

Guidelines for Better Visual Outcomes

Low-impact Mobile Facilities

A design guidelines document prepared
for the mobile telecommunications industry
by the Mobile Carriers Forum



Contents

1. Introduction and explanation 3

What is the purpose of these guidelines and who are they for?

What does "low-impact" mean?

Are all installations "low-impact"?

Key factors in the siting and design of low-impact mobile facilities

What about EME?

2. Regulatory framework for low-impact facilities 7

Principle legislation

Supporting legislation

Roles and responsibilities of the regulators

3. Key principles for the design and siting of low-impact facilities 12

Begin by analysing the site...

...then consider how the visual impact of the facility could be minimised on this site

4. The Low-impact Determination – guidelines for mobile facilities 20

5. Contacts 35

Who can you contact for further information?

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Disclaimer

This document has been prepared solely for the purpose of assisting mobile carriers in their planning and installation of specific low-impact mobile telecommunications facilities. The Mobile Carriers Forum has compiled the information contained in this document in good faith and has attempted to ensure that all information is current and accurate at the time of inclusion but this information is subject to change. The information contained in this document does not constitute the giving of legal or professional advice. You should seek legal or professional advice before acting on the basis of any information contained in this document.

These guidelines do not affect any rights given to mobile carriers under the Telecommunications Act 1997, and specifically the Telecommunications (Low-impact Facilities) Determination 1997 (as amended). Compliance with the guidelines is not compulsory. A mobile carrier's ability or decision to adopt these guidelines will depend on the particular circumstances of each new installation.

Chapter 1

Introduction and explanation

What is the purpose of these guidelines and who are they for?

These guidelines have been prepared to assist in the siting and design of new low-impact mobile telecommunications facilities, with the aim of minimising visual impact and achieving appropriate and acceptable outcomes.

The guidelines were initiated by the Mobile Carriers Forum. The Mobile Carriers Forum was formed under the Australian Mobile Telecommunications Association to improve communication and cooperation between the carriers. All infrastructure building mobile carriers operating in Australia have contributed to the development of this document.

An important objective of the Mobile Carriers Forum is to maintain an environmentally and socially responsible approach to mobile network rollouts.

The Mobile Carriers Forum has worked together to prepare these guidelines to assist and inform those using the Low-impact Determination to plan for, and install, mobile telecommunications facilities, and to provide a guide for the siting and design of low-impact facilities.



Low-impact CBD rooftop installation

The guidelines are conceptual rather than prescriptive, and promote appropriate site selection and design for future facilities.

The guidelines relate only to mobile telecommunications facilities and they are written for the mobile carriers and their contractors. It is recognised, however, that the principles and explanations within the document will also be useful to other groups, including Local and State government and community groups.

These guidelines do not affect any rights given to mobile carriers under the Telecommunications Act 1997, and specifically the Telecommunications (Low-impact Facilities) Determination 1997, as amended. Compliance with the guidelines is not compulsory. A mobile carrier's ability or decision to adopt these guidelines will depend on the particular circumstances of each new installation.

Chapter 1

Introduction and explanation

What does "low-impact" mean?

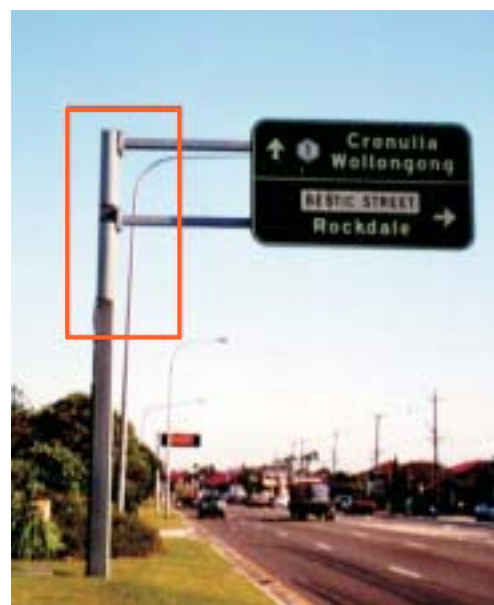
Telecommunications facilities are primarily regulated under Commonwealth law. Prior to 1 July 1997, the installation of all telecommunications facilities were exempt from State and Territory laws. On this date the Telecommunications Act 1997 came into effect and carriers must now comply with State and Territory laws in relation to the installation of certain types of telecommunications facilities.

The government recognised however, that there are some telecommunications facilities and activities that are unlikely to cause significant community disruption or significant environmental disturbance. These are exempt from certain State and Territory laws. These new telecommunications facilities and activities are described in the Telecommunications Act 1997 (as amended), (referred to as "the Act"), and in a Ministerial determination made under the Act – the Telecommunications (Low-impact Facilities) Determination 1997 (referred to as the "Low-impact Determination"), as amended.

The Act and the Low-impact Determination define what low-impact installation activities may be undertaken in certain areas without reference to particular State and Territory laws.

The activities are tabulated and categorised from Part 1 to Part 7 in the Schedule to the Determination. Part 1, Part 3 item 5 and Part 7 describe activities that are of particular relevance to the mobile carriers.

The regulatory framework for low-impact facilities is discussed more in the following chapter, and the relevant parts of Low-impact Determination are covered in chapter 4.



Panel antennas co-located on a road sign.

