

Chapter 11

Buffer Areas



11 Buffer Areas

11.1 Objectives of this Chapter

The objective of this Chapter is to minimise land use conflicts between potentially incompatible land uses through the establishment of appropriate buffer areas.

11.2 Definitions

In this Chapter the following definitions apply:

“Buffer Area” means an area of prescribed width between adjoining land uses or developments that is created for the purpose of mitigating the impacts of one or more of those land uses, and in which the carrying out of certain development is restricted.

“Encroaching Development” means any development, including subdivision, the erection of a building or the carrying out of an activity on land to which this Plan applies, which is proposed on land adjacent to an existing development or land use, or to land previously zoned for a specific purpose under the Lismore LEP 2000.

11.3 Conflicts in Land Uses

Conflicts in land use may occur where residential development encroaches into non-residential areas, and established land use practices associated with a particular land use or activity are likely to lead to a real or perceived loss of amenity for residents. Typical external effects which may be generated by certain land uses and which could be considered to be incompatible with residential development include noise, odours, chemical sprays dust etc. If these effects are not taken into account at the development control stage pressures can be exerted on land owners to modify existing land use practices. This could affect the economic viability of an established land use or industry and in some cases could result in the sterilisation of a resource.

The most appropriate means for reducing potential land use conflicts is to provide for a physical separation between incompatible land uses in the form of a buffer area. The purpose of a buffer area is to provide a sufficient setback requirement such that impacts are reduced to the extent that they do not adversely affect the adjoining land use. Clause 11.4 sets out preferred buffer areas for a variety of land uses including agriculture, animal establishments, industries, public utilities and environmentally sensitive areas.

11.4 Recommended Buffers

The buffer areas outlined in this section are intended as a guide for establishing a physical separation between residential development and certain activities and developments where potential conflicts between land uses may arise. Where an application is received for a development which is likely to result in a conflict with existing or likely future adjoining land uses, it will be the responsibility of the “encroaching development” to provide the required buffer areas.

Intensive Horticulture

Horticulture is an important industry on the North Coast, and makes a significant contribution to Lismore’s economy. Lismore City is the third highest producing Local Government Area in the region in terms of gross value of agricultural commodities. It is also the most diverse Local Government Area with respect to the type of commodities it produces.

Potential conflicts between horticulture and residential development are dependant on the nature of the horticultural operation and the type of management practices employed by the producer. Commercial operations which involve the regular or intermittent use of chemical sprays on crops have the greatest potential for conflict with adjoining residential uses.

Both the aerial and ground application of pesticides is common practice for many commercial agricultural activities. Banana producers regularly use aerially applied sprays such as misting oil and fungicide on their crops. Tree crops such as macadamias and low chill stone fruit commonly utilise ground based spray rigs such as air blast misters.

Where pesticides are applied aerially, the Pesticide and Allied Chemicals Act requires that the property owner (or person authorising the spraying of the chemicals obtain the prior written consent of all owners of dwellings or public premises whose boundaries are located within 150 metres of the spray area. Under suitable conditions most of an aerially applied spray is deposited within an area extending 150 metres down wind of the aircraft flight path. The likelihood of pesticide drift beyond the target area is influenced by:

- How quickly the pesticide evaporates;
- The method of application, type of equipment used;
- The ability of the crop or ground surface to capture the spray droplets;
- Weather conditions and air turbulence during and shortly after the application.

While buffers of 150 metres are often recommended between residential and agricultural areas, “biological buffers” offer an alternative to conventional setback requirements in that they assist in the capture of airborne pesticide droplets through the creation of a vegetation filter. Research into the behaviour of pesticide spray drift has shown that vegetation screens can prove effective barriers to spray drift where they meet the following criteria:

- (a) are of a minimum width of 30 metres;
- (b) contain random plantings of a variety of tree and shrub species of differing growth habits, as spacings of 4 to 5 metres;
- (c) include species which have long, thin and rough foliage which facilitate the more efficient capture of spray droplets (see Appendix A for suitable species).
- (d) provide a permeable barrier which allows air to pass through the buffer (at least 50% of the screen should be open space).

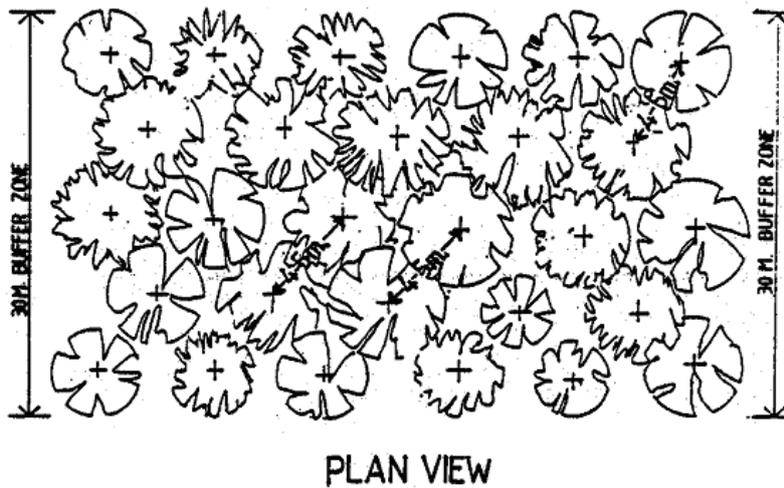
Biological buffers have additional advantages in that they:

1. create corridors and habitat areas for wildlife;
2. increase the biological diversity of the area, thus assisting with pest control;
3. favourably influence the micro-climate;
4. are aesthetically pleasing; and
5. provide opportunities for recreational use such as cycleways/walkways.

Recommended Buffer

- (a) 150 metre dwelling setback where there is no planted buffer; or
- (b) 80 metre dwelling setback, including a “biological buffer” of minimum width of 30 metres established prior to development along the boundaries adjoining horticultural land use, and established in accordance with the criteria contained in Appendix A and the figure below.

Applications for development, where biological buffer areas are proposed, shall include a detailed landscaping plan indicating the extent of the buffer area, the location and spacing of trees and shrubs and a list of tree and shrub species. The application shall also contain details concerning the proposed ownership of the buffer area and the means by which the buffer is to be maintained.



