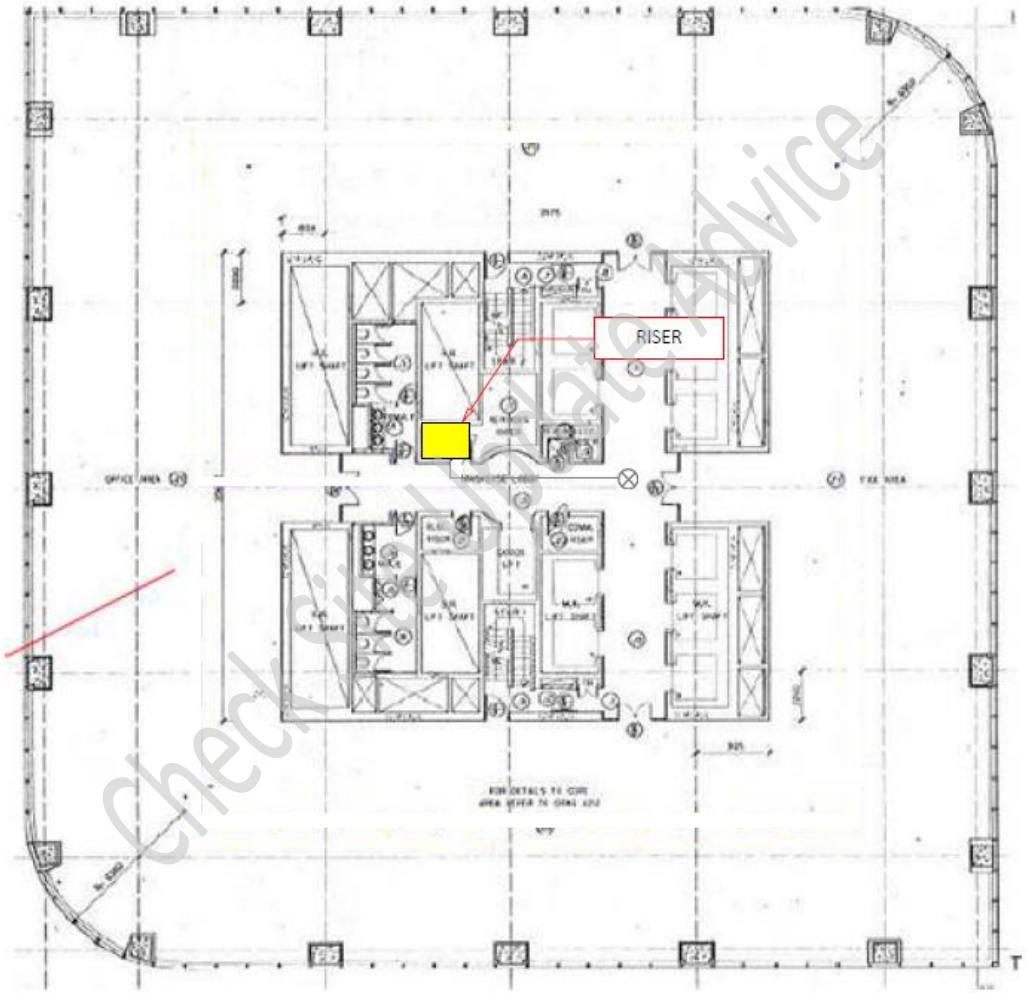
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 38

Note:

