



**Shade can reduce exposure to ultra violet (UV) radiation by over 90per cent, but this only occurs when shade is directly overhead. Shade does not provide 100per cent protection.**

Types of shade, such as a tree or umbrella, reduces exposure to UV radiation by up to 75per cent. That means that 25 per cent or more of UV radiation still reaches you directly from the sun or is reflected off surrounding surfaces, such as grass, water, snow and concrete. A range of SunSmart strategies should be used to reduce UV exposure.

## Types of shade

The two main types of shade are natural and built. Whatever the shade type, it should:

- Be appropriate for seasonal and climatic conditions.
- Provide a suitable barrier to direct and indirect UV radiation.
- Cast a dark shadow.
- Suit the surrounding environment.
- Utilise shade materials that
  - Offer at least 94% block-out of direct UV radiation and minimises indirect UV radiation
  - Are a close weave material
  - Are dark colours
- Provide sufficient shade to protect all people when the UV levels reaches dangerous levels (3 or above). In Queensland this is all year round.
- Use a combination of built and natural shade.

## Planning shade

In many cases shade planning and design will involve more than simply planting a tree or establishing a new shade structure. A well-considered shade project will result in shade that:

- Covers the appropriate area and falls in the right place, at the desired time of day, all year round in Queensland.
- Creates an outdoor space that is comfortable to use in all seasons.
- Is attractive, practical and environmentally friendly.

## Assessing shade needs

- There are a number of tools available to assist identifying your shade needs, planning and creating shade for outdoor spaces.

SunSmart - Shade audit

[www.sunsmart.com.au/shade-audit](http://www.sunsmart.com.au/shade-audit)

Sun safety in the shade - Queensland Government

[www.sunsafety.qld.gov.au/intheshade](http://www.sunsafety.qld.gov.au/intheshade)

## Maintaining shade

There are a number of strategies you can use to ensure your shade lasts and is of good quality. These strategies should be considered at the time of planning your shade.

- Obtain references and license details of the proposed contractor.
- Obtain a shadow diagram and ensure that the shaded area is fit for purpose.
- Agree on a maintenance plan.

### Obtain:

- Certification of the structural design by a qualified structural engineer.

## Creating and maintaining shade

- Compliance with the Building Code of Australia (if applicable).
- Certification of the UV block rating percentage of the canopy material, along with relevant test reports.
- Warranties regarding shade materials.
- Certification from the contractor that all components of the structure are fit for purpose.
- Choose dark backgrounds on walls and other vertical surfaces.
- Place mass planted shrub beds along walls to restrict access and attractiveness as a graffiti surface.
- Avoid materials that are likely to be damaged and consider ease of replacing materials.
- Engage users in the planning of shade.

### More information

- Queensland Government's Sun Safety website  
[www.health.qld.gov.au/public-health/industry-environment/environment-land-water/shade/design/vandalism/default.asp](http://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/shade/design/vandalism/default.asp)
- Crime Prevention through Environmental Design resource from Queensland Police  
[www.police.qld.gov.au/programs/cscp/safetyPublic/](http://www.police.qld.gov.au/programs/cscp/safetyPublic/)

### Tips for reducing shade costs

- Incorporate strategies at the management level so sun safety initiatives can be considered in the next budget.
- Consider lobbying for the creation of shade. Contact the Early Childhood Centre Director, the school's parent body or Principal, the local Councillors or your workplace supervisor.
- Research possible grants programs - see Queensland shade grants resource.
- Work together with other groups that share your space and pool resources.
- Approach local charity organisations that may have grants for special community projects.
- Approach local businesses who may wish to sponsor your project.

- Contact local nurseries or the council parks and gardens department, as they may have free or discounted plants available.
- Make shade attachments and window tinting part of equipment purchasing agreements.

### Creating natural shade

Natural shade can be achieved by planting trees and vines that cover pergolas. The planting of trees for protective shade is a long-term project. Adequate care and maintenance needs to be given so that the trees are able to mature and provide the required shade. There are a few important points to consider when creating natural shade.

### Benefits of natural shade

- It is a cheaper alternative and useful addition to built shade.
- It is more aesthetically pleasing.
- It is environmentally friendly.
- It absorbs harmful carbon dioxide emissions.
- Tree planting can provide an educational opportunity for children.
- It can provide a habitat for local wildlife.

### Daily shade patterns

- By understanding the shadows cast by the sun, you can ensure shade falls at the right angle at the right time, maximising the effect of natural shade.