Macadamia De-husking Plants

The mechanical de-husking of macadamia nuts is considered to be ancillary to the agricultural operation of macadamia producing properties in that it forms part of the normal harvesting process of macadamias. Consequently Council does not regulate macadamia de-husking plants by means of control on siting, noise generation, or hours of operation. During harvesting operations de-husking plants may generate significant levels of noise and traffic which can have impacts on adjoining properties. Proposals for new dwellings on properties adjoining existing macadamia de-husking plants should be located as far as practical from the plant in order to minimise adverse impacts.

Recommended Buffer

300 metres for residential development.

Piggeries

Piggeries on the North Coast range from small operations of less than ten sows (approximately 100 pigs) to large intensive units housing up to 800 sows (8,000 pigs). Most piggeries operate as part of a mixed farming operation where the piggery usually subsidises other farm enterprises.

Intensive piggeries which contain 50 or more pigs (5 or more breeding sows) are classified as “animal establishments” under the Lismore Local Environmental Plan 2000 and are permissible in rural zones subject to the granting of development consent by Council.

Piggeries accommodating more than 2,000 pigs (200 sows) are classed as Designated Development under Schedule 3 of the Environmental Planning and Assessment Regulation, 2000 and will require the preparation of an Environmental Impact Statement.

Piggeries accommodating more than 200 pigs (20 sows) may also be classed as designated if they are located:

- (a) within 100 metres of a natural waterbody or wetlands; or
- (b) in an area of:
 - High watertable; or
 - Highly permeable soils; or
 - Acid sulphate, sodic or saline soils; or
- (c) on land of slopes greater than 6 degrees; or
- (d) within a drinking water catchment; or
- (e) on a floodplain; or
- (f) within 5km of a residential zone and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to effect the amenity of the neighbourhood by reason of noise, odour, dust, traffic or waste.

Under the provisions of the Pollution Control Act, 1970, piggeries containing 50 or more breeding sows require the approval of the Environment Protection Authority. The buffer area for these piggeries will be determined by the EPA on a site specific basis but in any case shall not be less than that nominated in this Plan.

The irrigation of wastewaters from piggeries also requires an annual licence under the provisions of the Clean Waters Act, 1970.

Depending on the size of the establishment, and the method of effluent disposal, piggeries are likely to have a significant impact on nearby residential development through the generation of odours. The extent of the impact will be dependent on factors such as the size of the operation, prevailing wind conditions and topography. Buffers between piggeries and residential development should be of a sufficient distance so that odours generated by piggeries do not cause an undue loss of amenity to adjoining residents. The recommended buffers apply to piggeries and associated effluent disposal areas.

<i>Recommended Buffer</i>	Primary Buffer	Secondary Buffer
Large feedlots (>500 pigs)	500 metres	1,000 metres
Small feedlots (<500 pigs)	300 metres	600 metres

Urban/village residential and rural residential development is excluded from both the primary and secondary buffer areas. Single dwellings on agricultural holdings may be permitted in the secondary buffer (but generally not in the primary buffer) if no alternative suitable location is available.

Cattle Feedlots

A cattle feedlot consists of a confined yard area with watering and feeding facilities where cattle are completely hand or mechanically fed for the purposes of beef production.

Development consent is required for all cattle feedlots of 50 or more head (except where cattle are penned for feeding, weening, dipping, temporary agistment purposes or of drought or other emergency feeding). Large feedlots containing 1,000 or more head of cattle are classed as Designated Development under Schedule 3 of the Environmental Planning and Assessment Regulation 2000 and will require the preparation of an Environmental Impact Statement.

The establishment of feedlots containing more than 400 head of cattle also require approval from the Environment Protection Authority. The EPA will establish buffer areas for these feedlots on a site specific basis but in any case the buffers shall not be less than nominated in this Plan.

Cattle feedlots can have a significant environmental impact on adjoining properties through the generation of odours, dust and noise (from stock truck movements and feed mill operations). Consequently sufficient buffering needs to be provided between feedlots and residential development to mitigate the effects of these impacts.

<i>Recommended Buffer</i>	Primary Buffer	Secondary Buffer
Large feedlots (>500 head)	500 metres	1,000 metres
Small feedlots (<500 head)	300 metres	600 metres

Urban/village residential and rural residential development is excluded from both the primary and secondary buffer areas. Single dwellings on agricultural holdings may be permitted in the secondary buffer (but generally not in the primary buffer) if no alternative suitable location is available.

Other Intensive Livestock Operations

Buffers may be required to other intensive livestock operations which are likely to impact on nearby residential development and these will be assessed individually according to the size, nature and characteristics of the operation. Generally the following minimum buffer areas should apply:

	Primary Buffer	Secondary Buffer
Dairies	300 metres	600 metres
Poultry Farms	300 metres	400 metres
Abattoirs	800 metres	1,000 metres

Urban/village residential and rural residential development is excluded from both the primary and secondary buffer areas. Single dwellings on agricultural holdings may be permitted in the secondary buffer (but generally not in the primary buffer) if no alternative suitable location is available.

Grazing Land

Residential dwelling sites adjoining grazing land shall have a minimum 30 metre setback with a minimum 5 metre wide planted buffer along the boundaries adjoining the grazing land. Infill residential development zoned 2(a), 2(f) and 2(v) are exempt from this requirement.

Cattle Dip Sites

There are 288 cattle tick dip sites in Lismore, 257 of which are operational. Cattle dipping remains an essential component of the cattle tick control program on the North Coast. The noise, dust and pesticide use associated with cattle dipping means that the operation of dip sites is generally not compatible with residential development. Even decommissioned dip sites are likely to contain chemical residues in the surrounding soil which may place a constraint on the development of surrounding land for residential purposes.

Various chemicals have been used in cattle tick dip sites over the years however arsenic, DDT and to a less extent Ethion, have been found to be the most persistent and may present a hazard to human health and/or the environment when present in high levels. The use of arsenic in dips ceased in 1955, followed by DDT in 1962. While current tickicides are not expected to be as persistent as arsenic or DDT they may still pose a harmful threat to humans and the environment if direct exposure to the chemical occurs.

The Cattle Tick Dip Site Management Committee (DIPMAC) recommends a 200 metre radius assessment zone around all cattle dip sites. While the 200 metre zone does not exclude all development within this area, the following matters must be addressed in any application for development within 200 metres of an identified dip site:

- (a) Whether the dip site is in active use, and if so whether current dip practices are likely to result in exposure of tickicides to the proposed development by any means.

