BUSHFIRE CONSULTANCY AUSTRALIA

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BAL-12.5 Construction checklist

Date:

Site address:

Job description:

Bushfire risk assessment reference:

Council Consent or DA Reference:

The following specification list has been provided and certified as in accordance with the DA consent, the requirements of Planning for Bushfire Protection 2019 and AS3959:2018. The specification list, in accordance with the recommendations of the bushfire assessment report, have been varied to comply with the requirements of Section 7.5 of *Planning for Bushfire Protection 2019*.

Deemed to Satisfy Provisions of AS3959-2018

Section 5 BAL 12.5

5.1 General

A building assessed in Section 2 as being BAL-12.5 shall conform with Section 3 and Clauses 5.2 to 5.8.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 5.2 to 5.8 (see Clause 3.8).

NOTE: BAL-12.5 is primarily concerned with protection from ember attack and radiant heat is up to and including 12.5 kW/m2 where the site is less then 100m from the source of bushfire attack.

5.2 Subfloor supports

Note: Clause 5.2 has been replaced with Clause 7.2 in accordance with the requirements of Section 7.5.2 PBP 2019

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

a) a wall that complies with Clause 5.4,

b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or

c) a combination of Items (a) and (b) above.

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

(i) of non-combustible material; or

(ii) of bushfire-resisting timber (see Appendix F AS3959-2018); or

(iii) a combination of Items (i) and (ii).

NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 5.7).

C5.2 Combustible material stored in the subfloor space may ignite by embers and cause an impact to the building

Specification (Material or construction method used)

5.3 FLOORS

5.3.1 General

This Standard does not provide construction requirements for concrete slabs on ground.

5.3.2 Elevated floors

5.3.2.1 Enclosed subfloor space

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with-

a) *a wall that complies with Clause 5.4; or*
b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or
c) a combination of Items (a) and (b) above.

5.3.2.2 Unenclosed subfloor space

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400mm above finished ground level, shall be one of the following:

(a) Materials that comply with the following:
i. Bearers and joists shall be—

A. non-combustible; or

B. bushfire-resisting timber (see Appendix F); or

C. a combination of Items (A) and (B) above

ii. Flooring shall be-

A. non-combustible; or

B. bushfire-resisting timber (see Appendix F); or

C. timber (other than bushfire-resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or

D. a combination of any of Items (A), (B) or (C) above OR

(b) A system complying with AS 1530.8.1

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

Specification (Material or construction method used)

5.4 EXTERNAL WALLS

5.4.1 Walls

The exposed components of an external wall that are less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see figure D3 Appendix D) shall be one of the following:

(a) Non-combustible material including the following providing the minimum thickness is 90 mm:

i) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.
ii) Precast or in situ walls of concrete or aerated concrete.
iii) Earth wall including mud brick.

OR

(b) Timber logs of a species with a density of 680 kg/m3 or greater at a 12% moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 mm (see Clause 3.11); and gauge planed.

OR

(c) Cladding that is fixed externally to a timber-framed or a steel-framed wall and is—
   i. non-combustible material; or
   ii. fibre-cement a minimum of 6 mm in thickness; or
   iii. bushfire-resisting timber (see Appendix F); or
   iv. a timber species as specified in Paragraph E1, Appendix E; or
   v. a combination of any of Items (i), (ii), (iii) or (iv) above.

OR

(d) a combination of any of Items (a), (b) or (c) above.

This Standard does not provide construction requirements for the exposed components of an external wall that are 400 mm or more from the ground or 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see figure D3, Appendix D AS3959-2018)

Specification (Material or construction method used)

5.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed.

Specification (Material or construction method used)

5.4.3 Vents and weepholes

Except for exclusions provided in Clause 3.6, vents and weepholes in external walls shall be screened with a mesh made of corrosion-resistant steel, bronze or aluminium.

Specification (Material or construction method used)

5.5 EXTERNAL GLAZED ELEMENTS, ASSEMBLIES AND DOORS

5.5.1 Bushfire shutters

Where fitted, bushfire shutters shall conform with Clause 3.7 and be made from-

(a) non-combustible material; or
(b) a timber species as specified in Paragraph E1, Appendix E; or
(c) bushfire-resisting timber (see Appendix F); or
(d) a combination of Items (a), (b), or (c) above.

