Outdoor Structures Australia

(07) 5462 4255

Quality, Durability, Sustainability and Delivery **- that's our mission.**

Outdoor Structures Australia (OSA) is a division of Wilson Timbers and as a team we are committed to quality, sustainable practices, delivering WOW with service and long term happy customers through durability and performance.

OSA is a supplier of high quality, durable and sustainable Australian hardwood products to councils and the construction industry throughout Australia. Excelling in specialist requirements and innovative timber designs.

OSA supplies exceptional quality hardwoods and treated timbers for bridges, boardwalks, outdoor furniture, landscaping, traffic bollards, fencing, decking, shelters and more.

Boardwalks / Deckwood

Hardwood Bollards

Single Eclipse Bollard

Post and Rail

Shore Bollard

Standard Bollard

Lindsay Park Shelter 10m x 6m

Park Furnture

Double Eclipse Bollard

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HARDWOOD BOLLARDS

Class1(25 years+)

Australian hardwood

Available pre oiled

OSA Quality assured

Custom designs

Outdoor Structures Australia's (OSA) "Heavy Duty" range of traffic Bollards are complemented with matching traffic barriers and post and rail fencing. OSA is passionate about producing high quality weather exposed timber bollards suitable for the extreme Australian climate. Our market leading expertise in timber is carried through into our traffic barriers which are widely purchased by Queensland local and state government agencies.

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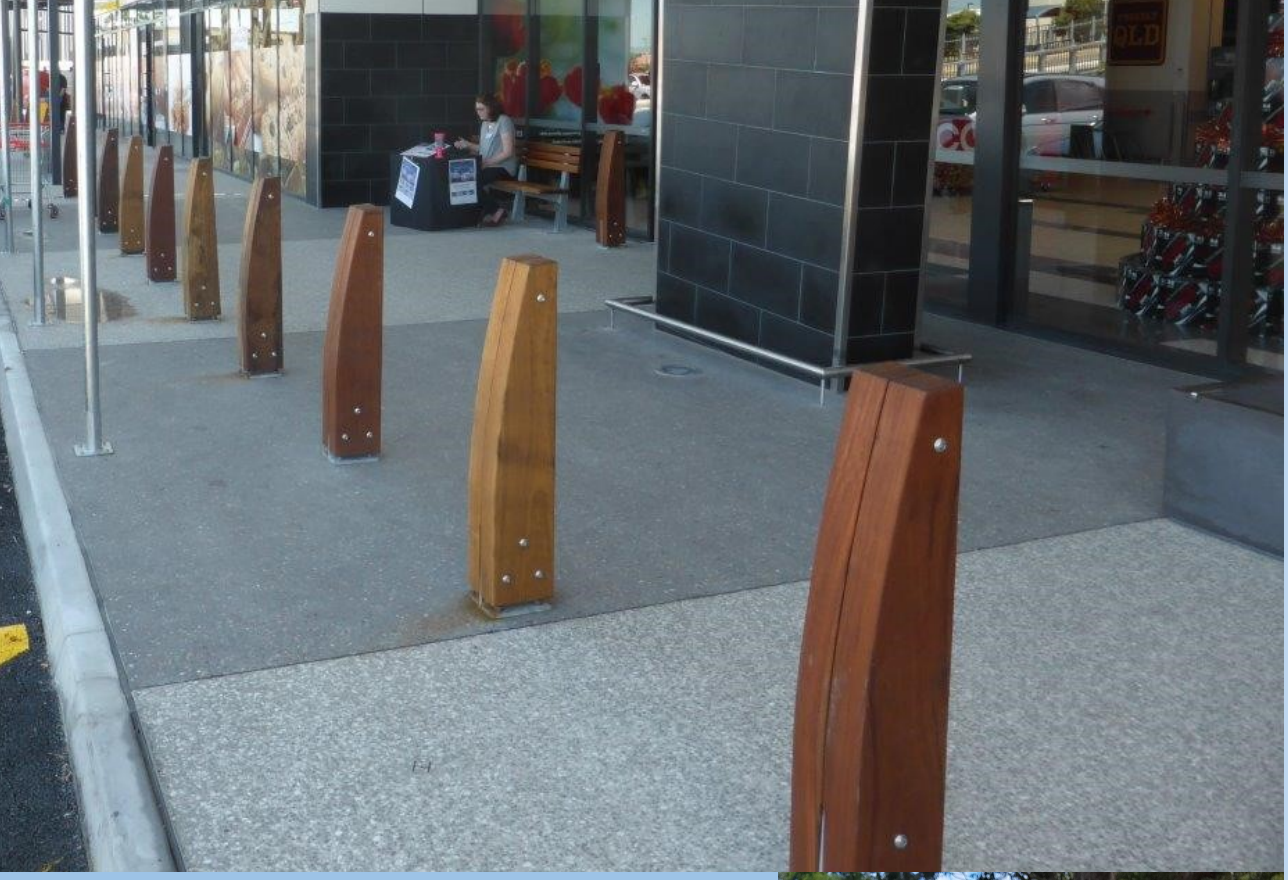
Eclipse Bollards



Outdoor Structures Australia's (OSA) Eclipse architectural traffic Bollards are one our most popular bollards for inner city and cosmopolitan applications. Here at OSA we are passionate about producing sustainable, high quality, durable timber bollards suitable for our extreme Australian climate. The Eclipse bollards are available in the single Eclipse to the right or the double Eclipse as above. Suitable for both in ground or bolt down applications.

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The Shore bollard

The Shore Bollards are a beautiful collective of Australian hardwood timbers with a life span of 40 years plus. Reinforced with a 12mm galvanized or 316 stainlees steel backbone the Shore bollards are designed to be extremely strong, easy to install and will complement any urban streetscape.

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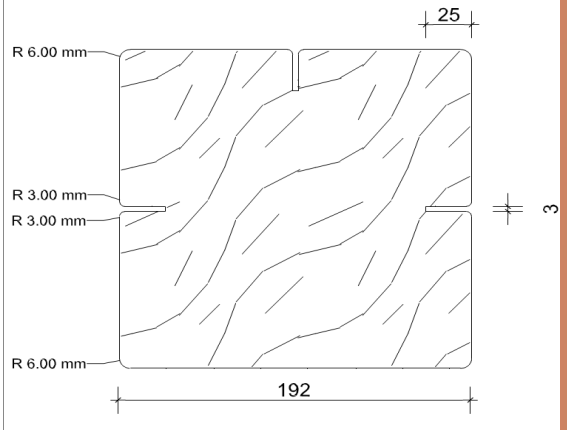
The "Pioneer" Post

Pioneer Posts are manufactured from durability class 1 timbers and designed to stand the test of time 25 years +. The unique profile is designed with expansion joints which work in the same manner as concrete to eliminate unsightly cracks as the timber dries out. A stainless steel cap is optional and can be fitted to stop water penetration into the end grain to ensure longevity. Pioneer bollards are extremely strong and suitable as ram raid barriers.

- **Unique profile reduces cracking**
- **Sustainably sourced**
- **Extremely strong**



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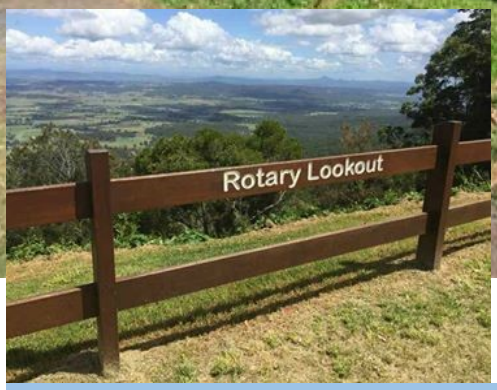
POST AND RAIL FENCING



Durability class 1 Australian hardwood (25 years +)
Available pre-oiled
OSA Quality assured
Custom designs

Outdoor Structures Australia's (OSA) "Heavy Duty" post and rail fences and bollards are made tough and easy to assemble. OSA is passionate about producing high quality weather exposed post and rail timber fences and bollards suitable for the extreme Australian climate.

We guarantee our post and rail fences are accurately and neatly machined to the highest standard and we deliver on time.

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Custom Sign Engraving

Outdoor Structures Australia (OSA) is dedicated to providing beautiful, durable and sustainable timber sign solutions to any park setting or urban landscape. With our C.N.C router machine and our experienced CAD operator we can custom build and manufacture any quality timber signs, bollards, post and rail fencing to your specifications. OSA is passionate about producing high quality weather exposed timber signs suitable for the extreme Australian climate.

Our market leading expertise in timber is carried throughout our entire product range which are widely purchased by local and state government agencies Australia wide.

Outdoor Structures Australia *outlasts and outperforms*

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BLAXLAND BBQ SETTING

Class 1 (25years+) Australian hardwood Available pre-oiled OSA Quality assured Custom designs

Outdoor Structures Australia's (OSA) "Heavy Duty" range of park furniture is made tough and heavy. OSA is passionate about producing high quality weather exposed timber furniture suitable for the extreme Australian climate. A favorite with national parks our Blaxland BBQ tables have proven the test of time. Blaxland BBQ tables are supplied flat pack, pre-drilled and ready to assemble.