- (b) Whether contaminants are likely to move off the site through spray drift, erosion of contaminated soil, stormwater run-off or in windblown dust.
- (c) Whether the proposed development site is located “upstream” or downstream” of the dip site.
- (d) Whether the dip site is securely fenced, particularly with respect to preventing children from entering the dip area. Most fencing around dip; sites are designed for stock control and would not normally be of a standard that would exclude humans.
- (e) Whether warning signs have been erected around the perimeter of the contaminated area.
- (f) The lateral extent of chemical contamination in the soil around the dip site, as determined by soil sampling techniques undertaken in accordance with EPA/DIPMAC guidelines.
- (g) Whether the proposed development could result in the use of contaminated land for purposes such as the growing of vegetables, fruit trees or raising of poultry, livestock etc.
- (h) Whether any rehabilitation measures are proposed for the dipsite (such as the relocation of contaminated soils off the site to a secure storage area).

Applications for development within the 200 metre assessment zone will be assessed on their merits taking into account the above factors, and any advice received from the Environmental Protection Authority.

Extractive Industries

Extractive industries involve the use of an extensive range of plant and equipment which creates noise and dust as material is won from the quarry face and then crushed and screened for loading and transport. In some cases blasting is necessary to extract the material. Quarrying activities are incompatible with many land uses, particularly those of a residential nature. It is therefore desirable to provide a buffer area around quarries to minimise land use conflicts and safeguard quarry resources which could be sterilised as a result of encroachment by residential land uses.

The extent of the buffer requirement depends on the size of the quarry, whether blasting is utilised, the nature of production methods, the extent of crushing and screening operations, topography and site conditions and the intensity of surrounding development and land uses. A two level buffer standard is recommended with the primary and secondary buffer as follows:

	Primary Buffer	Secondary Buffer
Large quarries (>10,000m ³ pa)	500 metres	800 metres
Medium quarries (5,000m ³ – 10,000m ³ pa)	400 metres	600 metres
Minor quarries (< 5,000m ³ pa)	300 metres	400 metres

Urban/village residential and rural residential development is excluded from both the primary and secondary buffer areas. Single dwellings on agricultural holdings may be permitted in the secondary buffer (but generally not in the primary buffer) if no alternative suitable location is available.

Sewerage Treatment Works

The operation of sewerage treatment plants involves the aerobic treatment of sewage effluent in order to achieve a quality of effluent discharge from the plant as prescribed by license issued by the DEC. The normal and efficient operation of sewerage treatment works involve the generation of some odours which may make them incompatible with certain land uses, particularly residential, commercial and public uses.

The Department of Planning recommend a buffer of at least 400 metres width around sewerage treatment works, although this may be varied to suit local conditions. Compatible uses which may

be carried out within the 400 metre buffer include agricultural and grazing uses, commercial plant nurseries, certain recreational uses and industrial development.

Recommended Buffer

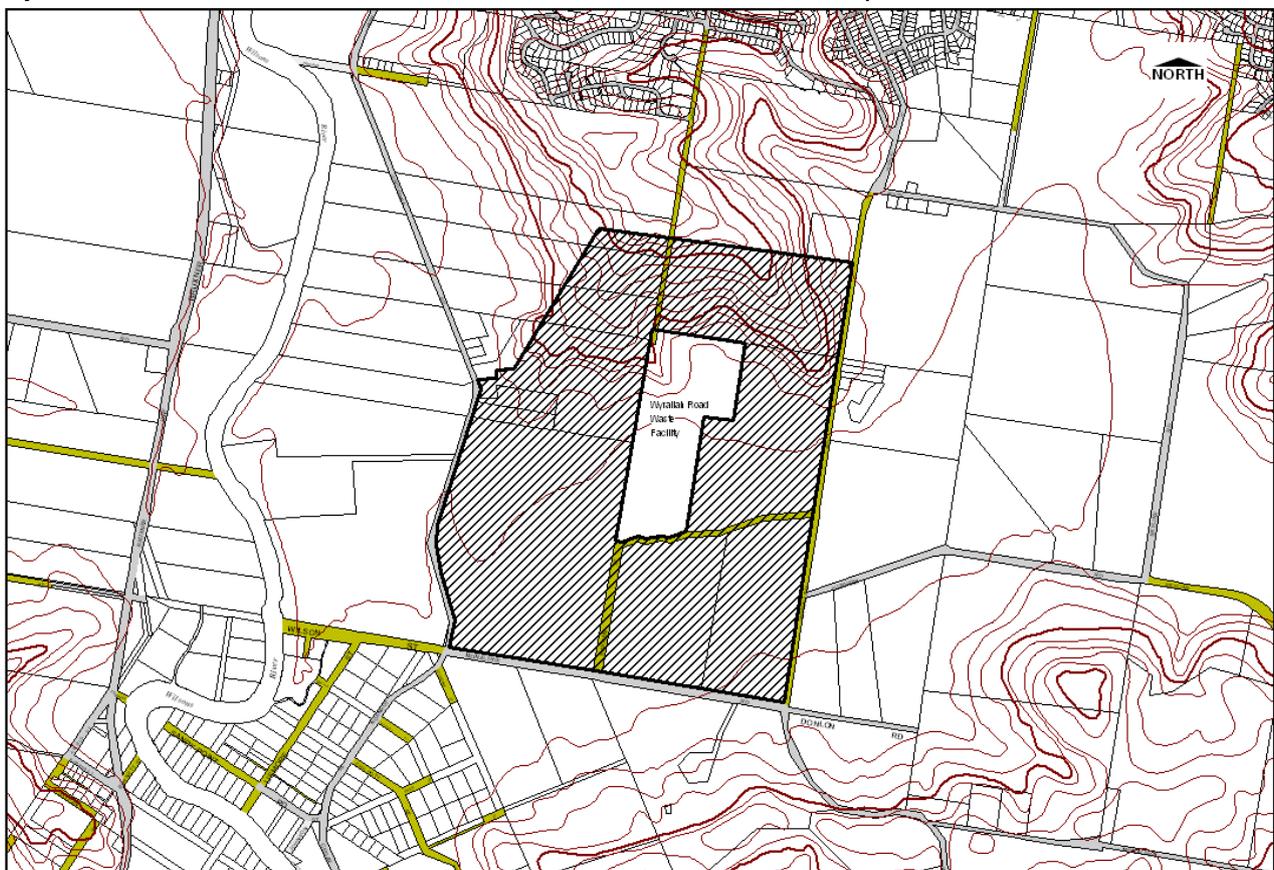
- 400 metres for residential and commercial uses, and public uses such as community facilities, schools, etc.
- 100 metres for industrial uses.