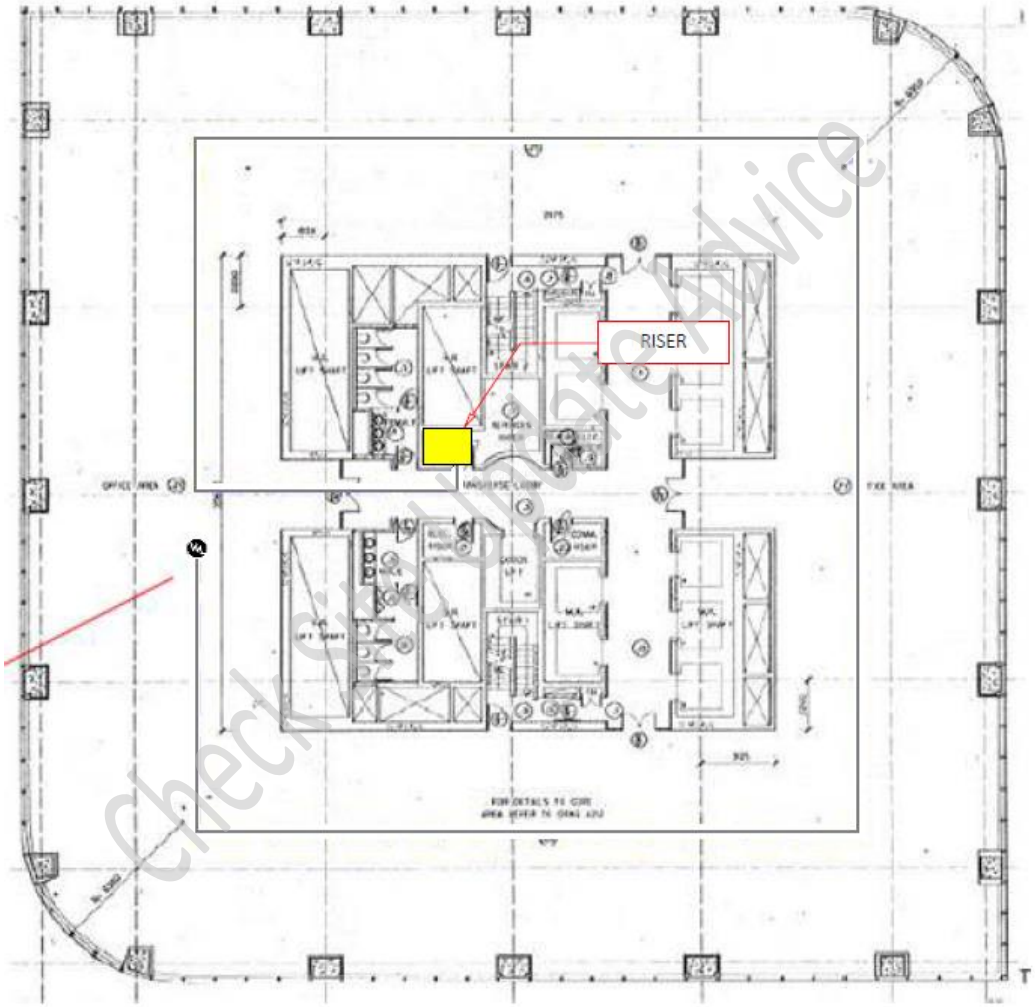
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 39 to 50

Note:

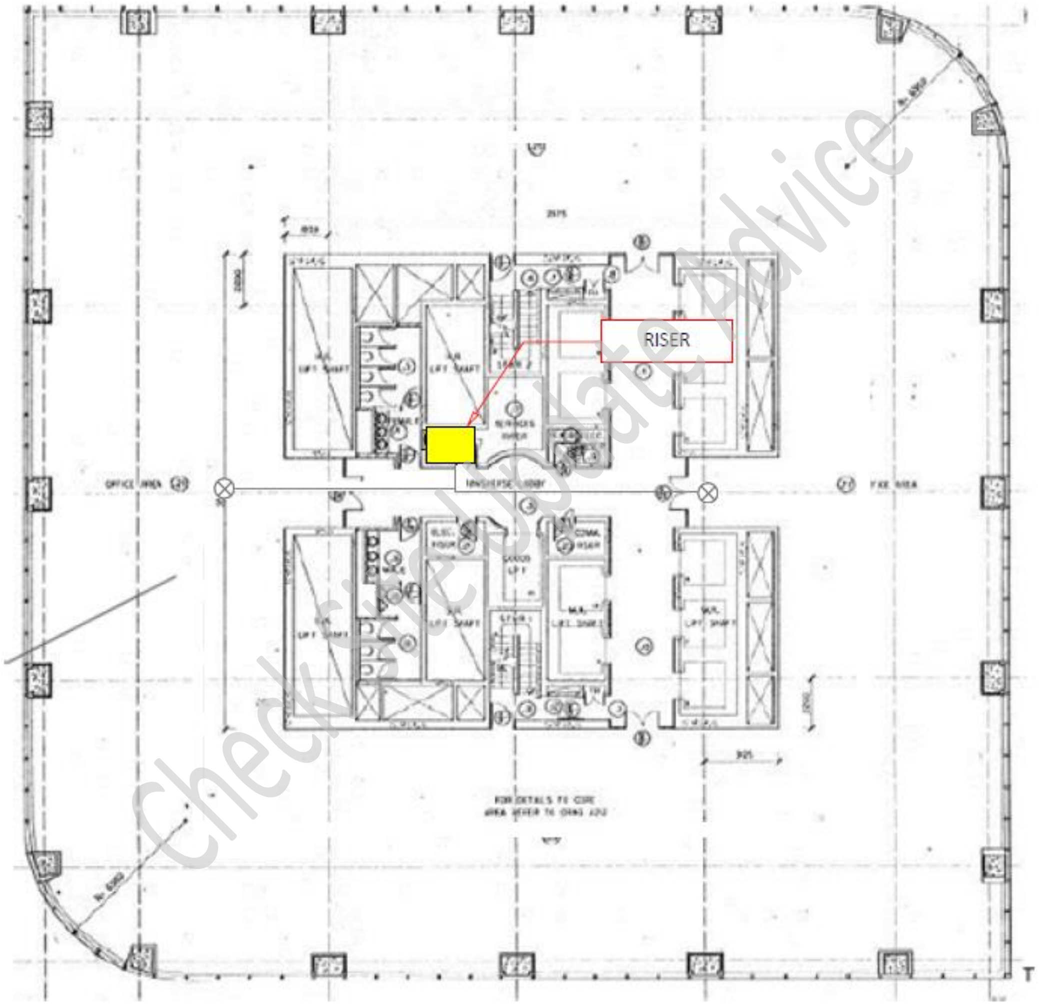
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 51