### Location

- Ensure shade is created in areas of frequent use.
- Plant trees to complement built shade structures and increase coverage in an area.
- Keep large trees away from power lines and underground services such as water, gas and sewerage.
- Phone 'Dial Before You Dig' on 1100 for more information.

### Type of plant

- Suitable trees have broad canopies, dense foliage and sufficient clearance beneath the canopy to allow access. If trees with less dense foliage are

## Creating and maintaining shade

used, they can be planted in groups to create protective shade. Species selected should be suitable for the local soil and climate.

- Size of canopy (of a tree or group of trees) - The larger the canopy diameter, the greater the opportunity for protection from UV radiation.
- Height of the branches from the ground - Trees with high canopies cast shade well away from the base of the trees at various times of the day. Try to select shade trees which grow to a moderate height (e.g. their lowest branches will be around 2 to 3 metres from the ground)
- Avoid species that have seed pods or stone fruit, attract bees or wasps, have thorns or spikes, drop branches and leaves, are known to cause health issues (e.g. allergy, skin and respiratory irritations), or have extensive root systems that may damage surrounding pavement or create a tripping hazard.

For more information about tree planting isuitable to your climate view Appendix A - 'Tree planting information'.

Alternatively, visit the Queensland Government's Sun Safety Website

[www.sunsafety.qld.gov.au/intheshade/typesofshade.aspx](http://www.sunsafety.qld.gov.au/intheshade/typesofshade.aspx)

[/www.sunsafety.qld.gov.au/intheshade/qldclimate.aspx](http://www.sunsafety.qld.gov.au/intheshade/qldclimate.aspx)

### Maintenance

- The maintenance of the trees you plant is just as important as choosing the right tree for the right place. A bit of effort in the early stages of the tree growth will make trees independent and reduce the chance of having to replant. Many parts of Queensland experience drought conditions, so to ensure the longevity of natural shade ensure:
  - Choose native plants that are suitable for your area which also retain water.
  - Adopt water-saving approaches.
  - Mulching - this reduces moisture loss and controls weed growth. Use newspaper, straw or gravel for about 1-2 metres around the plant

- leave a small gap around stem to prevent rotting. Fertilising - promotes growth and protects from insects and disease.

- Tree guards - check constantly for any damage that might be caused by guards and remove once trees are established.
- Weed control - a weed free circle of 1-2 metres for 2 years helps establish the trees.
- Contact Greening Australia for information about planting tips.
- You can also receive free trees, seedlings and advice about natives by contacting your local council.

*Handy hint: Did you know that rate payers may be eligible for free plants or trees in some jurisdictions? Contact your local council to see whether your organisation can access free plants or trees to create natural shade.*

## Creating built shade

Built shade can be connected onto existing buildings and structures or can stand-alone. There are a few important points to consider when creating built shade.

### Benefits of built shade

- The shade cast is more predictable and provides reliable coverage.
- It can provide protection from the rain.
- Some types can be erected easily and transported for use in many locations.

### Permanent

- Long lasting structures able to withstand most weather conditions.
- Recommended for children's playgrounds, entry zones to buildings, pathways, service zones and other public congregation areas.

### Demountable/flexible shading devices

- Shade structure that are easy to set up, take down, be extended or contracted depending on circumstances. Examples include canvas awnings, louvers, shade sails.

## Portable

- This provides options for shade where it may not be readily available. Examples include umbrellas, shelters and small tents.
- Although inexpensive, the protection provided from UV radiation is often limited due to their size and should be used in conjunction with other sun protective methods – Slip, Slop, Slap, Seek and Slide.

## Absorption and Transmission of UV radiation:

The table below relates to the amount of effective UV radiation transmitted and absorbed by a material.

Ultraviolet Protection Factor	Protection Category	%UVR Absorbed	%UVR Transmitted
10	Moderate protection	90	10
20	High protection	95	5
30	Very high protection	96.7	3.3
40	Very high protection	97.5	2.5
50	Maximum protection	99	1

Source: Creating Shade in Public Places document

## For more information

- Cancer Council Queensland [www.cancerqld.org.au](http://www.cancerqld.org.au)
- Cancer Council 13 11 20
- Cancer Council Australia [www.cancer.org.au](http://www.cancer.org.au)
- Queensland Government Sun Safety website [www.sunsafety.qld.gov.au](http://www.sunsafety.qld.gov.au)