Garbage Tips

Lismore City Council operates a garbage tip at East Lismore. Garbage tips generate a number of external impacts related to their operation which include odours, dust, noise from machinery, traffic and visual impacts. Buffers between the perimeter of the working area of the tip and residential development should seek to minimise those impacts on residences while taking into account the operation characteristics of the tip and specific conditions affecting the site.

Recommended Buffer

Wyrallah Road, East Lismore – the area shown hatched on the map.



Industrial Development

Where the subdivision of land is proposed for industrial development which adjoins existing residential development (or land zoned for the purposes of residential development), a buffer shall be provided by the subdivider along the boundary with the residential land. The purpose of the buffer is to provide visual screening and assist in the reduction of impacts such as noise or other emissions from future industrial development.

Buffers should be mounded (to a minimum height of 1.5 meters) and densely planted in accordance with an approved landscaping plan. Generally Council will not accept land in buffer areas for dedication as Public Reserve. The subdivider shall provide details as to the type of industry to be adjoining the residential land, the future ownership of the buffer area and the means by which the landscaping will be maintained to Council's satisfaction.

Recommended Buffer

	Minimum	Preferred
Light Industries	10 metres	20 metres
General Industries	20 metres	40 metres

Buffer widths may be reduced where a public road provides a physical separation between residential land and industrial development, however mounding and landscaping will still be required to provide an effective visual barrier.

Potentially Hazardous or Offensive Industries

Potentially hazardous or offensive industries are defined as industries which would pose a significant risk to the biophysical environment or to human health or property or would omit a polluting discharge (including noise) in a manner which would have a significant adverse impact on the locality, if the development were to operate without employing measures (such as isolation from other development) to reduce or minimise its impact.

Industries of this nature may be located in rural areas within the 1(a) General Rural zone subject to development consent (see Chapter 3 – Industrial Development). The width of buffer areas between potentially hazardous or offensive industries and non compatible uses such as residential development will be dependent on the nature of the industry but should be of sufficient distance that adverse impacts are reduced to acceptable limits.

Recommended Buffer

1,000 metres to residential development and other non-compatible uses (a reduction may be considered depending on the nature of the industry).

Crematoriums

Crematoriums are a permissible use in the 4(a) Industrial zone but prohibited in residential zones under the Lismore LEP 2000. Where industrial areas border on residential areas an appropriate buffer is required to overcome perception issues that may be experienced by nearby residences.

Recommended Buffer

A minimum of 80 metres from existing residential development or from land that is zoned 2(a) Residential Zone, 2(f) Residential (Flood Liable) Zone or 2(v) Village Zone.

Planning for Bushfire Protection

Applications for development consent are to demonstrate compliance with the guideline “Planning for Bushfire Protection” published by the Rural Fire Service, updated from time to time, and available from the Rural Fire Service website at www.bushfire.nsw.gov.au

A list of suitable fire retardant trees and shrubs are included in Appendix B.

Rivers, Watercourses and Wetlands

Buffers between residential development and rivers, streams, watercourses and wetlands are necessary in order to maintain water quality and protect the aesthetic, recreational and habitat values of the watercourse and riparian vegetation.

Recommended Buffer

Rural dwellings (and unsewered urban development) – 50 metres from the nearest point of the dwelling house or effluent disposal trench to the bank of any river, stream or watercourse.

Urban development (sewered) – 30 metres from the nearest boundary of urban allotments to the bank of any river, stream or watercourse. This buffer may be reduced in width where effective stormwater control and a landscaped buffer is provided. A list of suitable trees and shrubs for planting in streamside buffers is included in Appendix C.

Environmental Buffers

To protect the integrity of areas which are recognised as having high environmental value (such as National Parks, Nature Reserves and 7(a) Environmental Protection Zones, as well as water catchment areas and State Forests) a sufficient setback between new residential development and the defined boundary of environmentally sensitive areas should be maintained. Adverse impacts on these areas from residential development may include predation of wildlife by domestic animals, invasion of exotic weeds, and nutrient enrichment from stormwater run-off.

Recommended Buffer

Rural dwellings – 200 metres (preferred), 100 metres (minimum)

Urban development – 20 metres from the nearest boundary of any urban development (a reduction may be considered where an appropriate animal proof fence is erected along the boundary).

Railway Lines

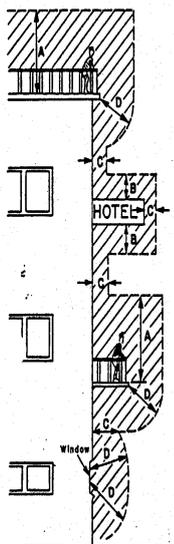
The following minimum setbacks from railway lines apply to residential dwellings:

Rural areas 50 metres
 Urban areas 20 metres (with appropriate mounding and planting)

Powerlines

The minimum allowable clearances for powerlines as set out in the Table below, are the minimum necessary when the conductor will be at its closest position to a building or structure during strong winds or high temperatures. Under these conditions the conductor may swing or sag considerably towards a building or structure compared with its normal position. Allowance should be made for any swing or sag of powerlines under these conditions.

Required minimum clearance of parts of buildings or structures from the closest position to which an electric overhead power line may swing or sag in accordance with the design of the power line.