OSA specialise in pre- fabricated Australian hardwood products and we welcome your custom designs.

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FLINDERS STREET FURNITURE

PROVEN DURABILTY

SUSTAINABLE HARDWOOD

GALVANISED FRAME

EASY INSTALLATION

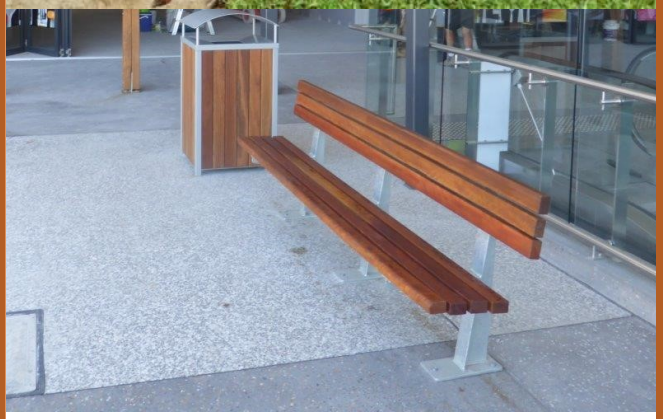
WHEEL CHAIR ACCESS

PRE-OILED

The simple and economic design of the Flinders range , makes the perfect solution for your outdoor furniture needs.

The Flinders range is available in rustic rough sawn or dressed appearance.

Flat packed and pre-oiled your Flinders setting is easy and fast to install and will be the centre piece to your outdoor area in no time



- The Flinders BBQ table and bench seats are available in heavy duty rustic finish or dressed finish as above.
- The steel frame can be supplied galvanised or powder coated to a custom colour.

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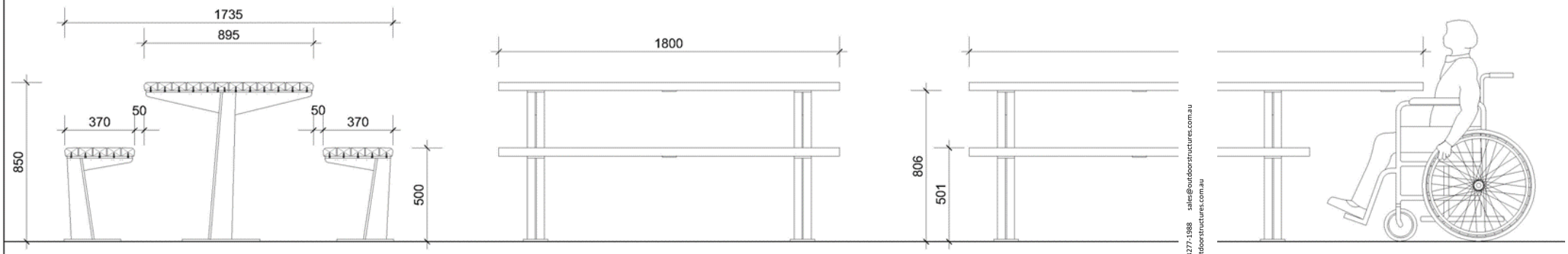

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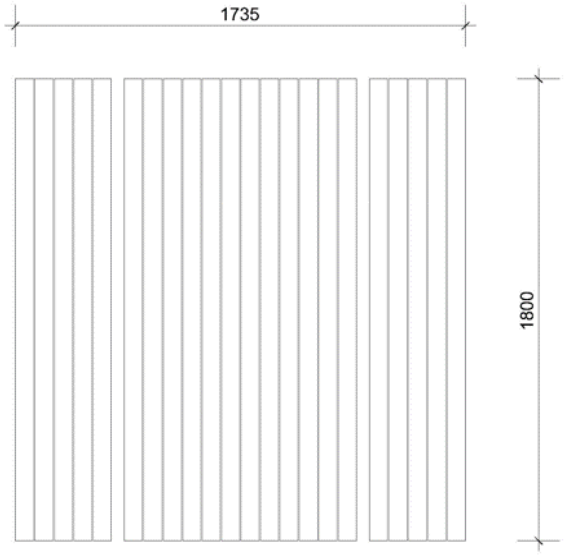

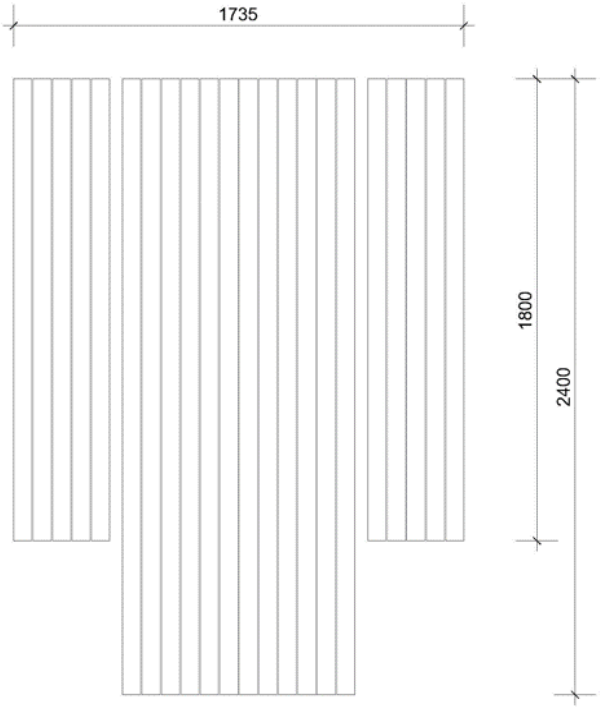

Outdoor Structures Australia
Practical solutions that enhance community design projects

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Date: MARCH 2012	DIMENSIONS AND GENERAL LAYOUT OF FLINDERS BARBECUE TABLE		Descriptic
Drawn: E.M.S.			
Approved	Scale: N.T.S.	Job No: N/A	Drawing No: BBQFSD

Lindsay Shelter

- **Fully Pre-cut**
- **Timber or steel post options**
- **Detailed for long life**
- **Customized options available**

Outdoor Structures Australia (OSA) has developed a range of simple but effective skillion roofed shelters called the Lindsay range.

The basic shelter is available in standard sizes of 5x6m, 6x6m and 10x6m. The roof frame can be supported on either our Pioneer Post (timber) or on galvanized steel.

The timber post can be directly installed in the ground for lowest cost yet it is rated with a design life of 35 years. Many galvanized posts would not reach anything like this time span. Alternatively, the pioneer post can be mounted in a heavy galvanized post support. The galvanized steel post option can be supplied powder coated giving a wide range of optional colours.

This design gives flexibility in the way that multiple shelters can be linked together. An example is seen in the main photo where three shelters are combined to create a performance stage. This shelter uses the Pioneer Post.

The H3 treated pine used in the roof structure is supplied standard with a coat of Jarrah Tanacoat penetrating oil. Painting is available at an extra cost. Pioneer posts have a sealing coat of Tanacoat Golden Oak.

The Lindsay shelter offers wide flexibility in combination and size. As an aid to designers a dynamic CAD block is available from the Designers' Tools section of our website. With the click of a mouse you can choose any view and any post option for our standard shelters. Remember to save this file to your computer first.