Chapter 1

Introduction and explanation

Are all installations "low-impact"?

As will be discussed later, the Low-impact Determination defines those activities that are low-impact by reference to what type of facility is proposed and where it is proposed to be installed. Facilities in areas of environmental significance are never low-impact. (The Determination sets out what is an area of environmental significance.)

New towers (which includes lattice towers, poles and masts not attached to a building) are not low-impact. However, an extension to a tower or a tower on a building may be treated as a low-impact facility, provided certain conditions are met. The replacement of a tower or pole at the same location with one of equivalent height and displacement is also a "low-impact" installation.

Key factors in the siting and design of low-impact mobile facilities

Whilst minimising visual impact is a very important objective, and that is the subject of this document, one or more other factors may have a substantial bearing on the final outcome. It should be recognised that not all future installations will be able to incorporate the techniques and methods proposed in this document, and that the best visual outcome is not always possible to achieve.

Some of the issues which often need to be considered in parallel with visual impact include:

- the availability and suitability of land
- any reasonable requirements of the landlord
- radio frequency performance
 - coverage objectives
 - capacity
 - network design constraints
 - relationship to other base stations
 - line of site
 - height of surrounding buildings, trees and other structures



Low-impact prefabricated equipment cabin.

Chapter 1

Introduction and explanation

- occupational health and safety
- the impact on other facilities located at the same site
- noise – usually from air conditioners
- access for maintenance purposes
- installation time frames and availability of materials
- the individual carriers' design
- construction issues – structural and loading feasibility
- cost
- compliance with relevant and applicable national EME standards
- co-location opportunities
- topographical constraints

What about EME?

Mobile carriers must comply with standards on exposure to electromagnetic energy (EME) set by the ACA. This requirement is given effect through the Radio Communications Act 1992 and the Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003.

On 7 May 2002, ARPANSA published the Radiation Protection Standard – Maximum Exposure Levels to Radiofrequency Fields – 3kHz to 300GHz. This 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 compliance.

It is important to remember that these guidelines focus specifically on visual outcomes and are not intended to address issues relating to EME.

Chapter 2

Regulatory framework for low-impact facilities

There are several regulatory documents for low-impact telecommunications facilities that must be read in conjunction with one another. This outline is provided in these guidelines for general background.

Note that the information contained below does not constitute the giving of legal or professional advice, and reliance should not be placed upon it in place of such advice.

Principle legislation

Telecommunications Act 1997

The Telecommunications Act 1997 (as amended), which is Commonwealth legislation, provides that telecommunications carriers have certain rights to engage in particular activities, together with certain immunities from State, Territory and local government laws in relation to the conduct of those activities.

These activities include:

- the inspection of land to determine whether it is suitable for the carrier's purpose
- the installation of specified facilities, including low-impact facilities
- the maintenance of facilities.

In carrying out these activities, a carrier must comply with a number of requirements which include:

- do as little damage as practicable
- act in accordance with good engineering practice and comply with recognised industry standards
- take all reasonable steps to restore the land and to protect the environment
- give notice to the owner and occupier/s of the land.

The Act also specifies that, in carrying out these activities, carriers must comply with the Telecommunications Code of Practice.



An extension to a tower is low-impact in industrial and rural areas, but not in residential or commercial areas (as long as the extension is no more than 5 metres and there have been no previous extensions to the tower).

Chapter 2

Regulatory framework for low-impact facilities

Supporting legislation

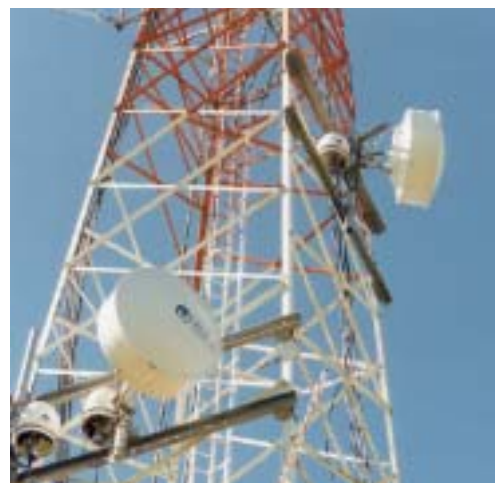
Telecommunications Code of Practice 1997

Schedule 3 (Clause 15) of the Telecommunications Act 1997 requires carriers to comply with a Ministerial Code of Practice.

Generally speaking, the Code places requirements on carriers to conduct their activities for which they are to exercise their statutory rights and immunities in a way that responds to the rights of individual landowners, affected utility service organisations and management authorities and to broader community concerns on environmental issues.

Those requirements include:

- Before commencing installation carriers must notify landowners (and occupiers if they are different from the owners), including a local council where it is the landowner or manager of public land.
- Carriers must do as little damage as practicable and act in accordance with good engineering practice.
- Carriers must comply with an objection and consultation process to resolve particular objections to their activities.
- When installing a low-impact facility between 10.00pm and 7.00am, carriers must make no more noise than is allowed under State or Territory law applying to similar activities.
- Carriers must take all reasonable steps to ensure that the land is restored to a condition similar to the condition before the activity began. This must start within 10 days of the facility being installed, unless otherwise agreed with the landowner/occupier.
- Before engaging in a low-impact facility activity, carriers must consider opportunities to co-locate.