Note:

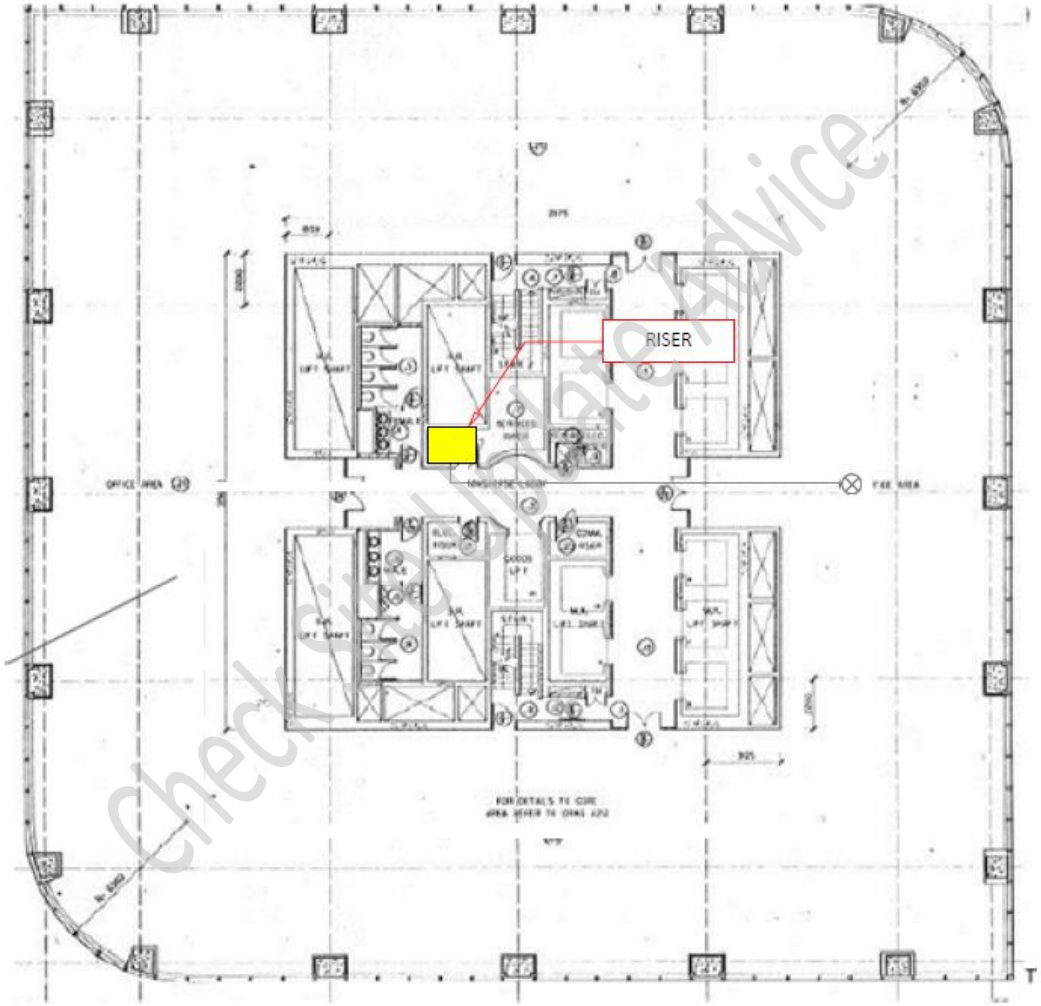
1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Level 52

Note:

1. Labels refer to antenna reference (refer to Section 3 of EME Guide for details).
2. Use of colour on this page is for equipment identification purposed and does not represent an RF hazard. EME levels resulting from the coverage antennas do not exceed general public limit.