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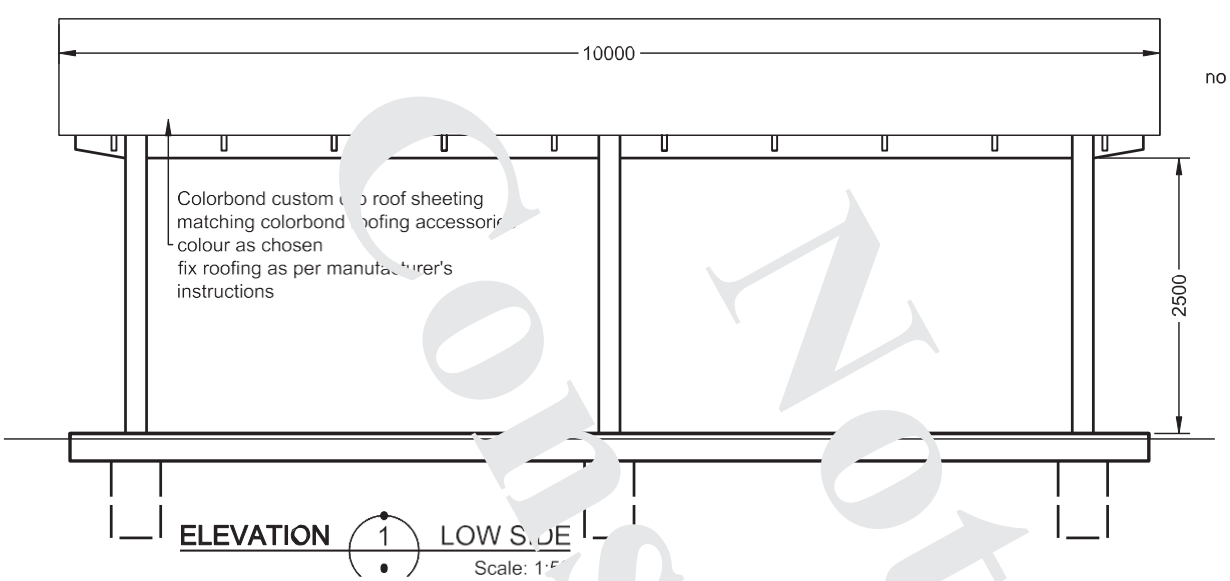
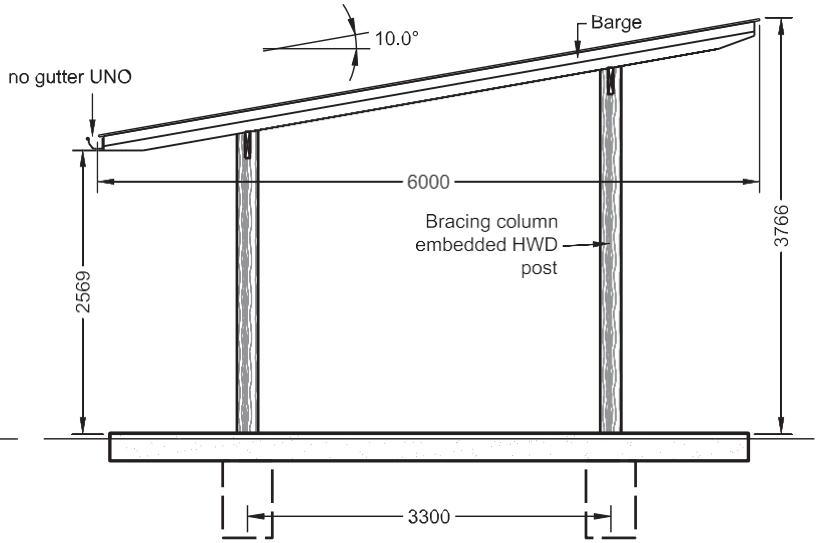
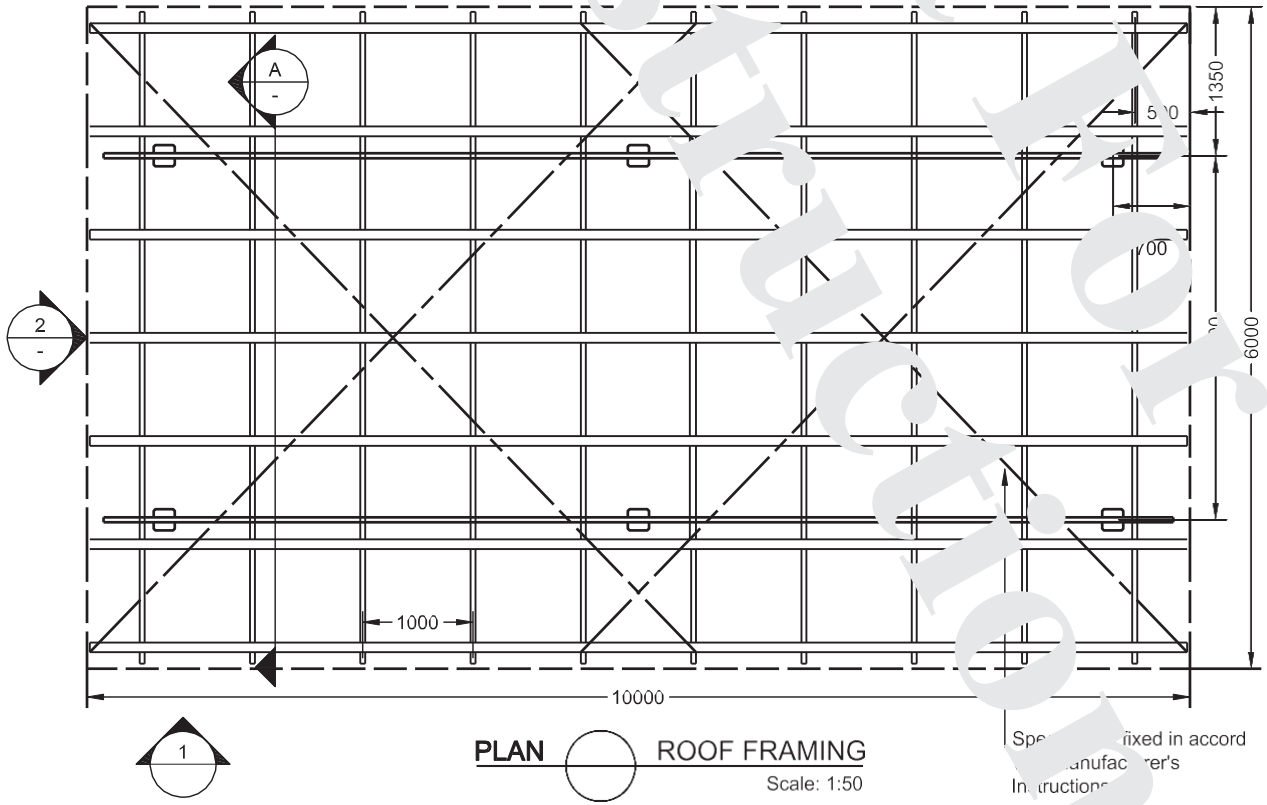


ELEVATION 1 LOW SIDE
Scale: 1:5



ELEVATION 2 END
Scale: 1:50

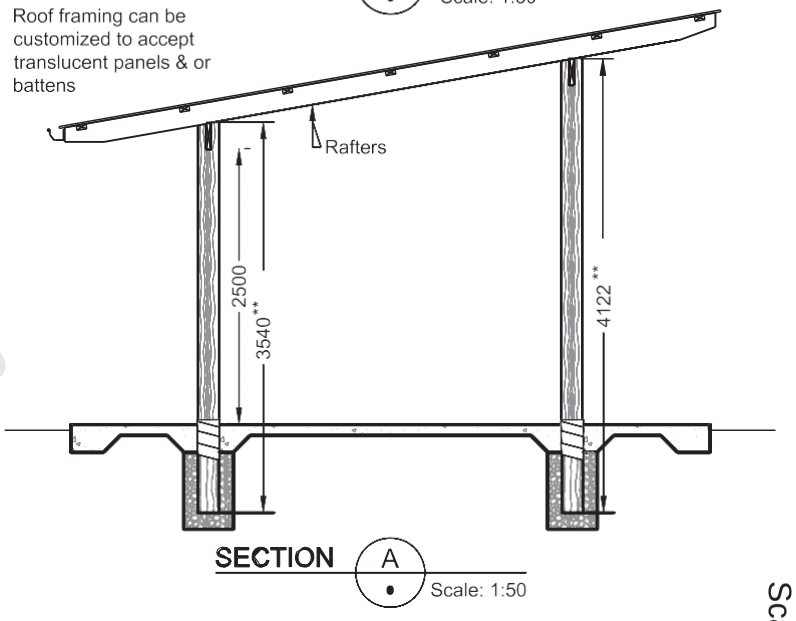


1

PLAN ROOF FRAMING
Scale: 1:50

Spe fixed in accord
anufac er's
In tructions

Roof framing can be
customized to accept
translucent panels & or
battens

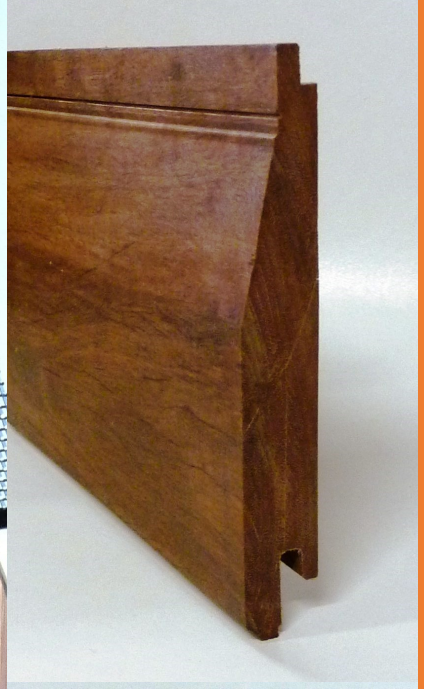


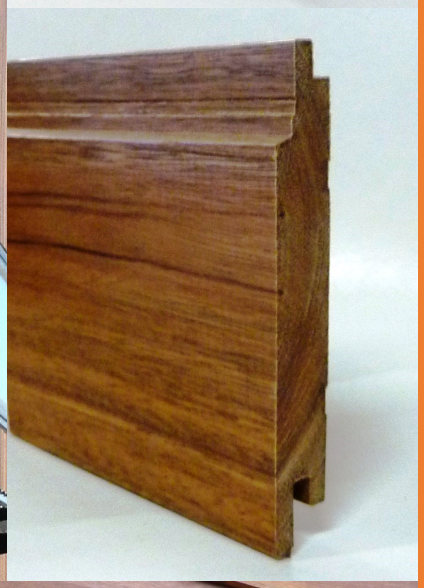
SECTION A
Scale: 1:50

** Dimension from bottom to top of column

10 x 6m version illustrated
Scale is for A3

Architectural hardwoods





Class 1 (25years+) Australian hardwood
Available pre-oiled
OSA Quality assured
Custom designs

Outdoor Structures Australia, (OSA) is passionate about producing high quality weather exposed timber suitable for the extreme Australian climate.