A 1.8m dish is low-impact in industrial and rural areas, but in residential and commercial areas the dish must be no more than 1.2m in diameter to be low-impact.

Chapter 2

Regulatory framework for low-impact facilities

Telecommunications (Low-impact Facilities) Determination 1997 (as amended)

The Telecommunications (Low-impact Facilities) Determination 1997 (as amended) is a Ministerial determination made under Clause 6(3) of the Telecommunications Act.

The Low-impact Determination defines those new installation activities that are low-impact, by reference to WHAT facility is proposed and WHERE it is proposed to be installed.

Chapter 4 of these guidelines deals with the WHAT part of the definition. It goes through, in some detail, those parts of the Low-impact Determination that are relevant to mobile carriers.

ACIF: C564: 2002 Deployment of Radiocommunications Infrastructure Code

From October 2002, all carriers must comply with the ACIF: C564: 2002 Deployment of Radiocommunications Infrastructure Industry Code, also referred to as the "ACIF Code".

The ACIF Code requires carriers to notify and consult on certain types of low impact facilities. These notification and consultation provisions came in to place in April 2003.

The Code requires carriers to:

- have written procedures for site selection;
- improve notification and community consultation procedures;
- design and operate base stations with the objective of minimising electromagnetic emissions; and
- provide electromagnetic radiation emission reports as per the Federal Departments of Health's requirements.

The following is an explanation of the *WHERE* part of the definition.

WHERE a facility is located affects whether it is low-impact or not

When assessing whether a facility is low-impact we must first establish the nature of the land use where the facility is proposed.

The Low-impact Determination identifies five land use types or areas by reference to the Principal Designated Use.

The areas have an order of importance, based on zoning under State or Territory law, so that an area only has its highest possible zoning.

The order of priority is:

1. Environmental Significance areas
2. Residential areas
3. Commercial areas
4. Industrial areas
5. Rural areas

Chapter 2

Regulatory framework for low-impact facilities

Roles and responsibilities of the regulators

Department of Communications, Information Technology and the Arts

The Department of Communications, Information Technology and the Arts provides strategic advice and professional support to the Australian Government on a wide range of policy areas including telecommunications, information technology and the information economy.

The Minister for Communications, Information Technology and the Arts is ultimately responsible for telecommunications regulation.

Australian Communications Authority

The Australian Communications Authority (ACA) is responsible for regulating telecommunications and radio communications, including promoting industry self-regulation and managing the radio frequency spectrum. The ACA also has significant consumer protection responsibilities.

Specifically, the ACA is responsible for the following:

- issuing carrier licences
- regulating service providers
- reporting on the performance of service providers with reference to consumer satisfaction and benefits, and quality of service
- registration (with safety-net style enforcement powers) of industry
- operations and technical codes of practice
- setting industry standards where codes fail or fail to be created
- regulating and enforcing carriers' powers and immunities
- handling public enquiries about certain matters related to telecommunications
- handling investigations of certain matters related to telecommunications, in particular those related to breaches of the Act
- ensuring industry compliance with mandatory standards and codes

So, even though low-impact facilities are exempt from State and Territory planning law, it does have relevance in defining the "areas" referred to in the Low-impact Determination.

Where the land use/zoning objectives for the land relates to more than one area and there is no indication of the predominant, preferred or most likely use, the provisions relating to most sensitive area must be applied in determining the Principal Designated Use. For example, in the case of a mixed use designation which allows for residential, commercial and industrial land uses, the site should be considered to have a residential Principal Designated Use.

Land that is in a built up area that cannot be otherwise described as a commercial, industrial or rural area, is to be considered a residential area.

Chapter 2

Regulatory framework for low-impact facilities

Telecommunications Industry Ombudsman

The Telecommunications Industry Ombudsman (TIO) is a formal and independent dispute resolution scheme. The TIO can investigate a complaint about failure to give notice or the manner in which a carrier has entered on to land. Carriers must comply with a direction issued by the TIO, pursuant to the TIO's constitution.

Australian Communications Industry Forum

The Australian Communications Industry Forum (ACIF) is an industry owned, resourced and operated company established by the telecommunications industry in 1997 to implement and manage communication self-regulation within Australia.

ACIF's role is to develop and administer technical and operating arrangements that promote both long term interests of end-users and the efficiency and international competitiveness of the Australian communications industry. This primarily involves:

- developing Standards and Codes to support competition and protect consumers, driving widespread compliance
- facilitating resolution of strategic and operational industry issues

Land that is not part of a built up area and cannot be otherwise described as a commercial, industrial or residential area, is to be considered a rural area.

A facility in an area of Environmental Significance is never low-impact.

There are provisions in the Low-impact Determination which explain what is an area of Environmental Significance.

Chapter 3

Key principles for the design and siting of low-impact facilities

Begin by analysing the site.

Achieving better visual outcomes for low-impact facilities should start with a good understanding of the site and its context.

The purpose of this is to ensure that an appropriate site in the search area is selected for the proposed facility. The following page has a list of issues and questions that may be considered when assessing a potential site. The issues may not be relevant for all sites, and this will depend on the nature of the site and facility proposed. For example, consideration of "design" of the existing site may be relevant to a proposal for a building rooftop, but may be less so for a proposal to co-locate on an existing telecommunications tower (unless that tower is specifically "designed" for the location).

Begin by analysing the site...