Specification (Material or construction method used)

5.5.2 Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated made of corrosion-resistant steel, bronze or aluminium.

The frame supporting the mesh or perforated sheet shall be made from-

(a) metal; or
(b) bushfire-resisting timber (see Appendix F); or
(c) a timber species as specified in Paragraph E2, Appendix E

Specification (Material or construction method used)

5.5.3 Windows and sidelights

Window assemblies shall-

(a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 5.5.1; or
(b) be completely protected externally by screens that conforms with Clause 3.6 and Clause 5.5.2; or

C5.5.3(b) *For item (b) the screening needs to be applied to cover the entire assembly, that is including framing, glazing, sash, sill and hardware.*

(c) conform with the following:

i. *Frame material* For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery, shall be made from one of the following:

(A) Bushfire-resisting timber (see Appendix F).

OR

(B) A timber species as specified in Paragraph E2, Appendix E.

OR

(C) Metal.

OR

(D) Metal-reinforced uPVC. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

There are no restrictions on frame material for all other windows.

(i) *Hardware* There are no specific restrictions on hardware for windows.

(ii) *Glazing* Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see

Figure D3, Appendix D), the glazing shall be Grade A safety glass a minimum of 4mm in thickness, or glass blocks with no restriction on glazing methods.

NOTE: Where double-glazed units are used, the above requirements apply to the external face of the window assembly only. For all other glazing, annealed glass may be used in accordance with AS 1288.

(iii) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL level.

(iv) *Screens* The openable portions of the windows shall be screened internally or externally with screens that conform with Clause 3.6 and Clause 5.5.2.

C5.5.3 For Clause 5.5.39(c), screening to openable portions of all windows is required in all BALs to prevent the entry of embers to the building when the window is open.

For item (c)(v), screening of the openable and fixed portions of some windows is required to reduce the effects of radiant heat on annealed glass and has to be externally fixed.

For item (c)(v), if the screening is required only to prevent the entry of embers, the screening may be fitted externally or internally.

Specification (Material or construction method used)

5.5.4 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall -

a) be completely protected by a bushfire shutters that conform with Clause 3.7 and Clause 5.5.1. *or*

b) be completely protected externally by screens that conform with Clause 3.6 and Clause 5.5.2. or

c) conform with the following:
(i) *Door panel material;* Materials shall be—

(A) non-combustible; or

(B) solid timber, laminated timber or reconstituted timber, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) hollow core, solid timber, laminated timber or reconstituted timber with a non-combustible kick plate on the outside for the first 400 mm above the threshold; or

(D) hollow core, solid timber, laminated timber or reconstituted timber protected externally by a screen that conforms with Clause 5.5.2; or

(E) for fully framed glazed door panels, the framing shall be made from metal or bushfire resistant timber (see Appendix F) or a species as specified in Paragraph E2, Appendix E or uPVC

(ii) *Door frame material*; Door frame material shall be-

(A) bushfire resistant timber (see Appendix F); or
(B) a timber species as identified in Paragraph E2, Appendix E; or

(C) metal; or
(D) metal reinforced uPVC. The reinforced members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

(iii) *Hardware* There are no specific requirements for hardware at this BAL level.

(iv) *Glazing* Where doors incorporating glazing, the glazing shall be Grade A safety glass a minimum of 4mm in thickness or glass blocks with no restriction on glazing methods.

(v) *Seals and weather strips* Weather strips, draught excluders or draught seals shall be installed.

(vi) *Screens* There are no requirements to screen the openable part of the door at this BAL level.

(vii) Doors shall be tight fitting to the door frame and to an abutting door, if applicable.

Specification (Material or construction method used)

5.5.5 Doors—Sliding doors

Sliding doors shall-

a) be completely protected by a bushfire shutter that conform with Clause 3.7 and Clause 5.5.1., *or*

b) be completely protected externally by screens that conform with Clause 3.6 and Clause 5.5.2, *or*

c) conform with the following:

(i) *Frame material*; The material for the door frames, including fully framed glazed doors, shall be-

(A) bushfire resistant timber (see Appendix F); or
(B) a timber species as identified in Paragraph E2, Appendix E; or
(C) metal; or
(D) metal reinforced uPVC and the reinforcing members shall be made from aluminium, stainless steel, or corrosion resistant steel.