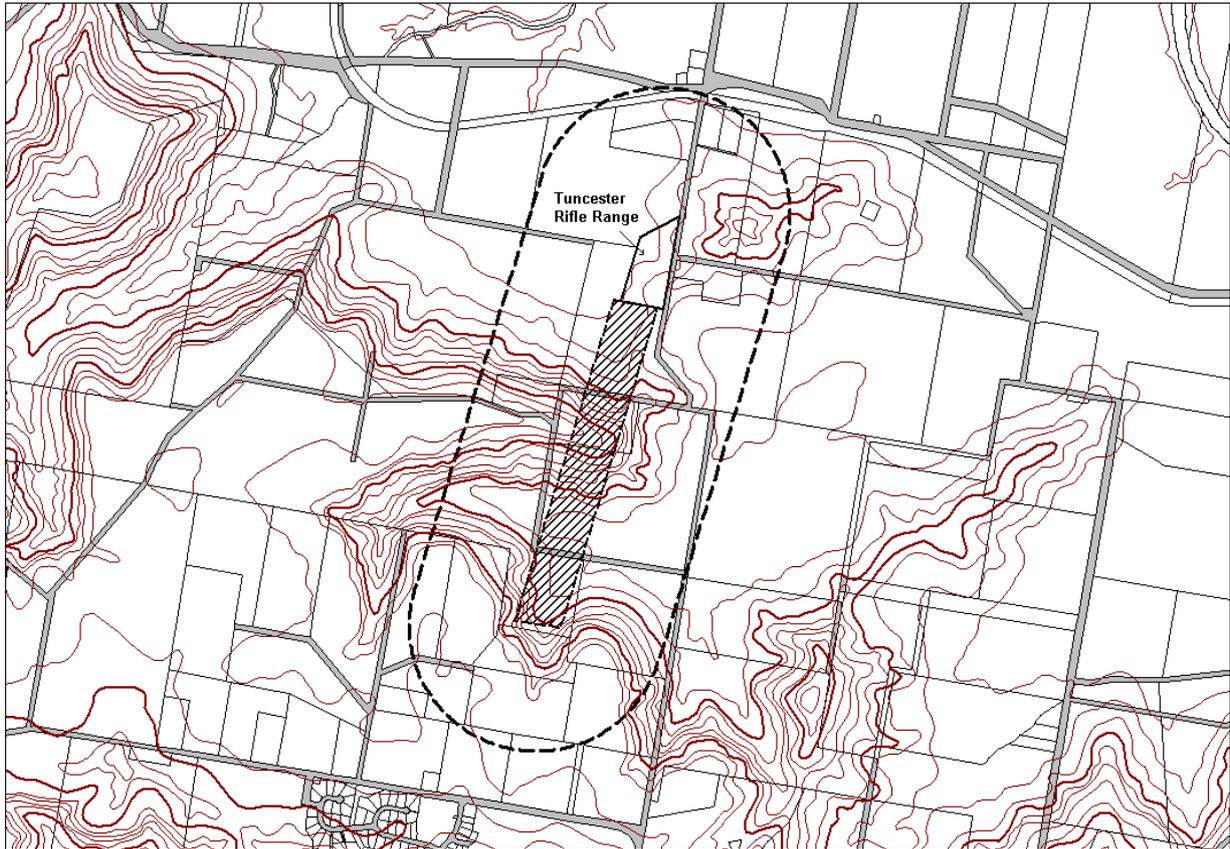


COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
		Voltage not exceeding 850 volts				
Dimension as shown in drawing		Insulated service lines	Insulated mains or bare neutral of a service line or of mains	Bare phase conductors of mains or of service lines	Voltage exceeding 650 volts but not exceeding 33 000 volts	Voltage exceeding 33 000 volts but not exceeding 132 000 volts
A	Any part of any roof, or similar structure, vertically below an overhead line and normally accessible to persons	2.7 metres vertically	2.7 metres vertically	3.7 metres vertically	4.5 metres vertically	5.5 metres vertically
B	Any part of any roof, or similar structure, vertically below an overhead line and not accessible to persons. Any advertising sign or the like	1.2 metres vertically	2.7 metres vertically	2.7 metres vertically	3.7 metres vertically	4.6 metres vertically
C	A wall, or similar structure, not normally accessible to persons. Any flag. Any advertising sign or the like	0.3 metres in any direction other than vertical	0.3 metres in any direction other than vertical	0.5 metres in any direction other than vertical	1.5 metres in any direction other than vertical	3.0 metres in any direction other than vertical
D	Any window opening. Any balcony, verandah or the like	Out of normal reach of persons	0.9 metres in any direction	1.5 metres in any direction	2.1 metres in any direction	3.0 metres in any direction
E	Any part of an outdoor wireless or outdoor television aerial or part of a staywire	1.8 metres in any direction	1.8 metres in any direction	1.8 metres in any direction	2.1 metres in any direction	3.0 metres in any direction
		The horizontal distance between the conductor closest to the aerial and a line drawn vertically through the part of the aerial closest to the power line must also comply with these clearances. Aerials must not be erected over power lines.				
F	Any part of a clothes line	1.8 metres in any direction	3.0 metres in any direction	3.0 metres in any direction	3.0 metres in any direction	3.0 metres in any direction
G	Over the carriageway of roads	5.5 metres vertically	5.5 metres vertically	5.5 metres vertically	6.7 metres vertically	6.7 metres vertically

Powerlines across private property generally require a 10 metre wide easement either side of the line to permit access to power poles for maintenance purposes. In rural areas dwellings should be located at least 20 metres clear of powerlines.

Rifle Ranges

Restrictions apply to the erection or use of any building for any purpose on land shown hatched on the following map, located immediately to the south of the rifle range in Rifle Range Road, Tuncester. In addition, no dwellings are permitted within the buffer area of 500 metres around the firing line of the pistol and small bore range, as indicatively shown by the dotted line on the map. Any other development and/or use proposed within the 500 metre buffer will be subject to Council consideration via the lodgement of a Development Application, having regard to the impact of that development on the continuing use of the rifle range.



Lismore Airport

Air space "protection" around an aerodrome is an important factor in maintaining the continued safe operation of an aerodrome. The Civil Aviation Authority defines a set Obstacle Limitation Surfaces (OLS) designed to provide a safe, efficient and predictable environment for aeroplanes in which to approach, land and takeoff. The objective of the OLS Standards is to define the air space around the aerodrome which is to be kept free of obstacles so as to enable aeroplane operations to be conducted safely. No structure or installation is to be erected within the air space nominated without specific approval of the CAA:

1. Above RL 56 metres AHD (45 metres above ground level of the airport) within an area of 4,000 metres radius from the runway as indicated in Figure 1.
2. Within the runway approach surfaces as indicated in Figures 1 and 2.

The nominated Obstacle Limitation Surfaces may be extended in the event of future extensions to the Lismore Airport runway.

Noise generated by aircraft has a differing impact upon a range of various land uses within the area surrounding airports. Accordingly, it is acknowledged by Council that certain types of development, such as residential dwellings, are not appropriate within close proximity to an airport.