Custom profiling is available.

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Tanacoat

Tanacoat premium timber oil is formulated for commercial applications.

. Boardwalks
. Marinas
. Fences
. Bollards
. Shelters
. Decks

Features and benefits

. UV absorbers
. Mould & algae resistant
. Water repellent
. Long lasting
. No sanding
. Easy re-coat
. High penetration
. Non film forming
. Highlights timber grain
. Low odour

Tanacoat is formulated by Lonza the timber treatment specialists. Tanacoat has a high flash point and low VOC. Tanacoat is a clear oil based coating that embraces the timber grain and provides protection to the timber against sunlight and moisture. Tanacoat is designed to penetrate deep into the timber and inhibit mould growth, cupping , warping, and twisting.

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Restoration:

When the timber has faded to a pale colour or water is not beading on the surface, simply re-apply Tanacoat to the clean, dry surface.

INTERIOR TIMBER:

Sand timber and remove any dust. Fill any surface imperfections and cracks with suitable filler. Apply 1 coat of Tanacoat and allow 48 hours to dry. Dressed timber may be coated using a lambswool applicator soaked in Tanacoat with the excess material wiped off after 1-2 hours.

Previously painted surfaces

Previous painted material will need to be completely stripped back to bare timber. Then treat as for new timber.

Application Method

Stir contents of can thoroughly with a wide flat stirrer ensuring the bottom of the can is reached. Apply 1 full coat of Tanacoat by either brush, spray or lambswool applicator.

Brush/Lambswool Applicator

Apply straight from can. Use a wide, quality brush. Dip lambswool applicator in Tanacoat. Spread coating evenly. Wipe off excess material 1-2 hours after application.

Spray

Suitable for application by all standard spray equipment. This is the preferred application for rough sawn timber.

It is advisable to back brush applied material to ensure complete wetting of the timber.

Thinning

Not usually required, however it may be thinned sparingly with mineral turpentine.

Cleaning

Clean all equipment promptly using mineral turps.

Approximate Coverage

Covers approximately 12-14 square metres per litre on dressed timber and 6-8 square metres per litre on rough sawn timber depending on surface porosity.

Drying Times

Approximate drying times at 25 deg. C and 50% Relative Humidity.

Touch Dry:	4-6 hours
Recoat:	24-48 hours.

Drying Times may be extended by adverse drying conditions or very high film build.

Additional Information

Tanacoat is solvent based and flammable. Use with adequate ventilation. Wear protective gloves if using an applicator.

Do not apply Tanacoat if rain is expected within 6 hours.

Available in 1L; 4L; 15L and 200L from:

Outdooor Structures (07) 5462 4255

Swale Drain Bridges

- **Solid Construction**
- **Vandal Resistant**
- **Detailed for Long Life**

As simple but effective low priced swale drain bridge is now available from Outdoor Structures Australia. The bridge is based on the member sizes and widths from our very successful Boardwalk Design Guide, with overall length in modules of 120mm. Stainless fasteners are an option.

Model	Span	Overall	Deck Width	Sill Width
SD2511	2.5	3.0	1.1	1.5
SD2514		(25 boards)	1.4	1.8
SD2517			1.7	2.1
SD2523			2.3	2.7
SD2526			2.6	3
SD3111	3.1	3.6	1.1	1.5
SD3114		(30 boards)	1.4	1.8
SD3117			1.7	2.1
SD3123			2.3	2.7
SD3126			2.6	3
SD4311	4.3	4.8	1.1	1.5
SD4314		(40 boards)	1.4	1.8
SD4317			1.7	2.1
SD4323			2.3	2.7
SD4326			2.6	3
SD4911	4.9	5.4	1.1	1.5
SD4914		(45 boards)	1.4	1.8
SD4917			1.7	2.1
SD4923			2.3	2.7
SD4926			2.6	3
SD6111	6.1	6.6	1.1	1.5
SD6114		(55 boards)	1.4	1.8
SD6117			1.7	2.1
SD6123			2.3	2.7
SD6126			2.6	3

Abutment Design Notes

The abutment should be designed with the following in mind:

1. The bridge should not be installed beyond a maximum 5% slope.
2. The bridge sill should not sit directly on the abutment but be spaced up to 50mm above on drypack concrete or neoprene blocks.
3. The abutment should have a concrete backwall and a side wall to stop soil encroaching on the timbers
4. The abutment should slope forward about 12mm across its width to shed moisture
5. Design reinforcing so there is no clash with the hold down bolt positions
6. The bridge is only intended to withstand nominal flood loads

Handrails

The swale drain bridges are not designed to carry handrails, if handrails are required use the demountable series bridge. Bikeway compliant rails are needed when the full height is greater than 250mm.

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TANALISED®

ARC WOOD PROTECTION

DECKWOOD BOARDWALKS

PROVEN DURABILITY

SUSTAINABLE AUSTRALIAN HARDWOOD

SLIP RESISTANT

ANTI CUPPING

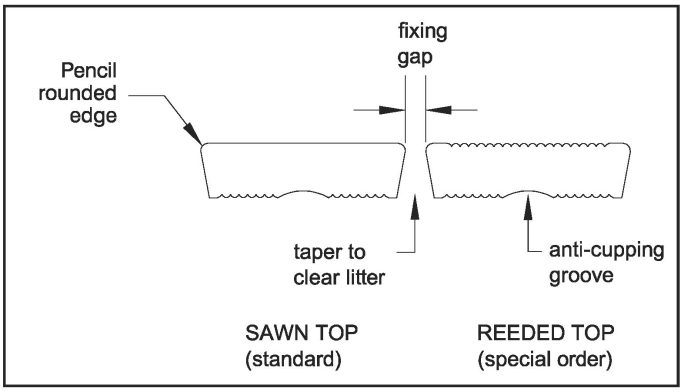
BRUSH SANDED

AVAILABLE PRE - OILED

Our unique patented Deckwood profile has been developed to last a generation. It has proven the test of time and has been used on board-walks and foreshores all around Australia.

- Scalloped to prevent cupping.
- Reeded to increase airflow.
- Tapered sides for self cleaning.
- Sawn and brush sanded top face for an R12 slip resistant rating.

Fig 1 NORMAL DECKWOOD PROFILES



A successful outdoor structure can only be achieved when many small points of detail are attended to at the design , supply and construction stages. Through formal research OSA has learnt these details. Our practises and products are different from the norm. It's our attention to detail and quality assurance that makes the difference. To ensure the maximum life span of your deck, insist on OSA Deckwood. Beware of cheaper imitations that do not adhere to OSA's high quality standards.

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LifePlus Decking

LifePlus Decking has a unique patented profile that extends the life of your deck and reduces maintenance by 50%.

Unique tapered sides are carefully designed to be self cleaning and allow leaf matter and dirt to pass through eliminating moisture traps.

Sawn top face adds slip resistance & extends the life of the decking by absorbing more decking oil resulting in up to 50% less oiling maintenance.

Brush sanded finish reduces splinters and public liability risk.

Anti cupping grooves provide air flow to prevent rot and reduce distortion in the boards.

Less maintenance

KD Queensland Spotted Gum

Slip resistant

Brush sanded finish

Lasts longer

Anti cupping

07 5462 4255

www.lifeplus.net.au

T I M B E R B O A R D W A L K S

DECKWOOD™ Selection Guide

Revision 3a

TANALISED®

Outdoor Structures Australia

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DECKWOOD™ SELECTION GUIDE

Revision Three

DECKWOOD™

When timber is used outdoors for public and commercial decking, exposed to the elements without the protection afforded by roof or paint systems, DECKWOOD™ is the ideal product. Typical uses include bridge and pontoon decking, marina gangplanks, loading docks, dock feeder rubbing strips, maintenance accessways, boardwalks, piers and park facilities. DECKWOOD™ is a superior timber product because of the species used, the timber quality, the preservation process and its unique patented profile.

Deckwood™ used in bridge construction

Timber information

Hardwood

The hardwood species used in DECKWOOD™ are excellent decking materials. The product is adaptable, easily transported and can be shaped on site. It also facilitates prefabrication while still allowing on-site modification. Its stability under harsh conditions makes it the first choice for decking. It is both tough and resilient and harmonises with many architectural themes.