(ii) *Hardware* There are no specific requirements for hardware at this BAL level.

(iii) *Glazing* Where doors incorporating glazing, the glazing shall be Grade A safety glass a minimum of 4mm in thickness.

(iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL level

(v) *Screens* There are no requirements to screen the openable part of the door at this BAL level.

(vi) *Sliding panels* Sliding panels shall be tight fitting to the frame.

Specification (Material or construction method used)

5.5.6 Doors—Vehicle access doors (garage doors)

The following applies to vehicle access doors:

(a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—

(i) non-combustible material; or
(ii) bushfire-resisting timber (see Appendix F); or
(iii) fibre-cement sheet, a minimum of 6 mm in thickness; or
(iv) a timber species as specified in Paragraph E1, Appendix E; or
(v) a combination of any of Items (i), (ii), (iii) or (iv) above.

(b) All vehicle access doors shall be protected with suitable weather strips, draught excluders, draught seals or brushes. Door assemblies fitted with guide tracks do not need gap protection.

NOTES:

1 Refer to AS/NZS 4505 for door types

2 Gaps for door edges or building elements should be protected as per Section 3.

C5.5.6(b) *These guide tracks do not provide a direct passage for embers into the building.*

(c) Vehicle access doors with ventilation slots shall be protected in accordance with Clause 3.6.

Specification (Material or construction method used)

5.6 ROOFS (INCLUDING PENETRATIONS, EAVES, FASCIAS AND GABLES, GUTTERS AND DOWNPIPES)

5.6.1 General

The following applies to all types of roofs and roofing systems:

a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
b) The roof/wall and roof/roof junction shall be sealed, or otherwise protected in accordance with Clause 3.6.
c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet conforming with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.
d) Only evaporative coolers manufactured in accordance with AS/NZS 60335.2.98 shall be used. Evaporative coolers with an internal damper to prevent the entry of embers into the roof space need not be screened externally.

Specification (Material or construction method used)

5.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;
b) cover the entire roof area including the ridge and hips; and
c) extend into gutters and valleys.

d) Be non-combustible; or

e) Comply with AS/NZS 4200.1, be installed on the outside of the frame an have a flammability index of not more than 5 as determined by AS 1530.8.2.

Specification (Material or construction method used)

5.6.3 Sheet roofs

Sheet roofs shall—

a) be fully sarked in accordance with Clause 5.6.2, except that foil-backed insulation blankets may be installed over the battens; or
b) have any gaps greater than 3 mm under corrugations or ribs of sheet roofing and between roof components sealed at the fascia or wall line and at valleys, hips and ridges by—

(i) a mesh or perforated sheet that conforms with Clause 3.6 and that is made of corrosion-resistant steel, bronze or aluminium; or

(ii) mineral wool; or

(iii) other non-combustible material; or

(iv) a combination of any of Items (i), (ii) or (iii) above.

NOTE: Sarking is used as a secondary form of ember protection for the roof space to account for minor gaps that may develop in sheet roofing.

Specification (Material or construction method used)

5.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 5.6.1 to 5.6.6.

b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] conforming with Clause 6.4 shall have a non-combustible roof covering, except where the roof is a translucent or transparent material.

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.

Specification (Material or construction method used)

5.6.5 Roof penetrations

The following applies to roof penetrations:

(a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors and the like, shall be adequately sealed. The material used to seal the penetration shall be non-combustible.

(b) Openings in vented roof lights, roof ventilators or vent pipes shall conform with Clause 3.6 and be made of corrosion-resistant steel, bronze or aluminium.

This requirement does not apply to a room sealed gas appliance.

NOTE: A gas appliance designed such that air for combustion does not enter from, or combustion products enter into, the room in which that appliance is located.

In the case of gas appliance flues, ember guards shall not be fitted.

NOTE: AS/NZS 5601 contains requirements for gas appliance flue systems and cowls. Advice can be gained from the manufacturers and State and Territory gas technical regulators.