## References

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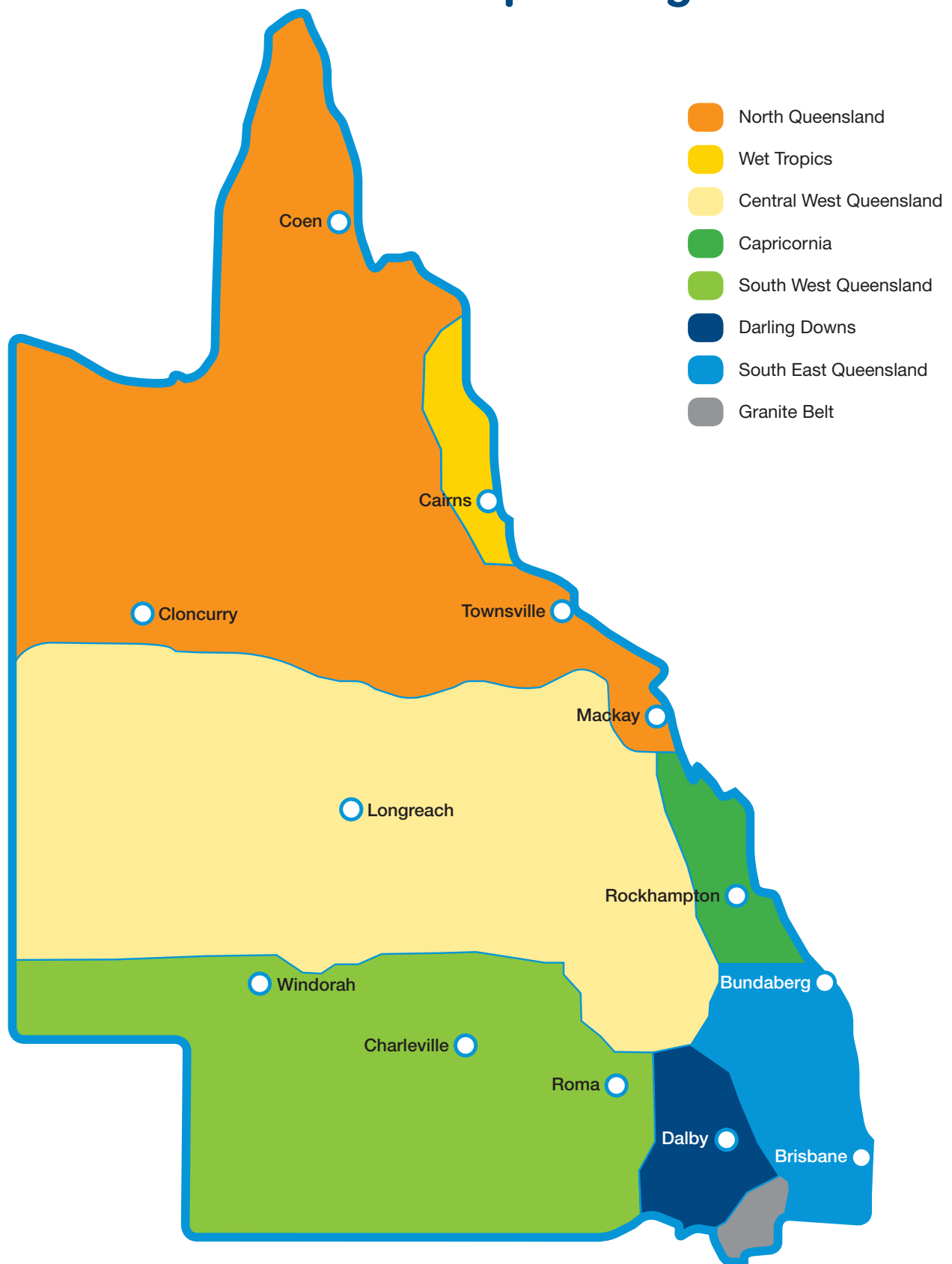
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## Acknowledgements

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## Appendix A: Tree planting information



## North Queensland

Botanical Name	Common Name	Height (M) Width (M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Melaleuca leucadendra	Broad-leaved tea tree	20 x 5		R	HL	MW			Fast growing paperbark flowers white
Melaleuca Argentea	Silver tea tree	20 x 5			HL	M			Fast growing paperbark white flower, silver grey foliage
Pongamia pinnata	Pongamia	15 x 5	D	R	HL	M			Masses of mauve flowers
Eucalyptus papuana	Ghost gum	20 x 10		R	L		V	A	Viable sized tree smooth white bark
Ficus virens	Figwood	30 x 20	D	T	HL	M			Deciduous in spring, bronze new foliage
Pleigynium timorense	Tulip plum	20 x 5	D	T	L	MW	V		Tasty red/purple plums
Nauclea orientalis	Leichhardt tree	20 x 15	D	T	HL	MW			Layered horizontal branches
Eucalyptus raveretiana	Black iron box	20 x 10			L				Long thin discolourous leaves, rare
Cassia brewsteri	Brewster's cassia	8 x 5	D	R	H		V		Masses of yellow orange flowers