Timber sourcing is predominantly from state managed forests supplemented by some private property sources where there is a very strong code of management. Environmental responsibility extends to *in-grade* structural testing which has resulted in extended spans ensuring a more efficient use of the forest resource.

Species

DECKWOOD™ is supplied as an unseasoned hardwood product developed specifically for commercial decking. In a typical installation, it will remain partially seasoned with some cross-grain movement in response to the weather.

While the Deckwood™ profiles can be produced as a seasoned product, albeit to a reduced thickness, there are economic and environmental reasons to use it unseasoned. The energy required for kiln drying one cubic metre of timber is 17 to 19 MJ. In addition, there is some timber lost by degradation. In practice, a deck of unseasoned Deckwood™ dries out in a few months without these unnecessary costs and is easier to saw and fix in its 'green' state.

The hardwood species selected for use in Deckwood™ (see Specification for species used, Page 6) have the physical properties suited to the task:

- appropriately durable, resisting both termites and rot,
- resistant to ultra violet light,
- stable in response to wetting and drying,
- resistant to vandalism and abuse with exceptional toughness and hardness, and
- requiring low maintenance.

Timber Quality

For a deck to look good, the exposed timber has to be *appearance grade*. In recent years, the emphasis on timber being used for structural purposes has perpetuated the misconception that the *F* † number alone is sufficient to describe the required timber order with no regard to species or timber quality. The *F* grades are concerned only with strength. While this is sufficient for hidden and protected elements in a building, it is far from true for exposed decking where defects can be unsightly, present a hazard to users and lead to premature degrade.

Decking life is extended by using timber without significant defects as faults facilitate moisture ingress, hastening the onset of both mechanical and biological decay. Until now it was difficult to find a hardwood producer dedicated to supplying timber suitable to withstand the rigours of the "Great Australian Outdoors". OUTDOOR STRUCTURES AUSTRALIA has accumulated an extensive knowledge of the correct application of timber, especially when used externally in public works.

The company is a pioneer in the production of quality hardwood prefabricated bridges, boardwalks and park furniture. It conducts a Quality Assurance programme for its hardwood production with visual grading as its cornerstone. The source timber for DECKWOOD™ has been In-Grade tested by the Queensland Forest Service and this has confirmed its great strength. The span tables in this publication have been based on these results.

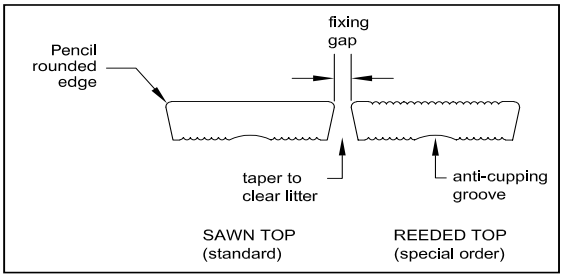
† The F grade is the maximum long term permissible bending strength in Mega Pascals. Its use has been retained even though the Australian Timber Code is now in a Limit State format.

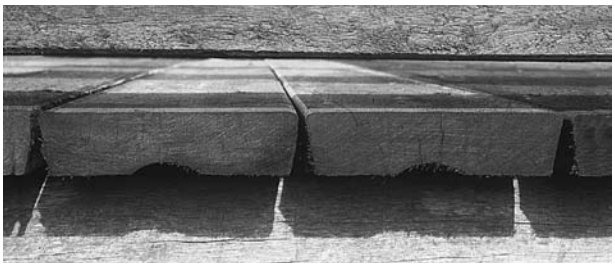
Preservation

While the durability of the truewood of hardwoods selected by OUTDOOR STRUCTURES AUSTRALIA is appropriate (Durability 1 based on CSIRO's Ratings for above ground exposed to weather use) for decking, any sapwood has to be treated to at least match the performance of the truewood. OUTDOOR STRUCTURES AUSTRALIA was the first in Australia to use the new *chrome and arsenic free* timber preservative treatment, Copper Azole (Tanalith E) for this purpose. The treatment colours the timber brown.

Deckwood™ profile

Fig 1 NORMAL DECKWOOD PROFILES





Deckwood™ Patented Profile

The main agency in the deterioration of decking timber is rain. It is not surprising that the quicker the timber can dry out, the longer it lasts. For this reason, planks should be spaced apart as far as practical to let air circulate to speed up the drying on the horizontal interface between planks and joists. Gaps also allow the wind to blow away leaf litter further contributing to a drier environment. The special DECKWOOD™ taper (like a cast drainage grating) also assists in drying by reducing leaf entrapment.

Upper surface edges are pencil rounded, lessening the development of splinters. This feature means planks are easier to handle as well as disguising any level mismatch between adjacent boards, speeding up laying. In wider planks, the anti-cupping groove reduces the tendency for individual boards to pond water by cupping, further enhancing safety and longevity.

The standard surface finish is a rough sawn upper face resulting in superior weathering performance and a measure of slip resistance. DECKWOOD™ is gauged for thickness, removing material from the lower face only, so boards form an even surface. Whenever possible, the product will be supplied with growth rings concave downward. However, face quality remains the determining factor.

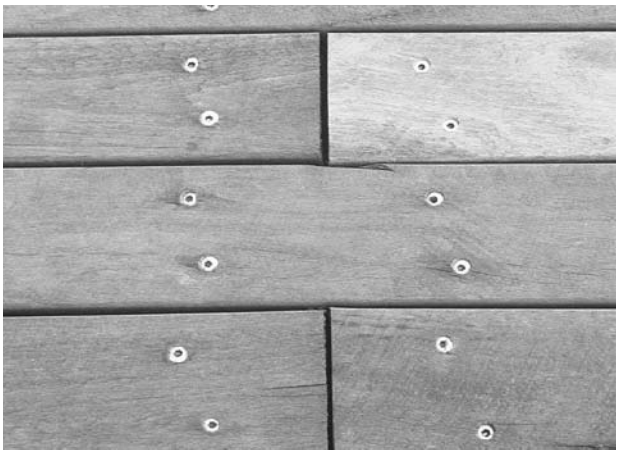
A reeded (rippled) upper surface is available to suit steep ramps and frequently wet areas where the increased friction created can assist when walking across the planks. Where there is a likelihood of travel in the direction of the plank, reeded decking should not be used as friction is reduced. OUTDOOR STRUCTURES AUSTRALIA does not recommend reeded decking for general decking purposes.

A dressed upper surface is suitable only under roofed areas and in conjunction with paint systems.

Table 1
Standard Deckwood™ Sizes

Size	31 x 113	35 x 70	35 x 95	35 x 120	45 x 70	45 x 95	45 x 120	45 x 145	70 x 95	70 x 145
Anti cupping groove	yes	no	yes	yes	no	yes	yes	yes	no	no
Mass kg/m	2.6	2.5	3.4	4.3	3.1	4.2	5.4	6.6	6.4	10.3

DECKWOOD™ lengths are readily available up to 3.6m long. In a typical order with a range of lengths, small quantities up to 6m long are often possible. Naturally, the likelihood of defects escalates with increasing length (and width) of decking planks so shorts (down to 1.2m) are more readily available. Arrange the decking running across the shortest direction, minimizing end laps and keeping decking lengths to practical limits.



Joining over double joists

TABLE 2

Maximum Spans for Standard Deckwood™

Size	Maximum spans in mm for various decking situations continuous over at least 2 equal spans							
	Detached house & isolated walking track structures	Terraces & plazas & gangways (no vehicles)	Footbridges & Boardwalks	Bicycleways & golf cars	Horses & cattle	Domestic garages & carport †		Controlled access bridge open to light vehicles
						‹ 1.8t GVM	‹ 2.5t GVM	‹ 3t GVM ‡ (Short load duration)
35 x 70	600	510	520	-	-	-	-	-
35 x 95	700	550	610	-	-	-	-	-
35 x 120	760	560	620	560	-	410	-	-
31* x 113	700	500	560	500	-	370	-	-
42* x 135	1030	820	890	820	630	600	510	-
45 x 70	810	700	700	-	610	580	490	-
45 x 95	900	780	780	-	610	590	500	-
45 x 120	980	810	860	780	620	600	510	-
45 x 145	1050	820	890	820	630	600	510	-
70 x 95	1500	1300	1300	1200	1200	1200	1100	1200
70 x 145	1500	1500	1500	1400	1400	1350	1150	1300

All tabulations are for two span continuous decking, loaded at the worst position on one span.
For single spans, reduce spans by 15%.
For Reeded (on top) DECKWOOD™ reduce the maximum spans shown above by 10%.
Spans greater than 900mm may need a distributor plank under them to ensure an even decking surface.
The 30kN tractor wheel load prescribed by AustROADS Bridge Code cannot be carried by these decks under conventional analysis.