(c) All overhead glazing shall be Grade A safety glass complying with AS 1288.

(d) Glazed elements in roof lights and skylights may be of polymer, provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm in thickness shall be used in the outer pane of the IGU.

(e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index not exceeding 5.

(f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(g) Eaves lighting shall be adequately sealed and not compromised for performance of the element.

Specification (Material or construction method used)

5.6.6 Eaves linings, fascias and gables

The following applies to eaves linings, fascias and gables:

(a) Gables shall conform with Clause 5.4.

(b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 5.6.5.

(c) Eaves ventilation openings shall be fitted with ember guards in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

Specification (Material or construction method used)

5.6.7 Gutters and downpipes

This Standard does not provide material requirements for—

(a) gutters, with the exception of box gutters; and

(b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.

Specification (Material or construction method used)

5.7 VERANDAS, DECKS, STEPS, AND LANDINGS

Note: Clause 5.7 has been replaced with Clause 7.7 in accordance with the requirements of Section 7.5.2 PBP 2019

5.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

NOTE: Spaced decking is nominally spaced at 3mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0mm – 5mm during service. It should be noted that recent research studies have shown that gaps at 5mm spacing afford opportunity for embers to become lodges in between timbers, which may contribute to a fire. Larger gap spacing of 10mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

5.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.2.1 Materials to enclose a subfloor space

The subfloor spaces of verandas, decks, steps, ramps and landings are deemed to be 'enclosed' when-

a) The material used to enclose the subfloor space conforms with Clause 5.4; and
b) All openings are protected in accordance with Clause 3.6 and made of corrosion resistant steel, bronze or aluminium.

5.7.2.2 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

5.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

5.7.2.4 Decking, stair treads and the trafficable surfaces of ramps and landings

Decking, stair treads and trafficable surfaces of ramps and landings shall be made from-

(a) non-combustible material; or
(b) bushfire resistant timber (se Appendix F); or
(c) a combination of Items (a) and (b).

5.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.3.1 Supports

Support posts, columns, stumps, stringers, piers and poles shall be-

(a) of non-combustible material; or
(b) bushfire resistant timber (se Appendix F); or
(c) a combination of Items (a) and (b).

5.7.3.2 Framing

Framing of verandas, decks, ramps or landings (i.e. bearers and joists) shall be-

(a) of non-combustible material; or
(b) bushfire resistant timber (se Appendix F); or
(c) a combination of Items (a) and (b).

5.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

Decking, stair treads and trafficable surfaces of ramps and landings shall be-

(a) non-combustible material; or
(b) bushfire resistant timber (se Appendix F); or
(c) a combination of Items (a) and (b).

5.7.4 Balustrades, handrails or other barriers

Those parts of the handrails and balustrades less then 125mm from any glazing or any combustible wall shall be-

(a) non-combustible material; or
(b) bushfire resistant timber (see Appendix F); or
(c) a combination of Items (a) and (b).

Those parts of handrails and balustrades that are 125mm or more from the building have no requirements.

5.7.5 Veranda posts

Veranda posts shall be from-

(a) non-combustible material; or
(b) bushfire resistant timber (see Appendix F); or
(c) a combination of Items (a) and (b).

Specification (Material or construction method used)

5.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.

External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9mm whichever is the greater. The metal pipe shall extend a minimum of 400mm within the building and 100mm below the ground.

NOTE: Refer to State and Territory gas regulations AS/NZS 5601.1 and AS/NZS 4645.1

NOTE: Concern is raised for the protection of bottled gas installations. Location, shielding and venting of the gas bottles needs to be considered.

Specification (Material or construction method used)

I, …….. of ……. ,
builders licence no …….. sincerely declares that all new construction is in accordance with relevant specifications of AS3959:2018.

Signed:

I, ……. the owner of ……, sincerely declares, to the best of my knowledge, that the above builder has conformed with building my dwelling to AS3959:2018 as stated above.

