



s.79BA 'Infill Development'

Lot 53 DP 517038 3 Bilgola Avenue, Bilgola Beach NSW

Prepared for Currie



August 2016

Prepared by Terence O'Toole B.App.Sc Environmental Health Grad.Dip Design in Bushfire Prone Areas

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The analysis, assessment and recommendations contained in the following Bushfire Assessment Report, are the sole views of Advanced Bushfire Performance Solutions Pty Ltd. The bushfire protection assessment, recommendations and strategies contained in this report are intended to address the submission requirements for DAs on bush fire prone land as outlined in appendix 4 of *Planning for Bush Fire Protection* 2006.

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Document Control

Document Name	Project Ref	Date	Author	Status	
20160512HARR BAR 1.0	20160512HARR	10-Aug-2016	то	Version 1	



1 Bushfire Assessment Certificate

Property Address	3 Bilgola Avenue, Bilgola Beach NSW Alterations and additions to existing residential building and new deck		
Description of Proposal			
Plan Reference	Site Plan DA 02 A Issue 2 Dated 24/05/2016		
BAL Rating	The proposed building has been assessed as requiring a maximum BAL-12.5 construction standard.		
Does the Proposal Rely on Alternative Solutions	YES I (Uses Method 2 assessment methodology)		
	NO 🗹 (Uses Method 1 assessment methodology)		
Does the Proposal	YES 🗹		
Require Referral to the RFS	NO 🗹		
Does the Proposal	YES I (see section 4 of this report)		
Comply with CDC	NO is tsee section 4 of this report		

I, Terence O'Toole of Advanced Bushfire Performance Solutions Pty Ltd have carried out a bushfire risk assessment on the above mentioned proposal and property. This report includes the submission requirements set out in Appendix 4 of *Planning for Bush Fire Protection* 2006 together with recommendations as to how the relevant specifications and requirements are to be achieved.

I hereby certify, in accordance with Section 79BA of the *Environmental Planning and Assessment Act* 1979 No 203:

- 1. That I am a person recognized by the NSW Rural Fire Service as a qualified consultant in bushfire risk assessment; and
- 2. That, subject to the recommendations contained within this report, the proposed development conforms to the relevant specifications and requirements*.

*The relevant specifications and requirements being; specifications and requirements of the document entitled Planning for Bush Fire Protection, ISBN 0 9751033 2 6, prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and any other document prescribed by Section 79BA(1)(a) of the Environmental Planning and Assessment Act 1979 No 203.

I am aware that this Bushfire Assessment Report, prepared for the above mentioned site, is to be submitted in support of a development application for this site and will be relied upon by the consent authority as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* and *Planning for Bush Fire Protection 2006*.