† Jacking of vehicles is permitted only directly over joists.
‡ GVM = Gross Vehicle Mass and is the total vehicle mass including load and passengers.
§ As 31 x 113 is kiln dried there can be a considerable lead time for supply.
* Means seasoned product

Deckwood™ is also available in factory tapers to facilitate minor changes in direction in laying boardwalks without the need for mitres. The narrow end of these tapers is 60mm to provide sufficient holding for the screws and sufficient strength to carry concentrated loads.

Wider planks are normally recommended for light vehicle bridges to improve ride and reduce rattle with the 35x120 size *often available ex-stock - check availablility*. Other sizes and non-typical lengths have to be run to order.* Narrow sections (70x35) allow better recovery from the forest resource and are typically recommended for boardwalks and similar applications where environmental and economic issues are a concern. 70mm wide Deckwood™ requires only single fixings and gives the maximum slip resistance.

Frequently, concentrated loads govern designs. As the load increases, the limiting criterion moves from:

- relative deflection between loaded and unloaded boards, to
- absolute deflection under concentrated load, and finally to
- strength.

In order to extend the span of a thin deck, it is possible to use distributor planks. These are typically 75x75 members running beneath the deck, sharing concentrated loads between adjacent planks as well as restraining relative movement between planks. When these are used, uniformly distributed loads begin to control the design. Alternatively, joists could be placed closer together. Where decking spans are greater than 900mm and an even, or stiff decking surface is required (e.g. outdoor dining area), a distributor plank should be used between the joists.

End Sealing

DECKWOOD™ should be end grain sealed to control end drying that otherwise may lead to splits. If the product is cut to length on site, the end grain should be resealed after cutting. CN emulsion is recommended as a preservative for all cuts, laps and recesses.

Gaps Between Decking

In normal environments, 35mm thick DECKWOOD™ will reach a reasonably stable moisture content within 9 months, at which time the nominal (design) spacing between boards will have been reached. Recommended final gaps between boards depend on the use of the deck. Where a measure of self cleaning of leaf litter is required and where pedestrians are

unlikely to wear high heels, a target gap of 10 - 12 mm is appropriate and even up to 30mm in remote walking track structures. In more formal areas, the spacing may be reduced but the decking cannot be placed closer than "hard-up". The final gap is the shrinkage across the plank, so a wider plank results in a wider gap. The gap allows expansion in response to prolonged rain periods, so wide planks laid with a small gap just before a prolonged wet period could be a problem. AS 1428.2 - Design for Access & Mobility (Disability access) requires that final gaps be not more than 13mm and should be oriented transverse to the predominant direction of travel.

Gaps over 30mm give a sense of insecurity to people as they can see through the gaps, while a 15mm gap is the maximum for stock use.

Cross grain shrinkage of the boards can be estimated from the following table, assuming an average moisture content of 28% at fixing time. DECKWOOD™ is not appropriate where furniture legs are smaller than 25mm or where stiletto heels are worn as they may penetrate the gaps between boards. In that

TABLE 3
Average Gap Setting

Deckwood™ Width	Shrinkage mm / gap			e.g.
	Location			
	Inland	Coastal	Over Water	
70	5	4	3	A mangrove boardwalk uses 120 wide decking and is to be reasonably self cleaning, so adopt a final target gap of 12 mm. As it is over water, skrinkage will be about 5mm, so fix with an initial gap of (12 - 5=) 7mm
95	7	5	4	
120	8	6	5	
145	10	7	6	

situation a seasoned decking timber can be supplied and it can be dressed all round (no pencilled edges). 70mm wide decking gives the most grip of any Deckwood™ size as it drains moisture more readily and also because of the unevenness caused by the gap between the adjoining piece.

Fixings

Fixing from the top simplifies construction on site and facilitates replacement of damaged decking. OUTDOOR STRUCTURES AUSTRALIA use wax coated stainless steel decking screws to expedite installation. The stainless steel is grade 304 and, while they will 'tea-stain' more easily than the more expensive 316, they are more robust, resulting in fewer breakages during construction and they do not have to be run to order.

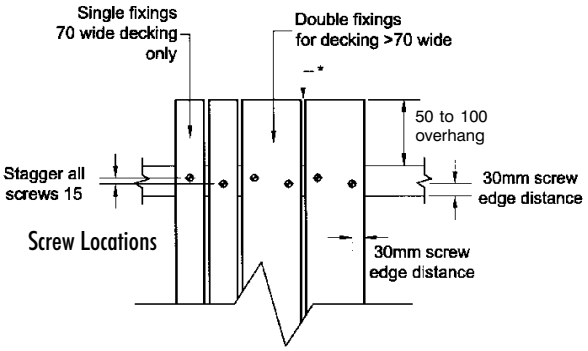
Where end joins in planks are unavoidable, use spaced double joists so screws are kept at least 100mm from ends of the planks. This reduces end splits that otherwise could be induced by the thick screws.

A feature can be made of the end join patten by inserting a banding plank along the join line. A 5mm gap between the ends of the planks is recommended when using this arrangement.

Joist tops should be coated with a preservative paste to counter the effects of water held at the joist-deck interface by capillary forces. Again CN emulsion is strongly recommended for this purpose as it increases the joist life significantly.

A damp proof course (DPC) such as Malthoid along the joist-top protects the member from degrade. The Malthoid should be coated with a preservative paste to counter the effects of water held at the joist-deck interface by capillary forces.

Predrilling and countersinking is necessary even for the 'selfdrilling' (type 17) fasteners to prevent deck splits and over-torquing the screws. The pre-drilling of holes in a staggered alignment as illustrated will reduce propagation of cracks originating at fasteners, prolonging joist life. While 70mm wide planks are single fixed, wider planks need two screws per joist. Fasteners shall be placed no closer than 100 mm from the ends of DECKWOOD™. Care should be taken not to over countersink as this promotes decay from ponding water. Additionally, the fasteners should not sit proud as they may become a trip hazard. Joist widths of 75 mm are the minimum.



Fixing from underneath suits prefabrication in panels as well as fixing to other materials such as metal frames e.g. aluminium gangplanks and bridges. Then the fixings are mostly hidden and result in a more durable deck. In this situation other head configurations may be used (depending on the support for the panel) such as hexagonal headed screws and coachscrews. Thought has to be given to re-tightening and the mode of decking replacement when using this method. Refer to OUTDOOR STRUCTURES AUSTRALIA for alternate fixing recommendations.

- All fixings are to be 14 gauge, type 17 screws with a countersunk/bugle head and a recessed hexagonal drive manufactured from stainless steel, grade 304.
- All screw holes to be pre-drilled with an appropriate bit combined with a countersink. For 35mm decks use 75mm screws. 45mm decking only requires an 85mm screw but generally the available screw is 100mm. The 100mm screw is unsuitable for fastening 70mm Deckwood™ - Discuss your application with OUTDOOR STRUCTURES AUSTRALIA.

Finishing

The Decking may:

- be left to weather naturally to a silver-grey. If this option is chosen bear in mind that some pieces of decking could become unstable and/or check.
- have its colour preserved somewhat and surface checking reduced by using Tanacoat (see Appendix - Tanacoat) or CN oil (preferred systems). Refer to OSA's Surface Coating Guide to determine which oil is suitable for your application. Alternatively a water repellent could be used. As a bonus, this type of finish can reduce staining from food and beverages - an important point where the deck is part of an eating area. Staining Tanacoat does little to enhance the colour of sawn face Deckwood. Do not use linseed oil as it provides food for fungus, making the deck unsightly.

Apply decking stains strictly according to the manufacturer's instructions so that the quality appearance of the product will be prolonged. We advise against the use of paints because of their high maintenance costs due to more stringent preparation of the surfaces. The one exception here is the last 200mm at the ends of boards may be painted to reduce moisture take-up and gives a traditional look and delineation for jetties and gangplanks. In such a situation, the end grain sealer (e.g. CN Emulsion) should be omitted.

Maintenance

Attention may have to be given to:

- replacing damaged boards
- tightening loose boards
- re-tightening fasteners left proud by shrinkage *Use a hand tool such as an old style hand brace, not power tools.*
- re-finishing as appropriate
- blowing out any leaf litter collecting between the joist and decking.

Storage

Exposing the timber prematurely to the weather without fixing, end treatment or oiling can result in timber warping, drying out and developing end splits. This can make the timber more difficult to work and may mar the overall appearance.

The purchaser is responsible for the site storage of DECKWOOD™. It shall be block stacked level with at least 150mm clearance underneath and located in an area that does not pond water. Stacks shall be covered with impervious sheeting to reduce evaporation and to provide protection from the sun. Particular care should be taken to avoid ends projecting from the stack. Placing the timber packs directly on the fixed joists is often the best option if timber deliveries can be scheduled that way.

Deckwood™ Specification

Species

Timber shall be selected from the following species:-

- spotted gum
- tallowwood
- ironbark.

Timber Quality

Timber will be graded under a hardwood quality control programme conforming to ISO 9002. At the time of grading, the bottom and sides of the plank will conform to AS 2082, Structural Grade No 2 while the exposed surface of DECKWOOD™ will conform to the following.