In the first place, the siting of a facility is influenced by the "key factors in the siting and design of low-impact mobile facilities", as outlined on pages 4 and 5 of this document. The design of the facility is then very much dependent on the opportunities and constraints of the selected site. These opportunities and constraints directly influence the ability to minimise visual impact.

The siting and design of a facility requires a PROCESS of investigation and analysis – here are some of the visual issues typically considered as part of that process.

Are there any other towers or public utility structures in the area?

Carriers are obliged by law to consider co-locating on any existing towers or public utility structures in the area before engaging in a low impact facility activity.

In some cases however, even though a tower or structure may exist in the area, it may produce a better visual outcome to locate on a rooftop or elsewhere. Co-locations don't always result in the best visual outcome.



Co-location on a water tank



In this case three carriers co-locating results in substantially increased visual bulk (note that the lower tower has since been removed).



Co-location facility with antennas flush mounted below the original headframe.

Chapter 3

Key principles for the design and siting of low-impact facilities

The existing site

Key elements	Typical considerations
Colour	<ul style="list-style-type: none">• Is it possible or appropriate to colour the facility to blend with the colour of this site?• Would it be more appropriate to colour the facility so that it contrasts, or would a neutral colour have less impact?
Texture	<ul style="list-style-type: none">• Is it possible or appropriate to match the texture or materials of the facility to the texture or materials of the background? For example, could an equipment cabin be brickwork?
Form	<ul style="list-style-type: none">• Is the form of this building blocky or finely articulated?• Could a low-impact facility on this site be sympathetic to the form?• How could antennas be mounted so that they will have the least impact? For example, should they be flush mounted to maintain the flat profile of the building, or is it more appropriate to mount them on the rooftop?• Could the form of the building assist to minimise the impact of a facility?• Does the form lend itself to the use of radio transparent screening?
Bulk and Scale	<ul style="list-style-type: none">• Is this site/building of a bulk and scale so that a facility here would not be visually obtrusive?• How does the bulk/scale relate to the form, and how does this impact on whether or not this site is appropriate for a telecommunications installation?
Design	<ul style="list-style-type: none">• Could the proposed facility on this site be designed so it is sympathetic with the design of this building/site?
Existing telecommunications infrastructure	<ul style="list-style-type: none">• Are there other telecommunications facilities on the site?• Will the proposed facility create or add to the existing clutter?• How could this be avoided or corrected?

Surrounding the site

Key elements	Typical considerations
Views and view corridors	<ul style="list-style-type: none">• Will the facility detract from a significant view corridor? What can be done to minimise this?
Local landmarks, places of heritage or cultural significance	<ul style="list-style-type: none">• Will the facility detract from any local landmarks or places of significance? For example, it is located on a rooftop next to a church steeple which currently dominates the skyline?
Vegetation	<ul style="list-style-type: none">• Is there vegetation around the site? Could vegetation be used to minimise the visual impact of a facility in this area? For example, could plants around the equipment cabin screen it from the footpath?

Chapter 3

Key principles for the design and siting of low-impact facilities

...then consider how the visual impact of the facility could be minimised on this site

The ability or decision to adopt these suggestions depends on the opportunities and constraints of the particular site as well as the technical requirements of the facility and other factors outlined on pages 4 and 5 of this document.

1. Maintain the integrity of landmarks and places of significance

Low-impact telecommunications facilities may detract from the integrity of landmarks or places of cultural or heritage significance. It is important to consider the visual impact of the facility on the buildings and places surrounding the site, as well as the site itself.

2. Avoid interrupting significant views

It is preferable that facilities should not substantially impact on the integrity of important views. If a proposed facility may interrupt such a view, then options to minimise the visual impact should be considered. It may be appropriate to integrate the facility in some way in order to reduce the visual clutter.



The form of this building enables the vertical element to be "extended" so that the addition looks like part of the original building. Careful detailing and colour matching are also very important in integrating this facility.



The impact upon the church may be minimised by locating antennas on the neighbouring building where the colour of the background makes the profile of antennas less visible.



An example of a view which should probably not be cluttered with mobile phone facilities.

Chapter 3

Key principles for the design and siting of low-impact facilities

3. Integrate the facility

Facilities can in many instances be integrated with existing structures. Opportunities for site sharing could be used where appropriate.

Where facilities are located on an existing building, the ability to integrate the facility depends largely on the form of the building.

Taking advantage of a modulated form

A building with a modulated roofscape or façade may provide opportunities to locate antennas so that they emphasise the form or are not seen from some vantage points.

Using screening

On other sites it may be appropriate to use radio transparent material to screen a facility from view. That screening may be in front or behind the facility.

Screening in front of a facility shields it from direct view and may be appropriate on a rooftop, for example, where there are multiple facilities.

Screening behind a facility reduces the visual impact by making the profile less visible. It is particularly important to complement the colour of the facility and the screening when this technique is used.



The engineering design of this facility allowed the antenna to be constructed as the "mast" and the dish to be placed within the "air conditioning unit".



The placement of antennas in this example emphasises the form of the roof.



The form and bulk of the original building is blocky and massive. Screening elements can be made to look like part of the original building.



The placement of antennas here repeats the pattern of the windows below.

Chapter 3

Key principles for the design and siting of low-impact facilities

Screening may be more appropriate on some building forms than on others. For example, it's easier to replicate or extend a simple block form using screening (a lift motor room for example) than a detailed, modulated façade (a carved sandstone building for example).