Section 3: Equipment Installed at this Site

Equipment List

Diagram Ref	Antenna Type	Make/Model	Bearing (°)	System/Function	Max Power Into Antenna(Watts)
A\B1\1, A\B3\1, A\L13\1, A\L37\1, A\L51\1, A\L51\2	Omni	Decibel DB786DC5N-XM	-	Optus LTE1800 Optus WCDMA2100 Telstra WCDMA850 Vodafone LTE1800 Vodafone WCDMA2100	0.447
A\B1\2, A\B2\1, A\B4\1, A\G\1, A\G\2, A\L52\1	Panel	HUBER+SUHNER 1309.26.0002	-	Optus LTE1800 Optus WCDMA2100 Telstra WCDMA850 Vodafone LTE1800 Vodafone WCDMA2100	0.146
R/L3/1 to R/L50/1	Radiax Cable	Andrew RXL5-1A		Optus LTE1800 Optus WCDMA2100 Telstra WCDMA850 Vodafone LTE1800 Vodafone WCDMA2100	1.5

Section 4: Site Specific Documents

N/A

Appendix 2 ARPANSA Fact Sheet

Australian Government
Australian Radiation Protection and Nuclear Safety Agency

Fact Sheet

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.

619 Lower Plenty Road, Yallambie VIC 3085
Telephone: +61 3 9433 2211
Fax: + 61 3 9432 1835

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.

How about people who work very close to base station antennas?

Workers accessing rooftops and towers that house base station antennas must consult with building and facility management before entering the site. A guide to working safely near mobile phone base stations is available at https://www.radioworksafe.com.au/.

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

Appendix 3 RFNSA Login Access Form

AMTA RF SAFETY COMPLIANCE PROGRAM

Details required for RFNSA access for Radiocommunications Facility Manager/ Owner or Carrier Subcontractor

Your Details (person requiring access to the RFNSA)

Contact Name:

Contact Number:

Contact Email Address:

Company Name (if applicable)

Prime Contact Name:

Prime Contact Number:

Prime Contact Email Address:

Do you have multiple staff requiring access? ☐ Yes ☐ No

Are You / Your Company:

☐ Property Owner / Facility Manager

☐ Carrier Sub-Contractor

☐ Other Please Specify

Site Details: (eg location and address of facility
If more than one location please provide further details)

Company Name (if applicable)

Contract Manager Name:

Contract Manager Number:

Carrier Contact Name:

Carrier Contact Number:

Return Completed Form to: rfnsasupport@amta.org.au

Appendix 4 AMTA Accredited RF Assessors

AMTA RF Safety Compliance Program

Approved Site RF Assessors List – May 2018

Company	Address	Phone	Fax/Mobile	Contact/email/web
Aurecon Australasia Pty Ltd	Aurecon Centre Level 8, 850 Collins Street Docklands VIC 3008	+61 3 9975 3221	+61 3 9975 3444	Ning Yu eme.assessment@aurecongroup.com www.aurecongroup.com
Catalyst ONE Pty Ltd	Suite 3, Level 2, 33 Herbert Street St Leonards NSW 2065	+61 2 9439 1999	+61 2 8905 9063	Judy Xu jxu@catalystone.com.au www.catalystone.com.au
Corearth Australia Pty Ltd	Level 1, 40 McDougall Street Milton QLD 4064	+61 7 3666 5333	+61 7 3666 5366	Craig Wrightson sales@corearth.com www.corearth.com
EMC Technologies Pty Ltd	176 Harrick Road Keilor Park VIC 3042	+61 3 9365 1000	+61 3 9331 7455	Stephen Phillips steve@emctech.com.au www.emctech.com.au
Huawei Technologies (Australia) Pty Ltd	Level 6, Tower B 799 Pacific Highway, Chatswood NSW 2067		+61 434 039 350	Sanaz Amiraski sanaz.amiraski@huawei.com www.hauwei.com
Kordia Solutions Pty Ltd	Unit 1D/400 Nudgee Road Hendra QLD 4014	+61 7 3907 1454	+61 7 3267 7321	Akos Jonyer Akos.Jonyer@kordia.com.au http://www.kordia.com.au/product/eme-compliance/
RADHAZ Consulting Pty Ltd	4/357 Collins Street Melbourne VIC 3000	+61 3 9937 6500	+61 3 9937 6144	Johnny Lim jobrequest@radhaz.com.au www.radhaz.com.au
Telstra EME	Telstra EME Level 3, 70 Collins Street Hobart TAS 7000	+61 3 6212 8144		John Parker ! EME SFW National@team.telstra.com
Total Radiation Solutions Pty Ltd	PO Box 680 Claremont WA 6190	+61 8 9381 7199	+61 8 9381 7166	Phill Knipe phill@t-r-s.com.au www.t-r-s.com.au
Visionstream Pty Ltd	1/31 Commercial Drive Shailer Park, QLD, 4128	+61 7 3827 5700		David Grindrod David.Grindrod@visionstream.com.au www.visionstream.com.au
WaveForm Global Pty Ltd	Unit B, 106 Robinson Road Virginia QLD 4014	+61 7 3266 3783	+61 406 176 492	Tim Pugsley tim.pugsley@waveformglobal.com.au www.waveformglobal.com.au