Signed:

APPENDIX

Bushfire-resisting timber species (Appendix F of AS3959:2018)

Where the Australian Standard requires bushfire resisting timber the following list of species is appropriate:

TABLE F1

BUSHFIRE-RESISTANT SPECIES

Standard trade name	Botanical name
Ash, silvertop	*Eucalyptus sieberi*
Blackbutt	*Eucalyptus pilularis*
Gum, red, river	*Eucalyptus camaldulensis*
Gum, spotted	*Corymbia maculata*
Ironbark, red	*Eucalyptus sideroxylon*
Kwila (Merbau)	*Intsia bijuga*
Turpentine	*Syncarpia glomulifera*

Timber Species and Densities (Appendix E of AS3959:2018)

TABLE E1

TIMBER SPECIES WITH A DENSITY OF 750 kg/m³ OR GREATER

Standard trade name	Botanical name
Ash, Crow's	*Flindersia australis*
Ash, silvertop	*Eucalyptus sieberi*
Balau (selangan batu)	*Shorea spp.*
Bangkirai	*Shorea laevifolia*
Belian	*Eusideroxylon zwageri*
Blackbutt	*Eucalyptus pilularis*
Blackbutt, New England	*Eucalyptus andrewsii*
	Eucalyptus campanulata
Box, brush	*Lophostemon confertus*
Box, grey	*Eucalyptus microcarpa*
Box, grey, coast	*Eucalyptus bosistoana*
Box, white-topped	*Eucalyptus quadrangulata*
Box, yellow	*Eucalyptus melliodora*
Brownbarrel	*Eucalyptus fastigata*
Candlebark	*Eucalyptus rubida*
Gum, blue, southern	*Eucalyptus globulus*
Gum, blue, Sydney	*Eucalyptus saligna*
Gum, grey	*Eucalyptus propinqua*
Gum, grey, mountain	*Eucalyptus cypellocarpa*
Gum, Maiden's	*Eucalyptus maidenii*
Gum, manna	*Eucalyptus viminalis*
Gum, red, forest	*Eucalyptus tereticornis*

(*continued*)

TABLE E1 (*continued*)

Standard trade name	Botanical name
Gum, red, river	*Eucalyptus camaldulensis*
Gum, rose	*Eucalyptus grandis*
Gum, spotted	*Corymbia maculata*
	Corymbia henryi
	Corymbia citriodora
Gum, sugar	*Eucalyptus cladocalyx*
Hardwood, Johnstone River	*Backhousia bancroftii*
Ironbark, grey	*Eucalyptus paniculata*
Ironbark, red	*Eucalyptus sideroxylon*
Jarrah	*Eucalyptus marginata*
Kapur	*Dryobalanops spp.*
Karri	*Eucalyptus diversicolor*
Kempas	*Koompassia malaccensis*
Keruing	*Dipterocarpus spp.*
Kwila (Merbau)	*Intsia bijuga*
Mahogany red	*Eucalyptus resinifera*
Mahogany, southern	*Eucalyptus botryoides*
Mahogany, white	*Eucalyptus acmenoides*
Messmate	*Eucalyptus obliqua*
Messmate, Gympie	*Eucalyptus cloeziana*
Northern Box (Pelawan)	*Tristaniopsis spp*
Oak, American	*Quercus spp.*
Peppermint, narrow-leaved	*Eucalyptus australiana*
Satinay	*Syncarpia hillii*
Stringybark, Blackdown	*Eucalyptus sphaerocarpa*
Stringybark, blue-leaved	*Eucalyptus agglomerata*
Stringybark, brown	*Eucalyptus baxteri*
Stringybark, silvertop	*Eucalyptus laevopinea*
Stringybark, white	*Eucalyptus eugenioides*
Stringybark, yellow	*Eucalyptus muelleriana*
Tallowwood	*Eucalyptus microcorys*
Turpentine	*Syncarpia glomulifera*
Woollybutt	*Eucalyptus longifolia*