On some sites it may be appropriate to use radio transparent material to construct new building elements to screen mobile facilities.

For example, radio transparent material could be used to construct advertising signs, false chimneys, bell towers and other elements, and the mobile facilities placed inside these structures.

Remember that these screening techniques may not always be feasible for technical, structural, financial and other reasons.

The wind loading of screening must be considered as some buildings are not capable of accommodating the additional load. Screening solutions also substantially increase the cost of a facility.



Rooftop screening shown from behind the facility.

Is screening low-impact?

Screening is not expressly referred to in the Low-impact Determination. In particular instances however, the use of screening may be authorised under Clause 6(2) of Schedule 3 of the Telecommunications Act. This clause provides that where a carrier is installing a low-impact facility, a carrier may, for purposes in connection with that installation, do anything necessary or desirable for that purpose on, over or under the land.



Here, the antennas are within the rooftop signage.



The bell tower has antennas within it.



Antennas are located within the column elements in this example.



Screening need not necessarily hide the antenna to be effective.

Chapter 3

Key principles for the design and siting of low-impact facilities

4. Minimise clutter

This is particularly important when there are several facilities on the one site. One means to reduce the visibility is to use screening as discussed in the previous section. Another is to organise or arrange facilities in an ordered way, all at the same height for example.

It is acknowledged that this sometimes cannot be achieved however, due to the differing technical objectives of each of the carriers, and the different types of equipment used.

5. Respect an existing designed facility

In instances where one carrier has gone to lengths to design a facility so that visual impact is minimised, if a new carrier is considering co-locating or site sharing, then that carrier should respect the



This example demonstrates an ordered approach to the placement of antennas to reduce clutter while fulfilling the site's radio requirements.



However, radio requirements have necessitated a less ordered outcome for this site, which is in a visually remote area.



Consider the impact of co-locating on this structure.



It may be inappropriate to use a bulky headframe if co-locating on this pole.

Chapter 3

Key principles for the design and siting of low-impact facilities

design of the original facility. For example, it may be inappropriate to co-locate a bulky triangular headframe on an existing slim pole. In this instance, the use of flush mounted panel antennas, coloured to match the pole, would look more appropriate.

Likewise, if a part of a rooftop has been carefully screened, it may be inappropriate to locate visually obtrusive antennas next to that screening.

6. Choose appropriate colours and textures

Using appropriate colours and textures is a very useful technique to reduce the visibility of facilities.

Generally, facilities should be matched to their background.

Where facilities are seen against the sky, a better visual outcome is generally achieved by using a non-reflective grey. There are sites however, where it may be appropriate that facilities seen against the sky be the same colour as the building or structure on which they are mounted, or some other colour.

As well as colour matching the antennas, it is also sometimes appropriate to treat equipment cabins so that they blend with the surroundings. For example, a brick (or "brick-like") cabin may be more appropriate than a standard metal cabin when adjoining a brick building.



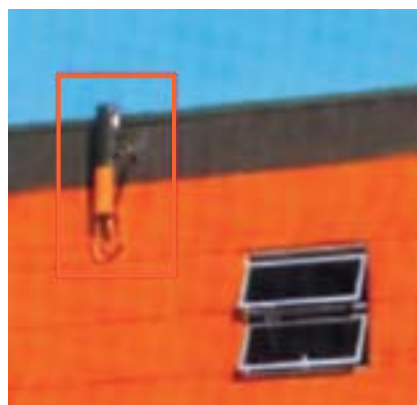
A better visual outcome may be achieved if the lower antenna were colour-matched like the one before.



Flush mounted panel antennas carefully matched to the colour of the sign to which they are attached.



A microcell installation coloured to match the traffic lights.



The colour of the antenna (and cables) matches the colour of the building.



Antenna matched to the brick background on a landmark building.

Chapter 3

Key principles for the design and siting of low-impact facilities

7. Place the facility so it is less likely to be seen by pedestrians

Where practical, facilities should be located out of the viewshed of pedestrians. This may be particularly relevant in areas where there is a lot of pedestrian traffic, such as the CBD.

For microcell installations in particular, a better visual outcome may be achieved if antennas are located above awning height. Consideration should also be given to the placement of associated equipment.

Better visual outcomes for other types of facilities may also be achieved by siting them out of the direct pedestrian viewshed. For example, a panel antenna on the edge of a building awning may be less visible if set back onto the building parapet, where the awning acts to screen it from view.

8. Use vegetation where appropriate

Planting may be used to partially screen equipment, and is often successfully used around cabins at ground level. Existing vegetation that does not compromise radio objectives may also be used to provide long distance screening or larger facilities.



A whip antenna mounted on top of an awning.



Antennas mounted at the top of a light pole out of the normal line of sight of pedestrians below.



Examples of where planting has been used to partially screen and soften the view of an equipment cabin.



Rooftop panel antennas.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

This is the WHAT part of the definition of low-impact facilities, introduced on page 8.

To make it easier to use, this chapter deliberately follows the same structure as the Schedule to the Low-impact Determination.

It includes only those parts of the Schedule which are relevant to mobile telecommunications. The guidelines provide explanations and examples of how the visual impact of each type of facility may be minimised.