Freedom from the following on the sawn (upper) face:-

- Loose and unsound knots
- Shakes
- Loose gum veins
- Knot holes
- Termite galleries
- Want, wane and bark
- Checks wider than 1mm
- End splits wider than 1mm
- Included bark
- Borer holes larger than 3mm diameter
- In addition, permitted defects will not cover more that 15% of the top face.

Permissible defects on the upper face may include 1 only borer hole up to 6mm diameter per plank.

Preservative Treatment

Treatment, natural durability classes and combinations will conform to AS 1604, TUMA (Timber Utilization and Marketing Act Qld 1987) and TMA (Timber Marketing Act NSW 1977). Sapwood will be treated to Level "H3" in accordance with TUMA. A certificate of treatment will be provided on request.

Branding

DECKWOOD™ will be identified by branding on the underside.

Tolerances

Unless noted otherwise, the actual cross-sectional dimensions of timber at the time of processing may vary from the dimensions stated by the following:-

- width ± 3 mm
- thickness 0, +2 mm
- length 0 mm
- length (cut to size) ±5 mm

Length	*Maximum bow (mm)*	
	35 thk Deckwood™	*45 thk Deckwood™*
1800	10	10
2400	20	15
3600	50	35
4800	70	50

Length	*Maximum spring (mm)*			
	70 wide Deckwood™	*90 wide Deckwood™*	*120 wide Deckwood™*	*145 wide Deckwood™*
1800	7	5	4	3
2400	12	10	7	6
3600	25	20	15	13
4800	30	30	30	25

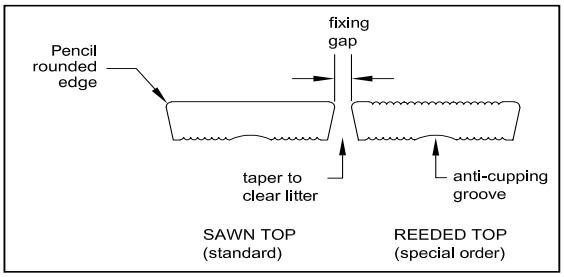
Moisture Content

Unseasoned.

Surface Finish

Gauged on the bottom with the sound sawn face being exposed uppermost.

Profile



The normal DECKWOOD profile is illustrated.
The profile does vary with the cross section. All profiles have I.P. Protection.

Screw Specifications

- All fixing screws to be 14 gauge, type 17 with a countersunk/bugle head and a recessed hexagonal drive.
- All screws to be stainless steel, Grade 304.
- All screw holes to be pre-drilled with an appropriate bit combined with a countersink.
- Minimum screw length 75mm for 35 thick decking and 85mm for 45 thick.

Additional Services

OUTDOOR STRUCTURES AUSTRALIA can undertake customising services including (but not limited to):-

- Cutting to length (± 5 mm), bevelling and re-sealing ends
- Coating with CN Oil Emulsion or Tanacoat
- Predrilling and countersinking for fixings
- Prefabricating into panels (with or without support battens)
- Engineering design, certification and supervision
- Special details such as tapered planks for change of direction
- Design and Prefabrication service available
- Supply of fixings, preservatives and accessories
- Supply of appearance grade hardwood for accessories to decks such as railings and handrail posts.

Construction Aids

Other OUTDOOR STRUCTURES AUSTRALIA's construction information is contained in:-

- the Boardwalk Guide
- the Boardwalk Installation Guide.

Appendix - Engineering Data

TABLE 4
Section Properties

Deckwood Size	Zxx	Ixx	E Ixx short term	In-Grade testing results			British Standard	
				Limit State Characteristic Strength	Permissible Stress Basic	Modulus of Elasticity §	Strength Class	BS 5268
				fb	fb	E		fb
Units	x 10^3 mm^3	x$10^6$$mm^4$	x10^9N-mm^2	MPa	MPa	MPa		MPa
31 x 113	15.3	0.22	3.0	84	27.5	13950	D50	16.0
35 x 70	11	0.18	2.0	55	17.0	11070	D40	12.5
35 x 95	15	0.22	3.1	84	27.5	13950	D50	16.0
35 x 120	19	0.29	4.0	84	27.5	13950	D50	16.0
45 x70	18	0.34	4.7	65	22.0	13950	D50	16.0
45 x 95	24	0.46	6.5	84	27.5	13950	D50	16.0
45 x 120	31	0.61	8.4	84	27.5	13950	D50	16.0
45 x 145	38	0.74	10.4	84	27.5	13950	D50	16.0
70 x 95	70	2.33	32.5	84	27.5	13950	D50	16.0
70 x 145	110	3.72	51.9	84	27.5	13950	D50	16.0

§ Average Modulus of Elasticity adjusted for exposure

TABLE 5
Moment Capacity

Size	Moment Capacity - 5 month duration loads kN - m		
	Limit State AS 1720.1-1997	Permissible Stress AS 1720.1-1988	BS 5268 part 2
31 x 113	0.74	0.53	0.24
35 x 70	0.36	0.24	0.14
35 x 95	0.70	0.50	0.23
35 x 120	0.90	0.65	0.30
45 x 70	0.69	0.51	0.29
45 x 95	1.16	0.83	0.38
45 x 120	1.49	1.07	0.49
45 x 145	1.82	1.31	0.60
70 x 95	3.41	2.44	1.13
70 x 145	5.34	3.83	1.77
Factors			
Capacity Reduction	Ø = 0.8		
Load Duration	k1 = 0.8	k1 = 1.40	k3 = 1.25
Exposure†	0.9	0.9	k2 = 0.8

† Exposure factors for both strength and stiffness have been introduced to be consistent with research on existing bridges.

It is assumed that the use of this decking will have only a small permanent load and, as the extreme live load is infrequent, decking creep can often be neglected. In most situations, distributed loads will not control the design.

TABLE 6

Loads

Building or Activity	Specifically	Uniformity Distributed Load kPa	Concentrated Load kN
Detached house[1]	General areas & balconies < 1m above ground	1.5	1.8
	Balconies > 1m above ground	3	1.8
Where people may congregate[1]	Terraces, plazas, hallways (no wheeled vehicles)	4	4.5
	As above but subject to wheeled trolleys	5	4.5
	As above but subject to medium vehicles	5	31
Golf Cars		5	4.5
Light vehicle traffic areas[1]	< 2.5 tonne gross vehicle mass	2.5	13 (9 if jacking restricted)
Livestock[2]	Horse & rider Cattle	5	8 + 30% impact
Walking track structures[3]	Track Class 3 & 4 viewing platforms	4	1.4
	Track Class 3 & 4 access ways	3	1.4
Structures for access and working[4]		2.5	1.0
Footbridges[5]		5	4.5 (no tractors)
Marinas[6]	Gangways	3 to 4	4.5
	Walkways & fingers	3 to 5	4.5

Vehicle loads in table are wheel loadings. Impact factors need to be applied where appropriate.

References

1 AS 1170.1 SAA Loading Code Part 1
2 Footbridges in the Countryside Design & Construction, Countryside Commission for Scotland 1981
3 AS 2156.2 Walking Track Part 2: Infrastructure Design
4 AS 1657 Structures for Access & Working
5 AS 5100-2004 Bridge Design (AustRoads). (Tractor loads have not been considered in the footbridge tables).
6 AS 3962-2001 Guidelines for Design of Marinas

TABLE 7

Summary of Loading Criteria used in Span Tables

Situation	Conc. load for strength & serviceability	Max short term deflection span/	Load on one plank to give 1.7mm deflection	Live Load Factor	Impact factor	Distribution load over a length (mm)	k1	j2 for live load
Detached house & isolated walking track structures	1.8kN	200	1 kN	1.5	1.0	75	0.8	1.0
Terraces, plazas, marina gangways & walkways	4.5kN	250	1.5 kN	1.5	1.0	160	0.8	1.0
Footbridges & boardwalks ¶	4.5kN	200	1.5 kN	1.5 §	1.0	160	0.8	1.0
Golf cars & cyclebridges ¶	4.5kN	250	2.0 kN	1.5 §	1.0	160	0.8	1.0
Horse & rider, cattle	8kN	200	2.0 kN	1.5	1.3	175	0.97	1.0
Domestic garages <1.8t GVM	6.5kN	200	2.0 kN	1.5	1.0	200	0.57	2
Domestic garages <2.5t GVM	9.0kN	200	2.0 kN	1.5	1.0	200	0.57	2
Bridges < 3.0t GVM	10.8kN	200	2.5 kN	1.8	1.3	200	0.94	1.0

All for 5 kPa UDL except 4kPa used for houses & track structures.

¶ Tractor & road vehicle loads have NOT been considered. These vehicles have to be excluded by design e.g. bollards, narrow width etc. The 4.5 kN load is not prescribed in the bridge code but has been adopted by OSA as consistent with other loading codes.

§ Load factor of 1.5 has been adopted for pedestrians & golf cars for bridge decks not over major roadways or railways. Otherwise a load factor of 1.8 should be adopted to be consistent with risk analysis philosophy of the bridge code.