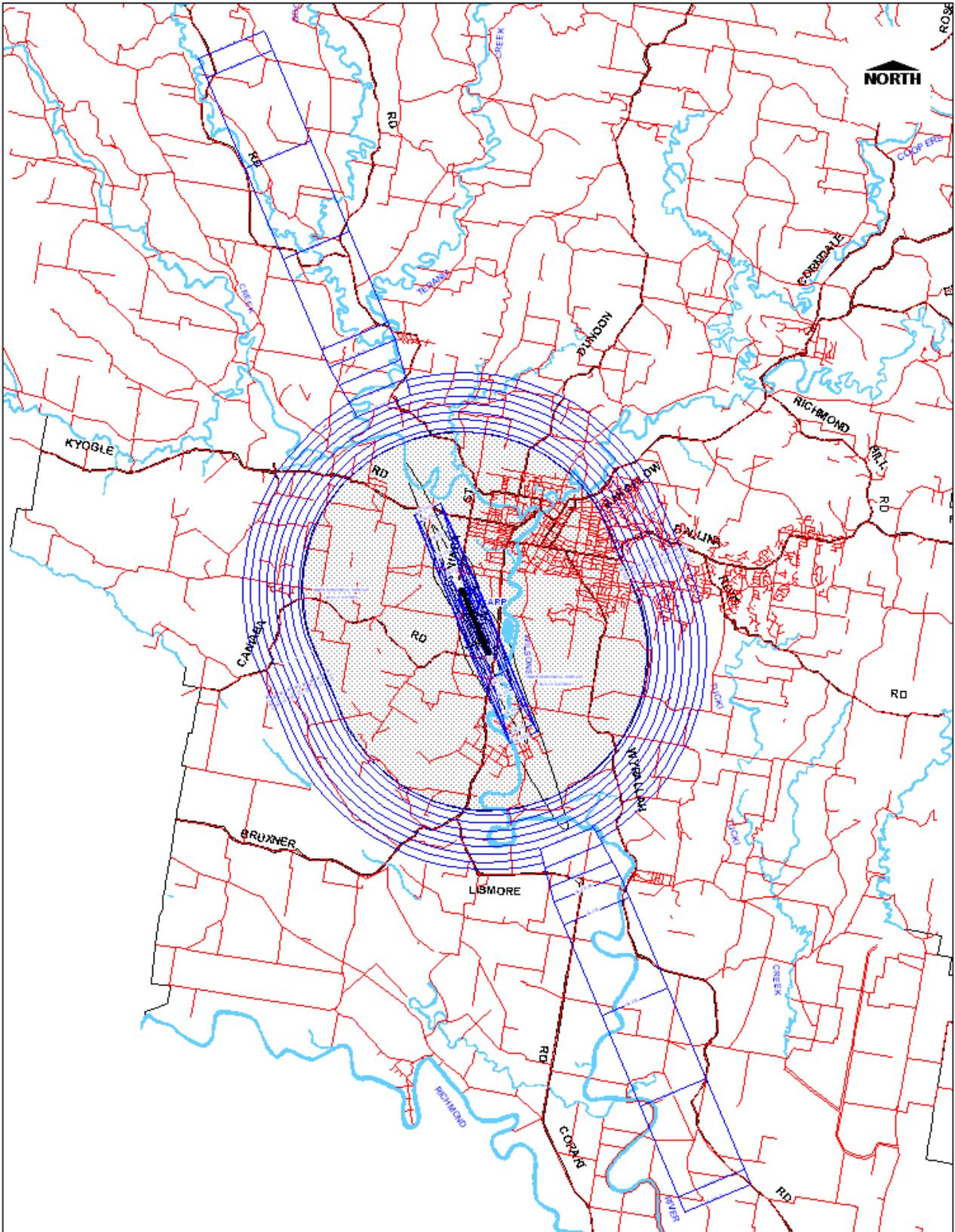
Taking this into account, in accordance with the requirements of the attached Land Use Compatibility Advice Table, Council will generally not permit any form of residential development in locations where the ANEF (Australian Noise Exposure Forecast System), as shown on Figure 3, is at a level of 20 ANEF or more.

**LAND USE COMPATIBILITY ADVICE FOR
AREAS IN THE VICINITY OF AUSTRALIAN AIRPORTS**

Building Type	ANEF Zone		
	Acceptable	Conditional	Unacceptable
Houses, home units, flats	Less than 20ANEF (note 1)	20 to 25 ANEF (note 2)	Greater than 25 ANEF
Hotels, motels, hostels	Less than 25 ANEF	25 to 30 ANEF (note 3)	Greater than 30 ANEF
Schools, Universities	Less than 20 ANEF (note 1)	20 to 25 ANEF (note 3)	Greater than 25 ANEF
Hospitals, Nursing Homes	Less than 20 ANEF (note 1)	20 to 25 ANEF ((note 3)	Greater than 25 ANEF
Public Buildings	Less than 20 ANEF (note 1)	20 to 30 ANEF (note 3)	Greater than 30 ANEF
Commercial Buildings	Less than 25 ANEF	25 to 30 ANEF (notes 3)	Greater than 35 ANEF (note 4)
Light Industrial Buildings	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Heavy Industrial Buildings	Acceptable in all ANEF zones		

Notes:

1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variations in aircraft flight paths.
2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential use. Land use authorities may consider that the incorporation of noise control features in the construction of residences is appropriate (see also Appendix A).
3. An analysis of building noise reduction requirements by an acoustic consultant should be made and any necessary noise control features included in the design of the building.
4. If the 35 ANEF contour is not at present included in ANEF drawings this contour should be determined by interpolation.
5. This table is included in the Standards Association of Australia's AS 2021-1985.



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Fig 1
Obstacle Limitation Surfaces