## Wet Tropics

Botanical Name	Common Name	Height (M) Width (M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Melicope elleryana	Euodia	8 x 3		T	HL	WM	V		Pink flowers, fast growing
Ficus benjamina	Weeping fig	30 x 30			HL	MW	V		Massive very effective shade
Flindersia brayleyana	Queensland Maple	30 x 10			H	M			Very fast masses of white flowers
Melaleuca leucadendra	Broad leaved tea tree	20 x 5		R	HL	MW			Fast growing paperbark, white flowers
Alphitonia whitei	Red ash	10 x 5		R	H	M			Rusty new leaves, masses of creamy white flowers
Buckinghamia celsissima	Spotted silky oak	10 x 5			L	M			Masses of 20cm white flower spikes
Terminalia sericocarpa	Damson	30 x 10		T		M			Dense canopy
Syzygium tierneyanum	Bamaga satin ash	25 x 15		T	L	MW			Large edible fruits, glossy leaves
Eucalyptus tessellaris	Carbeen	25 x 5		R	HL	M	V		Light green weeping leaves, smooth white bark or upper trunk

## Central West Queensland

Botanical Name	Common Name	Height (M) Width (M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Cassia brewsteri	Brewster's cassia	8 x 5	D	R	H		V		Masses of orange yellow flowers
Eucalyptus argophloia	Western white gum	25 x 10		R	H	M	V		Fibrous bark on trunk, smooth white branches
Eucalyptus argophloia	Mountain coolibah	20 x 10		R	H	M	V		Fibrous bark on trunk, smooth branches
Eucalyptus coolabah	Coolibah	25 x 10		R	H	M	V		Variable sized tree often gnarled appearance
Eucalyptus papuana	Ghost gum	20 x 10		R	L		V		Variable sized tree smooth white bark
Ficus macrocarpa var. hillii	Fig	20 x 15		R	HL	M			Large spreading fig
Lysiphyllum hookeri	Hooker's bauhinia	10 x 8	D	R	H	M	V		White/red unusual flowers, slow growing
Brachychiton rupestris	Narrow leaved bottle tree	15 x 5	D	R	H		V		Stately bottle shaped trunk, good fodder tree
Acacia macradenia	Zig zag wattle	5 x 4		R	LH		V		Drooping branches masses of long spikes of fluffy yellow flowers



## Capricornia

Botanical Name	Common Name	Height (M) Width(M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Melaleuca leucadendra	Broad leaved tea tree	20 x 5		R	HL	MW			Fast growing paperbark, white flowers
Eucalyptus tereticornis	Forest red gum	30 x 10		R	HL	M	V		Tall tree with irregular blotchy smooth bark
Eucalyptus papuana	Ghost gum	20 x 10		R	L		V		Variable sized tree, smooth white bark
Ficus virens	Figwood	30 x 20	D	T	HL	M			Deciduous in spring, bronze new foliage
Pleigynium timorense	Tulip plum	20 x 5	D	T	L	MW	V		Tasty red/purple plums
Nauclea orientalis	Leichhardt tree	20 x 15	D	T	HL	MW			Layered horizontal branches
Cupaniopsis anacardioides	Green leaved tamarind	20 x 8		T	HL	M	V		Heavy shade ornamental seed and fruit
Rhodospaera rhodanthema	Tulip satin wood	25 x 10		R	H	M	V		Large sprays of small red flowers
Eucalyptus raveretiana	Black iron box	20 x 10			L				Long thin discolourless leaves rare
Cassia brewsteri	Brewster's cassia	8 x 5	D	R	H		V		Masses of yellow orange flowers

## South West Queensland

Botanical Name	Common Name	Height (M) Width (M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Casuarina cristata	Belah	20 x 5		R	H	M	V	A	Quick growth, dense crown, standby fodder
Eucalyptus argophloia	Western white gum	25 x 10		R	H	M	V		Fibrous bark on trunk, smooth branches
Eucalyptus molluccana	Grey box	20 x 8		R	HL	M	V	A	Fast growing, white flowers, koala food
Eucalyptus ochrophloia	Yapunya	15 x 5		R	H	M	V	A	Weeping branches, rough yellow bark
Eucalyptus sideroxylon	Red ironbark	20 x 10		R	H		V		Poor soils to heavy clay red to cream flowers
Brachychiton rupestris	Narrow leaved bottle tree	15 x 5	D	R	H		V		Stately bottle shaped trunk, good fodder tree
Callitris columellaris var campestris	White cypress pine	20 x 5		R	L		V		Conical tree spreading out to good shade when older
Melaleuca lanceolata	Moonah	5 x 3		R	HL	MW	V		White flower in Spring or Summer
Acacia macradenia	Zig zag wattle	5 x 4		R	HL		V		Drooping branches, masses of long spikes of fluffy yellow flowers