Part 1 – Radio facilities

Item No.	Facility	Areas
2	Panel, yagi or other like antenna:	Residential Commercial
	(a) Flush mounted to an existing structure; and	Industrial Rural
	(b) Either:	
	(i) colour-matched to its background; or	
	(ii) in a colour agreed in writing between the carrier and the relevant local authority.	

Guidelines

Mounting

- The closer the antenna is mounted to a structure, the better the visual outcome.



Flush mounted panel antennas. The two on the right have not yet been coloured to match the background.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

- Flush mounting may result in a better visual outcome than mounting antennas which protrude from near the edge of building to which they are attached (Item 3 of the Schedule). Centrally locating protruding antennas on a rooftop may produce a better visual outcome than flush mounting, by removing antennas from the view from street level.



This example illustrates the difference between a flush mounted antenna and protruding antennas mounted near the edge of a building.

- A better outcome is generally achieved by flush mounting the entire antenna, rather than having a part of it seen against a building, and a part of it protruding from it.
- Consider the location of the feeder cables. A better visual outcome is generally achieved if the cables are not visible.
- Note that flush mounting is not always achievable for technical, structural or safety reasons. For example, it is not possible to flush mount antennas on a glass fronted building. Flush mounted antennas may also not be achievable due to occupational health and safety requirements for maintenance purposes.



CBD flush mounted antenna.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Colour matching

- Flush mounted antennas that are colour matched to their background often have better visual outcomes
- As well as matching the colour of the background, also matching the pattern of the background, brickwork for example, can further reduce the impact. This may be appropriate on landmark buildings

Item No.	Facility	Areas
3	Panel, yagi or other like antenna: (a) Not more than 2.8 metres long; and (b) If the antenna is attached to a structure – protruding from the structure by not more than 3 metres; and (c) Either: (i) colour-matched to its background; or (ii) in a colour agreed in writing between the carrier and the relevant local authority	Residential Commercial Industrial Rural



Panel antenna coloured to match the structure to which it is attached.



A good example of how both the cabin and antennas can be integrated with an existing building or structure.



Antenna matched to the stone background.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

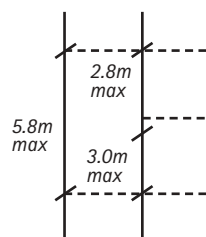
Guidelines

Protrusion

- The ACA has published a guide called *Telecommunications Facilities – Information for local government*. In this guide, the ACA advises that a facility that is 5.8 metres high is low-impact. This is based on an antenna which is 2.8 metres high, and is attached to an antenna mount which is 3 metres high.
- Industry recognises that a 5.8 metre high facility may cause undesirable visual outcomes, particularly when mounted close to the edge of a low height building, or in a visually prominent position. Carriers are encouraged to minimise protrusion in order to achieve better visual solutions
- Visual impact is largely determined by the scale of the facility relative to firstly, the scale of the building or other structure to which it is attached and secondly, the visual prominence of that building or structure

This relationship influences

- the actual visibility of the facility
 - the perception of size (and height) of the facility in its context, and also
 - the distance from which the facility is viewed
- It is also important to consider the scale of the facility in relation to the scale of surrounding development, and to the land uses surrounding the facility
 - For example, on a low-rise building, an antenna mounted to a height of 5.8 metres at the edge of the building will probably be highly visible and out of scale with the building
 - On a taller building, the visibility of a mobile facility may not be so great because of the relative scale of facility and the building. In this case there may be more opportunity to install a higher facility. However, the facility may need to be integrated with the building, or located towards the centre of the rooftop to achieve a better visual outcome.



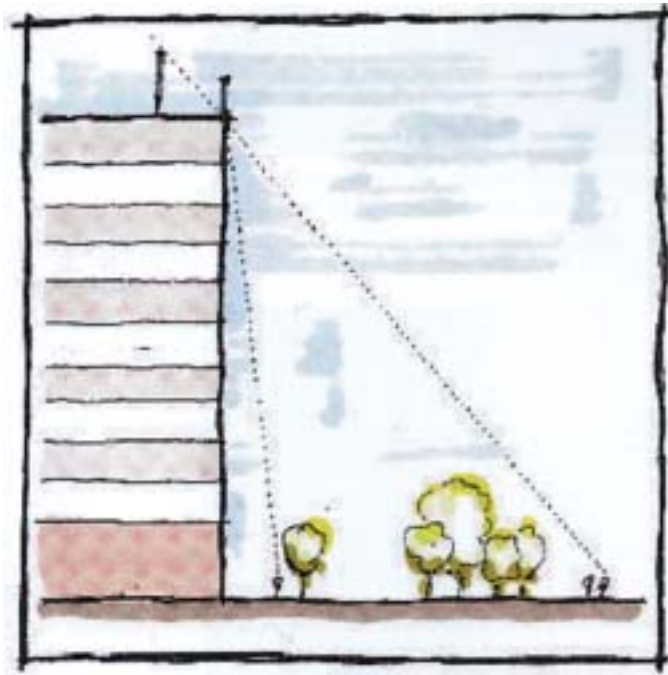
5.8m protrusion

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Many facilities on the same site

- Careful design and planning is required to minimise the cumulative visual impact where there are several facilities on the one site. One means to reduce visibility may be to use screening. Another may be to arrange and mount in an ordered way, all at the same height for example



Carriers are encouraged to minimise the height of a facility where possible, or use other methods such as screening, integration with the building, or setbacks to achieve better visual outcomes.