TABLE E2

SOME TIMBER SPECIES WITH A DENSITY OF 650 kg/m³ OR GREATER

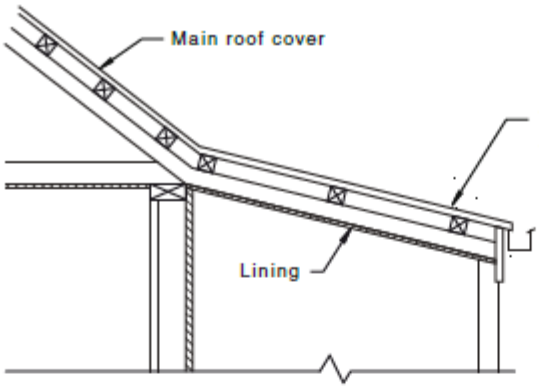
Standard trade name	Botanical name
Ash, alpine	*Eucalyptus delegatensis*
Ash, Crow's	*Flindersia australis*
Ash, mountain	*Eucalyptus regnans*
Ash, silvertop	*Eucalyptus sieberi*
Balau (selangan batu)	*Shorea spp.*
Bangkirai	*Shorea laevifolia*
Beech, myrtle	*Nothofagus cunninghamii*
Belian	*Eusideroxylon zwageri*
Blackbutt	*Eucalyptus pilularis*
Blackbutt, New England	*Eucalyptus andrewsii*
	Eucalyptus campanulata
Blackwood	*Acacia melanoxylon*
Box, brush	*Lophostemon confertus*
Box, grey	*Eucalyptus microcarpa*
Box, grey, coast	*Eucalyptus bosistoana*
Box, white-topped	*Eucalyptus quadrangulata*
Box, yellow	*Eucalyptus melliodora*
Brownbarrel	*Eucalyptus fastigata*
Candlebark	*Eucalyptus rubida*
Cypress	*Callitris glaucophylla*
Gum, blue, southern	*Eucalyptus globulus*
Gum, blue, Sydney	*Eucalyptus saligna*
Gum, grey	*Eucalyptus propinqua*
Gum, grey, mountain	*Eucalyptus cypellocarpa*
Gum, Maiden's	*Eucalyptus maidenii*
Gum, manna	*Eucalyptus viminalis*
Gum, mountain	*Eucalyptus dalrympleana*
Gum, red, forest	*Eucalyptus tereticornis*
Gum, red, river	*Eucalyptus camaldulensis*
Gum, rose	*Eucalyptus grandis*
Gum, shinning	*Eucalyptus nitens*
Gum, spotted	*Corymbia maculata*
	Corymbia henryi
	Corymbia citriodora
Gum, sugar	*Eucalyptus cladocalyx*

(*continued*)

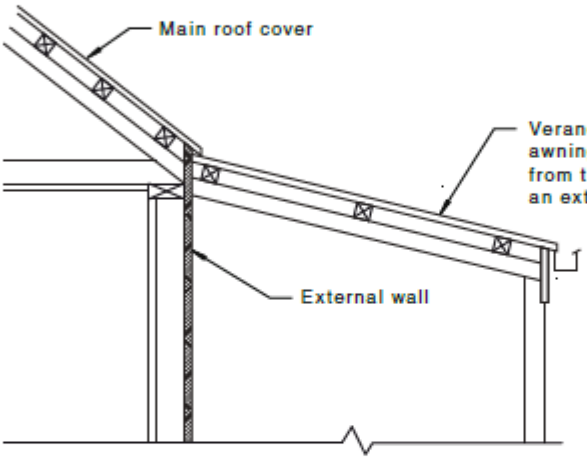
TABLE E2 (*continued*)

Standard trade name	Botanical name
Hardwood, Johnstone River	*Backhousia bancroftii*
Ironbark, grey	*Eucalyptus paniculata*
Ironbark, red	*Eucalyptus sideroxylon*
Jarrah	*Eucalyptus marginata*
Kapur	*Dryobalanops spp.*
Karri	*Eucalyptus diversicolor*
Kempas	*Koompassia malaccensis*
Keruing	*Dipterocarpus spp.*
Kwila (Merbau)	*Intsia bijuga*
Mahogany, Philippine red, dark	*Shorea spp.*
Mahogany red	*Eucalyptus resinifera*
Mahogany, southern	*Eucalyptus botryoides*
Mahogany, white	*Eucalyptus acmenoides*
Messmate	*Eucalyptus obliqua*
Messmate, Gympie	*Eucalyptus cloeziana*
Northern Box (Pelawan)	*Tristaniopsis spp.*
Oak , American	*Quercus spp.*
Peppermint, narrow-leaved	*Eucalyptus australiana*
Pine, celery-top	*Phyllocladus asplenifolius*
Pine, slash	*Pinus elliottii*
Ramin	*Gonystylus spp.*
Rosewood, New Guinea	*Pterocarpus indicus*
Satinay	*Syncarpia hillii*
Stringybark, Blackdown	*Eucalyptus sphaerocarpa*
Stringybark, blue-leaved	*Eucalyptus agglomerata*
Stringybark, brown	*Eucalyptus baxteri*
Stringybark, silvertop	*Eucalyptus laevopinea*
Stringybark, white	*Eucalyptus eugenioides*
Stringybark, yellow	*Eucalyptus muelleriana*
Tallowwood	*Eucalyptus microcorys*
Taun	*Pometia pinnata*
Turpentine	*Syncarpia glomulifera*
Vitex, New Guinea	*Vitex cofassus*
Woollybutt	*Eucalyptus longifolia*