Appendix - Tanacoat

TECHNICAL INFORMATION SHEET

TANACOAT is a new environmentally friendly timber product initially developed for Outdoor Structures Australia's Deckwood™ by Koppers Arch.

WHAT DOES TANACOAT DO?

It is a highly effective oil based finish that will penetrate surfaces and help protect against rotting, splitting and or drying out and will enhance the natural beauty of wood.

USES

- Hand rails
- Decking, verandahs
- Outdoor furniture
- Car parking bollards and dividers
- Landscape edging, railway sleepers
- Park tables, benches
- Posts, guide posts, signs
- Fencing, lattice, battens
- Bridges, jetties, boardwalks
- Weather boards
- Gazebos, shingles
- Decorative timber panels
- Floor boards
- Sound traffic barriers

APPLICATION

- Surface must be clean, dry and free from dirt and other loose materials.
- Apply treatment as a thin, even coating to the surface removing excess liquids.
- Approximate coverage 12-14 m2 per litre on dressed timber and 6-8 m2 per litre on rough sawn timber depending on surface porosity.
- Since coating rates can vary for different timbers, determine an exact coating rate on a small area prior to application.

ADVANTAGES

- Totally environmentally friendly and non-toxic
- Non aromatic
- Non-flammable
- Non-tacky, is not slippery when wet
- Does not evaporate or leach
- Can use brush, spray or roller to apply
- Highlights the natural timber grain
- Penetrates surface and prolongs timber life
- Helps to stop splitting and cracking of treated timber
- Tanacoat will help protect nails, screws and all metal fittings from rust and corrosion.

Our ref:CMcK/Outdoor/Tables

25th February 2006

Mr Ted Stubbersfield
Outdoor Structures Australia
PO Box 517
GATTON QLD 4343

Dear Sir

TIMBER QUEENSLAND

RE: 'Deckwood' Span Tables

Further to your request of the 16th December 2005, we advise that we have received and have reviewed the design assumptions, design procedures and resultant span outputs for Deckwood, prepared for you by James Pierce and Associates, Consulting Engineers in August 2005.

It should be noted that we were advised by James Pierce and Associates that the specific characteristic bending strength and stiffness properties for 'Deckwood', as provided to us and as used in the preparation of the span tables, were derived from an in-grade testing study of 'Deckwood' timber conducted by DPI&F.

We are in general agreement with James Pierce and Associates assumptions, criteria and procedures and consider these to be rational and in accordance with appropriate engineering principles.

In addition, we have input the assumptions, criteria and specific 'Deckwood' properties into alternative timber design software and run spot checks of outputs which revealed general consistency with the spans derived by James Pierce and Associates.

Yours sincerely,

Colin MacKenzie
MIEAust, CP Eng, NPER; RPEQ
TECHNICAL MANAGER

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Web: www.timberqueensland.com.au

for more information on all aspects of Tanacoat refer to;
http://www.outdoorstructures.com.au/tanacoat.php

References

AS 1428-2003 : Design for access and mobility
AS 1720.1-1997 : Timber structures - Design methods
AS 2156.2-2001 : Walking tracks: Infrastructure design
AS 2159-1995 : Piling - Design and installation
AS 5100-2004 : Bridge Design
Building Code of Australia
Deckwood Selection Guide - 2005: Outdoor Structures Australia, Revision 3
HB 69.14-1995 : Guide to traffic engineering practice - Pedestrians
HB 69.14-1999 : Guide to trafic engineering practice Bicycles
NAFI - 1989 : Timber Decks - Commercial Industrial & Marine, Timber Datafile Timber Manual
NAFI - 1989 : Timber in Landscape, Timber Datafile Timber Manual

Deckwood and the smaller LifePlus® Decking are the subject of the following Australian Intellectual Property Registration:

Australian Innovation Patent No AU2003100493 (Examined and Certified).
Australian Design Registration No AU155986.
Australian Design Registration No AU157321.
Australian Standard Patent Application No Au2003204845.
Australian Registered Trademark No 96541(LifePlus & Life+)

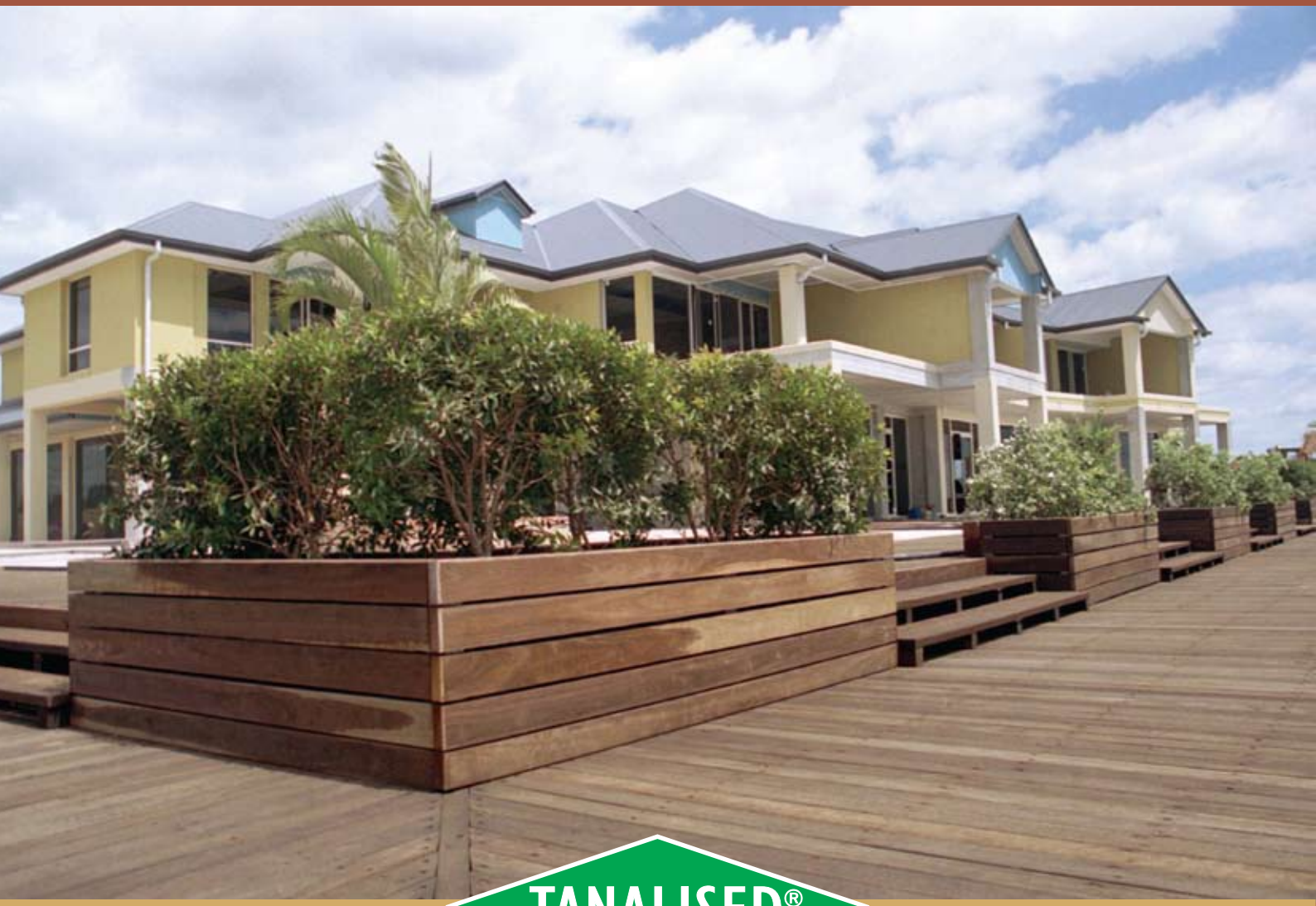
LifePlus® Decking is also the subject of a number of granted and pending international Patents, Designs and Trademarks, including:

Patent Cooperation Treaty Application No PCT/AU2004/000825
New Zealand Design Application, corresponding to AU Design Application 2106/2003
New Zealand Trademark Registration No 707428
Allowed US Design Patent Application No 29/195905
Japan Design Registration No 1220160
UK Design Application, corresponding to AU Design Application 2106/2003

Front Cover Credits

Main image	Deck, stairs and seasoned battens between Queensland Parliamentary Annex and Queensland University of Technology
Landscape Architects	EDAW Gillespies
Engineering	James Pierce and Associates
Construction	Naturform
Supply	Outdoor Structures Australia
Photography	Outdoor Structures Australia
Small Image	Boardwalk, Toohey Forest Park Brisbane
Design and Engineering	James Pierce and Associates
Construction	Eureka Landscapes
Supply	Outdoor Structures Australia
Photography	Dennis Clark Photography

T I M B E R B O A R D W A L K S



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KOPPERS ARCH
WOOD PROTECTION

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