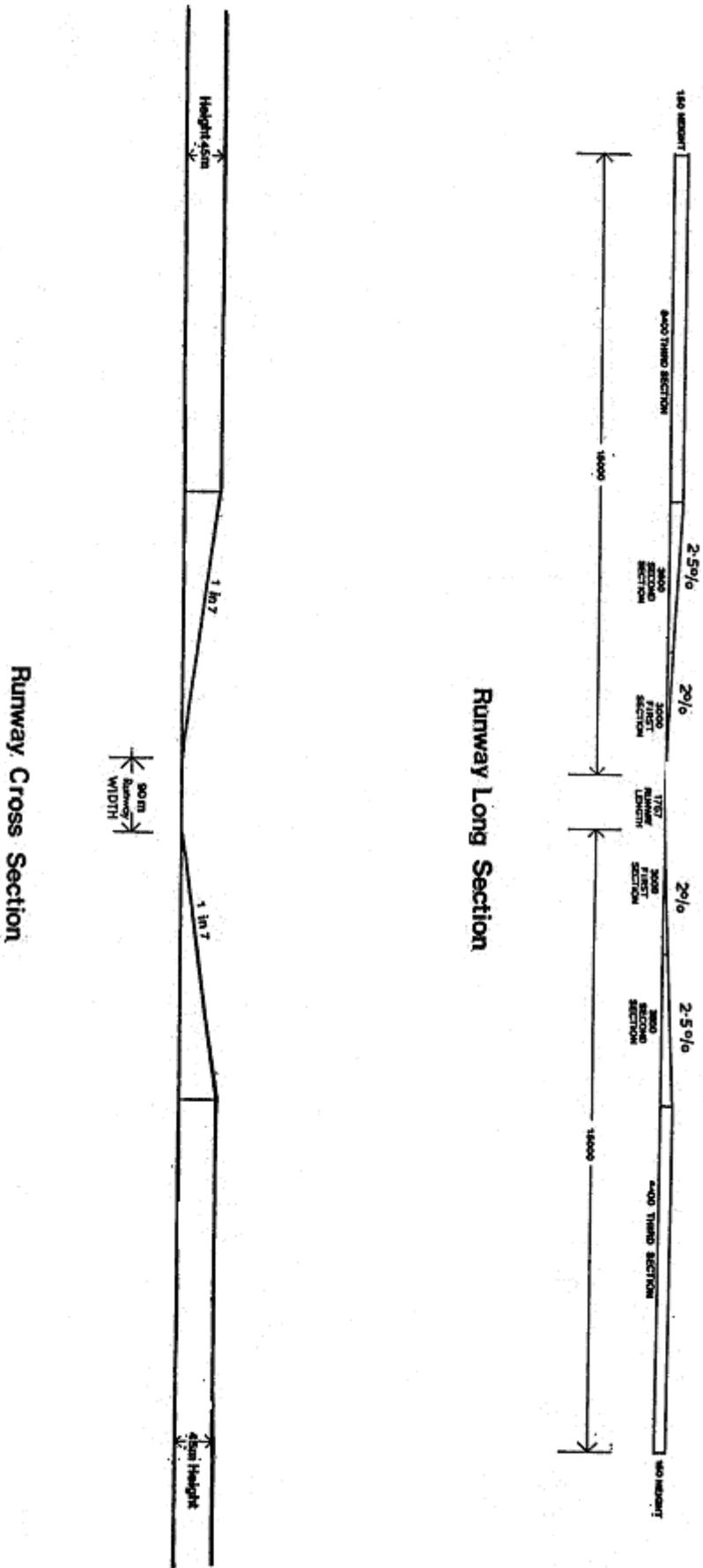


FIG 2

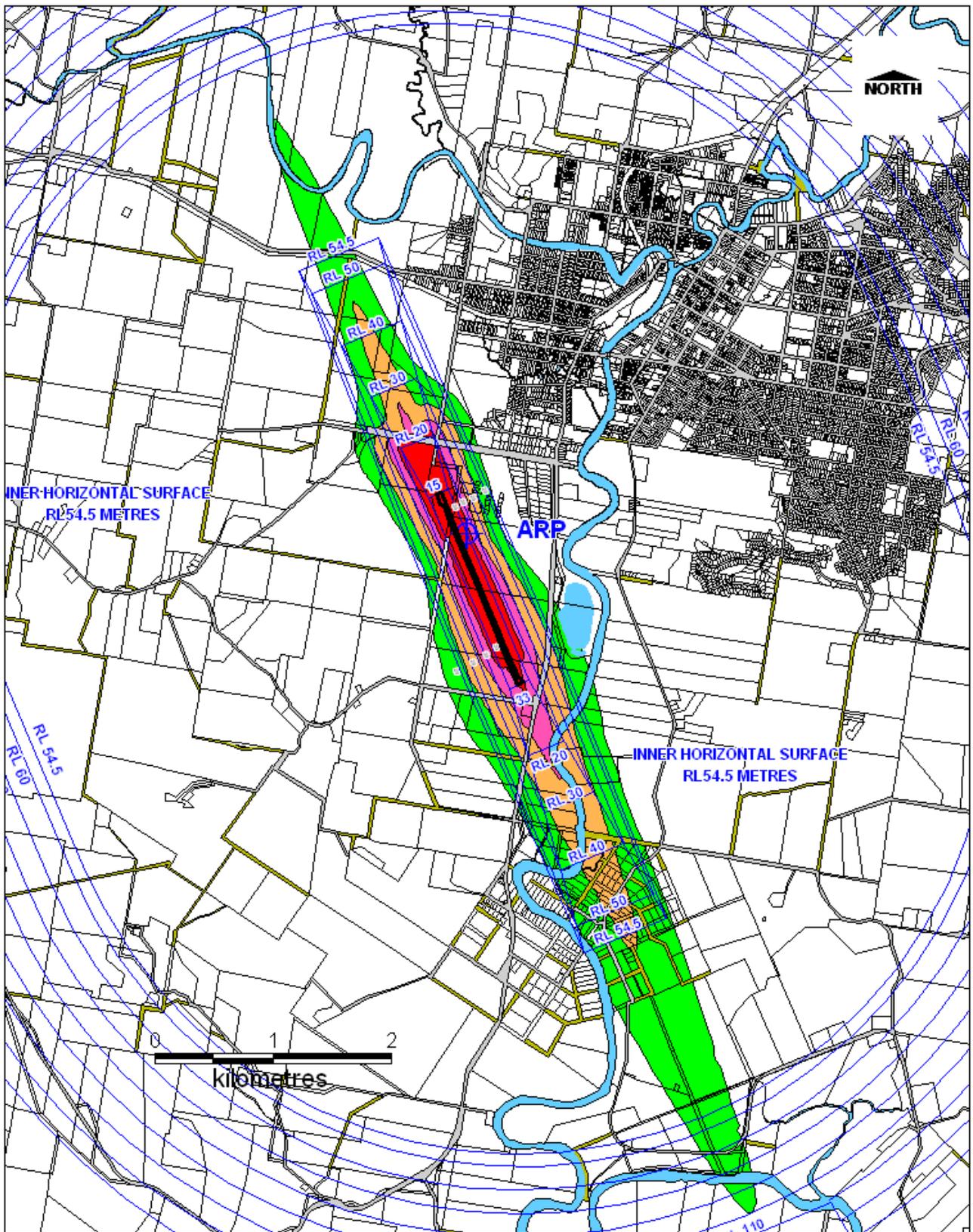


Fig 3

Airport Noise Buffers



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APPENDIX A

Trees and shrubs suitable for planting within a 'biological buffer'