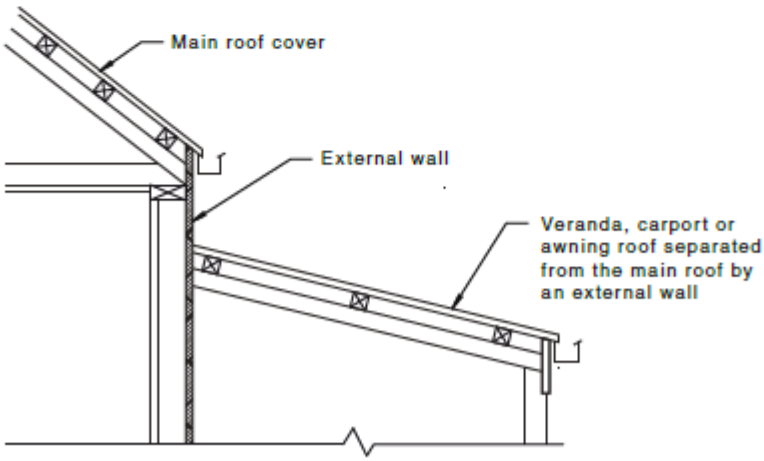
Illustrations (Appendix D of AS3959-2018)



(a) Continuous roof



(b) Continuous roof with veranda, carport or awning roof separated from main roof