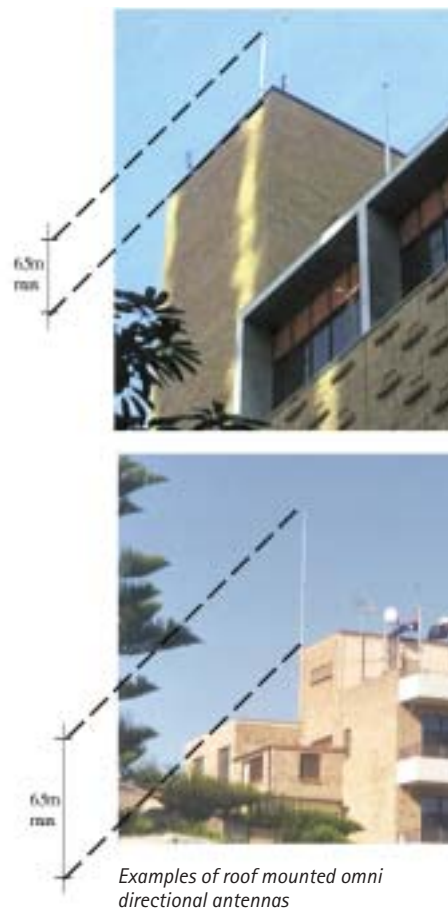
Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Item No.	Facility	Areas
4	<p>An omnidirectional antenna or an array of omnidirectional antennas</p> <p>(a) Not more than 4.5 metres long; and</p> <p>(b) Not more than 5 metres apart; and</p> <p>(c) if the array is attached to a structure – protruding from the structure by not more than 2 metres</p>	<p>Industrial</p> <p>Rural</p>

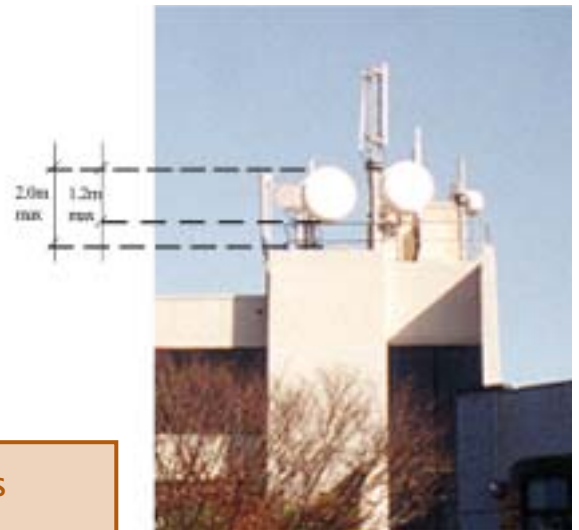
Guidelines

- Omnidirectional antennas generally have lesser visual impact than panel and other antennas because of their reduced visual bulk
- However, note that an omnidirectional antenna or array of omnidirectional antennas is not low-impact in residential or commercial areas
- In the ACA guide, *Telecommunications Facilities – Information for local government*, the ACA advises that a facility that is 6.5 metres high is low-impact. This is based on an omnidirectional antenna which is 4.5 metres high (long), and is attached to an antenna mount which is 2 metres high
- As with panel antennas however (part 1, item 3 of the Schedule) the industry recognises that a 6.5 metre high facility may be visually obtrusive. Carriers are encouraged to minimise protrusion to achieve better visual outcomes



Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities



A 1.2 m dish which is low-impact in residential, commercial, industrial and rural areas.

Item No.	Facility	Areas
5	Radiocommunications dish	Residential
	(a) Not more than 1.2 metres in diameter; and	Commercial
	(b) Either:	Industrial
	(i) colour-matched to its background; or	Rural
	(ii) in a colour agreed in writing between the carrier and the relevant local government authority; and	
	(iii) if attached to a supporting structure, the total protrusion from the structure is not more than 2 metres	

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

5A	Radiocommunications dish	Industrial
	(c) Not more than 1.8 metres in diameter; and	Rural
	(d) Either:	
	(i) colour-matched to its background; or	
	(ii) in a colour agreed in writing between the carrier and the relevant local government authority	



A 1.8m dish, which is low-impact in industrial and rural areas.

Guidelines

- The total protrusion from the structure to which the dish is attached can be no more than 2 metres

Item No.	Facility	Areas
6	Microcell installation with	Residential
	(a) A cabinet not more than 1 cubic metre in volume; and	Commercial
	(b) A separate antenna not more than 1 metre long	Industrial
		Rural



Microcell on a CBD "smartpole".

Guidelines

- Microcells located above typical awning height generally have lesser visual impact
- If facilities are flush mounted, colour matching to the background often has a better visual outcome
- In sensitive locations, the equipment cabinet may be located within existing structures

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Continued...page 27



A colour matched "extension" to the traffic lights.



An awning mounted colour matched whip antenna.



A colour matched patch antenna. Here is an example of how an antenna has been well placed and designed, in the context of an important view.