Brisbane wattle	<i>Acacia fimbriata</i>
White Sally wattle	<i>Acacia floribunda</i>
Sally wattle	<i>Acacia melanoxylon</i>
River She-oak	<i>Allocasuarina cunninghamiana</i>
Swamp She-oak	<i>Allocasuarina glauca</i>
Forest She-oak	<i>Allocasuarina torulosa</i>
Bottlebrush	<i>Callistemon</i> sp. (all <i>Callistemon</i> species including cultivars)
Willow-leaf Hakea	<i>Hakea salicifolia</i>
Common Tea Tree	<i>Leptospermum flavescens</i>
Lemon-scented Tea Tree	<i>Leptospermum petersonii</i>
Fine-leaved paperbark	<i>Mealaleuca linarifolia</i>
Hoop Pine	<i>Araucaria cunninghamii</i>
Turpentine	<i>Syncarpia glomulifera</i>

Other tree and shrub species with long, thin and rough foliage which present efficient targets for the capture of spray droplets may also be suitable for planting within biological buffers.

APPENDIX B

Fire retardant trees and shrubs

Cootamundra Wattle	<i>Acacia baileyana</i>
Silver Wattle	<i>Acacia dealbata</i>
Blackwood	<i>Acacia melanoxylon</i>
Lilly Pilly	<i>Acmena smithii</i>
River Oak	<i>Allocasuarina cunninghamiana</i>
Flame Tree	<i>Brachychiton acerifolium</i>
Kurrajong	<i>Brachychiton populneus</i>
Pink Euodia	<i>Euodia elleryana</i>
Blueberry Ash	<i>Elaeocarpus reticulatus</i>
Moreton Bay Fig	<i>Ficus macrophylla</i>
Rosemary Grevillea	<i>Grevillea rosmarinifolia</i>
Tulipwood	<i>Harpullia pendula</i>
Native Frangipanni	<i>Hymenosporum flavum</i>
Brush Box	<i>Lophostemon confertus</i>
White Cedar	<i>Melia azedarach</i>
Boobiella	<i>Myoposum insulare</i>
Native Daphne	<i>Pittosporum undulatum</i>
Firewheel Tree	<i>Stenocarpus sinuatus</i>
Turpentine	<i>Syncarpia glomulifera</i>
Brush Cherry	<i>Syzygium australe</i>
Riberry	<i>Syzygium leuhmanni</i>
Coolamon	<i>Syzygium moorei</i>
Water Gum	<i>Tristaniopsis laurina</i>

Other tree and shrub species, in particular local rainforest species and native palms and treeferns, may be suitable for fire retardant purposes where they meet the following criteria:

- i) have leaves which are large, coarse, moist and fleshy;
- ii) have tight or smooth bark;
- iii) have dense foliage; and
- iv) exhibit little or no presence of volatile oils in the foliage.

APPENDIX C

Trees and Shrubs suitable for planting in streamside buffers

Brush Ironbark Wattle	<i>Acacia aulacocarpa</i>
Blackwood	<i>Acacia melanoxylon</i>
Red Apple	<i>Acmena ingens</i>
Wild Quince	<i>Alectryon subcinereus</i>
Red Ash	<i>Alphitonia excelsa</i>
Rough-leaved Elm	<i>Aphananthe philippinensis</i>
Hoop Pine	<i>Araucaria cunninghamii</i>
Bangalow Palm	<i>Archontophoenix cunninghamiana</i>
White Booyong	<i>Argyrodendron trifoliolatum</i>
Two-leaved Coogera	<i>Arytera distylis</i>
Lacebark	<i>Brachychiton discolor</i>
Flame Tree	<i>Brachychiton acerifolium</i>
Black Bean	<i>Castanospermum australe</i>
River Oak	<i>Casuarina cunninghamiana</i>
Brown Kurrajong	<i>Commersonia bartramia</i>
Palm Lilly	<i>Cordyline stricta</i>
Pepperberry Tree	<i>Cryptocarya obovate</i>
Native Tamarind	<i>Diploglottis Australis</i>
Koda	<i>Ehretia acuminata</i>
Blue Quandong	<i>Elaeocarpus grandis</i>
Hard Quandong	<i>Elaeocarpus obovatus</i>
Green-leaved Walnut	<i>Endiandra Muelleri</i>
Hairy Walnut	<i>Endiandra pubens</i>
Flooded Gum	<i>Eucalyptus grandis</i>
Forest Red Gum	<i>Eucalyptus tereticornis</i>
White Euodia	<i>Euodia microcorca</i>
Creek Sandpaper Fig	<i>Ficus coronata</i>
Sandpaper Fig	<i>Ficus fraseri</i>
Moreton Bay Fig	<i>Ficus macrophylla</i>
Small-leaved Fig	<i>Ficus obliqua</i>
Strangler Fig	<i>Ficus watkinsiana</i>
Teak	<i>Flindersia australis</i>
Cudgerie	<i>Flindersia schottiana</i>
Ball Nut	<i>Floydia praelta</i>
Cheese Tree	<i>Glochidion ferdinandi</i>
Silky Oak	<i>Grevillea robusta</i>
Guioa	<i>Guioa semiglauc</i>
Tulip Wood	<i>Harpullia pendula</i>
Native Frangipani	<i>Hymenosporum flavum</i>
Foambark	<i>Jagera pseudorhus</i>
Thin-fruited Tea Tree	<i>Leptospermum brachyandra</i>
Mat Rush	<i>Lomandra hystrix</i>
Spiny Mat Rush	<i>Lomandra longifolia</i>
Red Kamala	<i>Mallotus philippensis</i>
White Cloud Tree	<i>Melaleuca bracteata</i>
White Cedar	<i>Melia azedarach var australasica</i>
White Bolly Gum	<i>Neolitsea dealbata</i>
Holly Wood	<i>Pittosporum rhombifolium</i>
Native Daphne	<i>Pittosporum undulatum</i>
Brown pine	<i>Podocarpus elatus</i>
Celery Wood	<i>Polyscias elegans</i>
Steelwood	<i>Sarcopteryx stipata</i>
Whalebone Tree	<i>Streblus brunonianus</i>
Brush Cherry	<i>Syzygium australe</i>
Giant Water Gum	<i>Syzygium francisii</i>
Red Cedar	<i>Toona ciliata</i>
Water Gum	<i>Tristaniopsis laurina</i>
Weeping Myrtle	<i>Waterhousea floribunda</i>