## Darling Downs

Botanical Name	Common Name	Height (M) Width(M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Acacia pendula	Myall	6 x 4		R	H	M	V		Weeping silver grey foliage standby fodder
Acacia macradenia	Zig zag wattle	5 x 4		R	L		V		Drooping branches, masses of long spikes of fluffy yellow flowers
Brachychiton populneus	Kurrajong	20 x 5		R	H	M	V		Fast growing dense crown profuse cream flowers
Callistemon viminalis	Weeping bottle brush	8 x 5		R	HL	MW			Weeping with brilliant red flowers
Eucalyptus camaldulensis	Red river gum	30 x 10		R	HL	MW	V		Large spreading tree with smooth light grey bark
Casuarina cunninghamiana	River she oak	30 x 10		R	HL	MW	V		Fine foliage, dense crown fast growing
Eucalyptus sideroxylon	Red ironbark	30 x 10		R	H		V		Poor soils to heavy clay, red to cream flowers
Grevillea robusta	Southern silky oak	25 x 10		R	HL	M	V		Semi deciduous, fern like leaves, golden flowers
Eucalyptus melliodora	Yellow box	25 x 10		R	H	MW	V		Spreading crown short trunk white flowers
Ficus macrophylla	Figwood	30 x 30		R	HL	M	V		Spreading shade tree, large flowing buttresses

## South East Queensland

Botanical Name	Common Name	Height (M) Width (M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Melaleuca bracteata	River tea tree	8 x 5		R	HL	MW	V		Small leaves, profuse white flowers, fast growing
Melaleuca quinquenervia	Broad leaved tea tree	20 x 5		R	HL	MW			Dense rounded crown, silvery new growth
Eucalyptus microcorys	Tallow wood	40 x 15		R	H	M	V		Large spreading tree when open grown, koala food
Ficus obliqua	figwood	30 x 30		T	HL	M			Massive spreading branches, small leaves
Harpullia pendula	Tulipwood	20 x 15		T	HL	M			Large glossy leaves, yellow flowers and showy seeds
Cupaniopsis anacardioides	Green leaved tamarind	20 x 8		T	HL	M	V		Heavy shade, ornamental seeds and fruit
Brachychiton acerifolius	Flame kurrajong	15 x 8	D	R	H	M	V		Masses of red flowers, frost tender when young
Lophostemon confertus	Brush box	30 x 15		R	HL	M	V		Dense dark spreading crown when open grown
Flindersia australis	Crow's ash	30 x 15		R	H	M	V		Heavy shade, semi- deciduous, white flowers
Rhodospaera rhodanthema	Tulip satinwood	25 x 10		R	H	M	V		Large sprays of small red flowers
Acacia melanoxylon	Blackwood	25 x 10		R	H	M	V		Variable – large shady shrub to large tree

## Granite Belt

Botanical Name	Common Name	Height (M) Width (M)	Deciduous (D)	Frost Tender (T) Resistant (R)	Soils Heavy (clay) (H) Light (Sandy) (L)	Tolerates Moist (M) Water logged soils (W)	Very drought resistant (V)	Alkaline Soil (A)	Notes
Eucalyptus albens	White box	25 x 10		R	H	M	V		Large spreading tree, white bark
Eucalyptus melliodora	Yellow box	25 x 10		R	H	MW			Spreading crown short trunk white flowers
Eucalyptus scoparia	Wallangarra white gum	12 x 5		R	L		V		Will grow on thin granite soils
Acacia fimbriata	Brisbane wattle	5 x 4		R	HL		V		Fast growing, profuse yellow flowers
Acacia nerifolia	Peachey wattle	12 x 4		R	L		V		Fast growing, dense pale foliage
Callistemon viminalis	Weeping bottlebrush	8 x 5		R	HL	MW			Weeping branches with brilliant red flowers
Brachychiton populneus	Kurrajong	20 x 5		R	H	M	V		Fast growing dense crown profuse cream flowers
Melaleuca alternifolia	Narrow leaved paperbark	7 x 4		R	HL	MW	V		Dense canopy of fine leaves, white flowers, source of tea tree oil

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