(c) Discontinuous roof

FIGURE D1 VERANDA, CARPORT OR AWNING ROOFS SHOWING CONTINUOUS AND DISCONTINUOUS ROOF TYPES

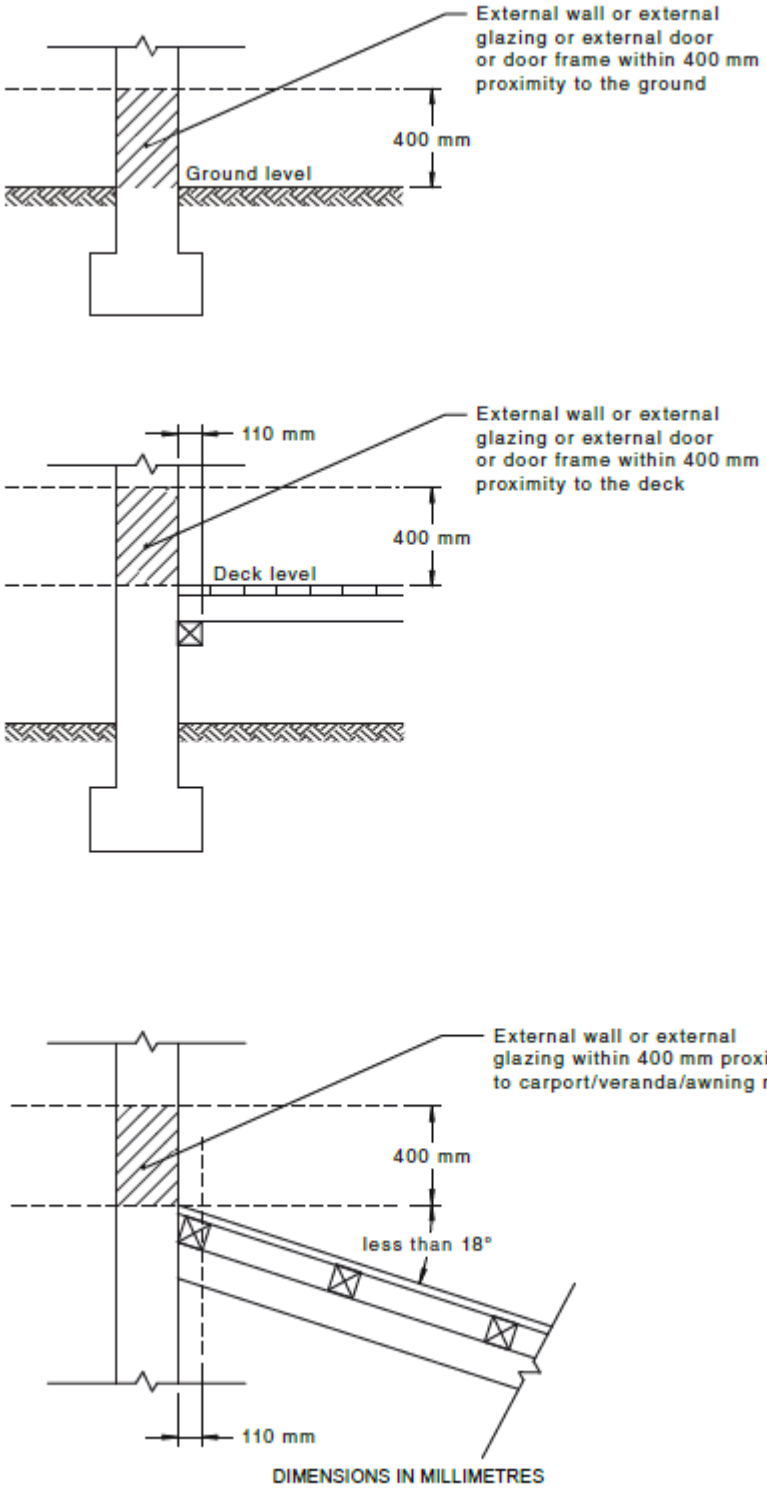


FIGURE D3 EXTERNAL WALLS OR EXTERNAL GLAZING, OR EXTERNAL DOORFRAMES WITHIN LIMITS ABOVE GROUND, DECKS, CARPORT ROOFS

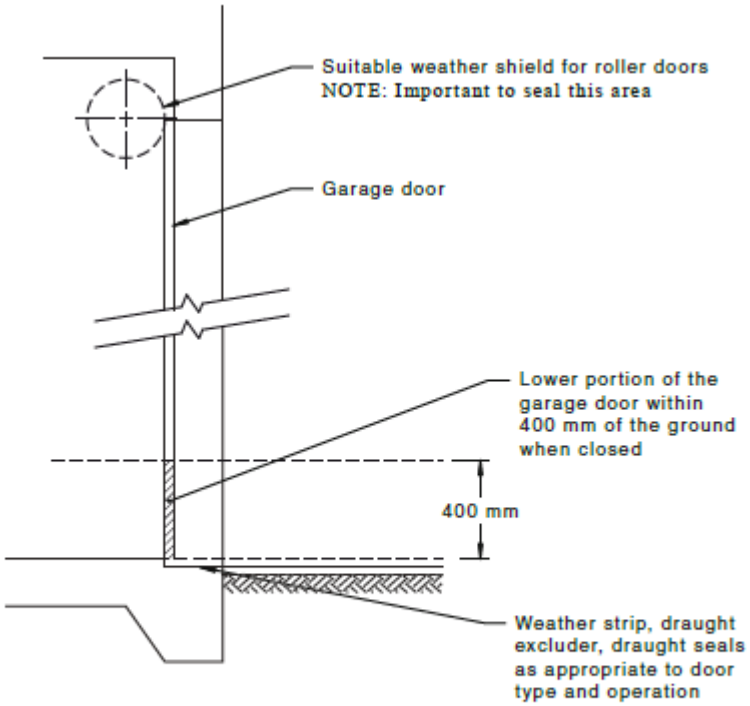


FIGURE D4 VEHICLE ACCESS DOORS (GARAGE DOORS)