Typical microcell equipment box.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Item No.	Facility	Areas
7	In-building coverage installation (a) to improve cellular coverage to mobile phone users operating inside a building; and (b) wholly contained and concealed in a building	Residential Commercial Industrial Rural



Guidelines

- In-building coverage installations are generally in tall office buildings, airports and function centres where external facilities do not provide coverage or capacity. (Often this is because the external facilities are designed to provide coverage at street level.)
- They generally have no visual impact outside the building
- Internal antennas could be coloured to match the ceiling

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Item No.	Facility	Areas
8	Equipment installed inside a structure, including an antenna concealed in an existing structure	Residential Commercial Industrial Rural



Guidelines

- Structure means "existing structure", within the envelope of a building for example
- There is no restriction on the size of the equipment cabin as long as it is fully contained within an existing structure
- Note that this does not apply in residential areas



Item No.	Facility	Areas
9	An extension to a tower if (a) the height of the extension does not exceed 5 metres; and (b) there have been no previous extensions to the tower	Industrial Rural



Guidelines

- A tower extension cannot be low-impact in a commercial or residential area
- Note that there can be no previous extension to that tower

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Part 3 – Above Ground Housing

Item No.	Facility	Areas
5	Equipment shelter	Residential
	(a) used solely to house equipment used to assist in providing a service by means of a facility mentioned in Part 1; and	Commercial
	(b) not more than 3 metres high; and	Industrial
	(c) with a base area of not more than 7.5 square metres; and	Rural
	(e) either	
	(i) colour-matched to its background; or	
	(ii) in a colour agreed in writing between the carrier and the relevant local authority	



Brick equipment shelter on a rooftop, integrated with the building form.



Rooftop cabins integrated with the colour and form of the building. Note also the colour matched antenna.



Examples of co-location of a street light.

Guidelines

- The dimensions apply only to those shelters accommodating equipment used to assist in providing a service by means of a facility mentioned in Part 1 of the Low-impact Determination (ie a low-impact radio facility)
- Equipment shelters can be designed and coloured to integrate with existing elements, such as other cabins or buildings on the site
- Rooftop equipment shelters should be located and designed to integrate with the existing roof form. However, it may be appropriate to use prefabricated equipment shelters on rooftops in many instances, particularly when those shelters are not visible from the street
- Community facilities could be provided as part of or alongside the shelters. For example, a shelter at the edge of an oval could have a roof overhang to provide cover for spectators, and public seating if appropriate.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Part 7 – Co-located Facilities

Item No.	Facility	Areas
1	Facility mentioned in (a) Part 1, 5 or 6; or (b) item 3 of Part 4; installed on or within (c) an original facility; or (d) a public utility structure	Industrial Rural

Guidelines

- “Original facility” includes any facility in place at 19 August 1999 (when the variation to the Low-impact Determination took effect) and any facility installed after this date for which planning approval was given
- “Public utility” means a body that provides to the public reticulated products or services (such as electricity, gas, water, sewerage or drainage), carriage services (other than carriage services supplied by a carriage service provider), transport services or similar product or service. “Public utility structures” include bridges, road signs, electricity transmission towers, water tanks, traffic light poles and street light poles
- Carriers have a statutory obligation before engaging in a low-impact facility to consider co-locating on a public utility structure which meets their needs and to make reasonable efforts to enter into an agreement with the relevant public utility in certain circumstances



Panel antennas flush mounted on a water tank.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

- The design of the new co-locating facility should be sensitive to the design of the original facility



Panel antennas flush mounted to a road sign.

- Flush mounting on an existing pole generally has less impact than attaching an additional headframe. However, flush mounting is not always possible for technical and safety reasons. For example, if antennas are flush mounted below an existing headframe, the lower facility may have to be switched off to allow access for the maintenance of antennas above. Antennas co-located on a pole may be offset to allow people to climb behind for maintenance purposes.



The co-located antennas repeat the form and pattern of the original pole.



Flush mounted antennas co-located beneath a triangular headframe.

Chapter 4

The Low-impact Determination – guidelines relating to mobile facilities

Item No.	Facility	Areas
2	Facility mentioned in (a) Part 1, 5 or 6; or (b) item 3 of Part 4; installed on or within (c) an original facility; or (d) a public utility structure where (e) the total volume of the co-located facilities is no more than 25 percent greater than the volume of the original facility or the original infrastructure; and (f) the levels of noise that are likely to result from the operation of the co-located facilities are less than or equal to the levels of noise that resulted from the operation of the original facility or public utility structure	Residential Commercial

Guidelines

- Note that there are additional volume and noise constraints for facilities in residential and commercial areas
- Volume refers to the physical volume of all visible parts on or within a facility, not the implied volume. For clarity, the volume of an original facility only includes its apparent or visible parts and associated supporting structures, and not the total area occupied by that facility. For example, when calculating the volume of a lattice tower and associated infrastructure, the total volume would be the sum of the volume of the actual latticing of the tower. The foundations of the tower would not be considered in the volume calculation
- The 25% volume rule can not be used to achieve a low-impact tower extension in a residential or commercial area
- The volume rule also applies to co-location on public utility structures including electricity poles, traffic light poles, street light poles, water reservoirs and road signage



Volume of an original facility only includes its apparent or visible parts and associated supporting structures.

Chapter 5

Contacts

This document has been prepared to assist and inform those using the Low-impact Determination, and to provide a guide for the siting and design of new low-impact mobile facilities.

Should you require further information, the following is a list of contact details for those groups referred to in this document, and those involved in preparing it.

This document can be found on the following web site:
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Optus	www.optus.com.au
Hutchison Telecoms	www.orange.net.au