Terence O'Toole

10 August 2016

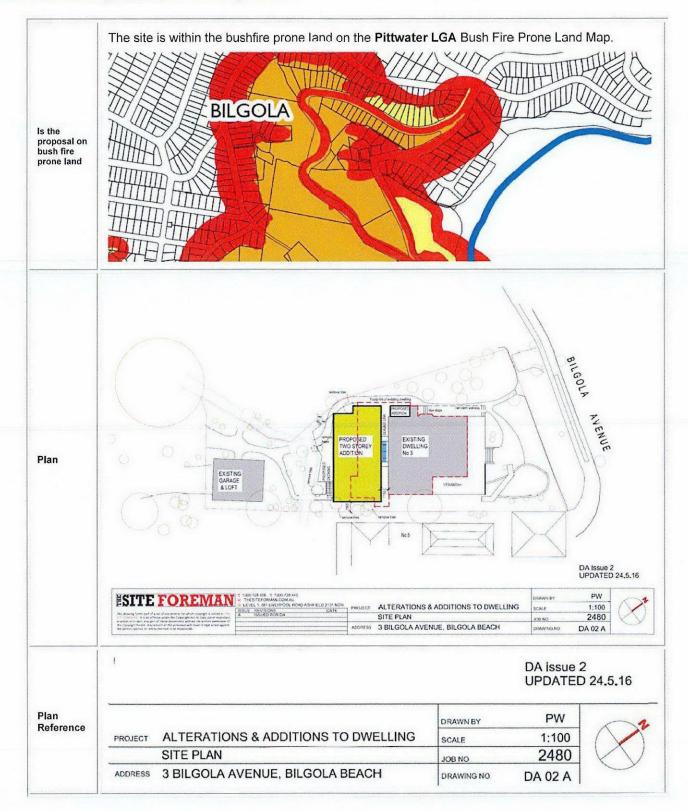
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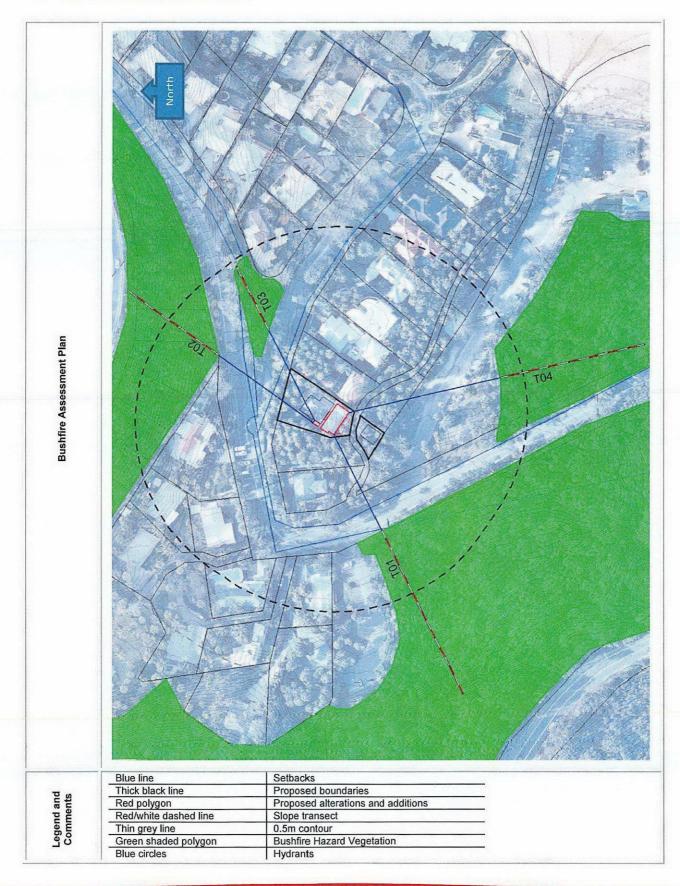


2 Proposed Development





3 Assessment Details





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Bushfire Assessment Report

APZ located who APZ managed to	in accordance with Appendix 2 Ily within the development
Vegetation	 The SixMaps mapping (SydneyMetroArea) classifies the vegetation north, west and south of the site as predominantly dry sclerophyll forest. Some lesser fringe zones are classified as littoral rainforest however, they do not represent a significant extent such that bushfire behaviour would be affected. The small isolated stand of vegetation to the north east of the site is classified as remnant vegetation as it does not support a greater than 50m fire run.
Slope	 Slopes influencing bushfire behaviour were calculated from 0.5m contours extracted from LPI 1m DEM The slopes are represented by 4 transects (T01-T04) All bushfire hazard vegetation is located on up-slopes to the proposed development.
Environmental Features	• None
Setback	 Setbacks are measured from the footprint of the proposed works to the edge of the bushfire hazard vegetation. The proposed building complies with AS3959-2009 Method 1 setbacks The site is able to fully support the Method 1 minimum setbacks for BAL-12.5 by utilising managed land on adjoining lots and road reserves. No APZs are proposed beyond the boundaries of the development; however existing managed lands may be relied upon for APZs. No new or additional APZ burden will be placed on adjoining landowners. All proposed APZs (see table below) are practical, do not compromise soil stability and negate potential crown fires within the APZ.
Construction	 The proposed building and deck will be constructed to AS3959-2009 requirements for BAL-12.5. The existing building should be upgraded to improve the resilience of the building. The measures to upgrade are described in the RFS document <i>Best Practice Guide- Upgrading of Existing Buildings</i>. This will effectively ember-proof the building and will generally not substantially increase the cost of the development.
Management	 The entire residential lot is to be managed (as a minimum) to inner protection area (IPA) standards and maintained at this standard for the life of the development or until no longer required. All asset protection zones provided within the residential lot will be the responsibility of the landowner. Where practical overhanging trees should be pruned to reduce leaf litter accumulation on the roof.

Bushfire Assessment Summary Table

Transect	101	102	103	TOA
Vegetation Type	Dry Sclerophyll Forest	Dry Sclerophyll Forest	Remnant	Dry Sclerophyl Forest
Slope	-9.98°	-17.02°	-9.23°	-4.46°
Complying Table A2.4 setback				
Complying Table 2.4.2 setback	48-<100m	48-<100m	23-<100m	17-<24m
Method 2 modelled setback				
Proposed setback	60.40m	65.60m	57.25m	87.53m
Compliance	Yes	Yes	Yes	Yes
BAL Rating	BAL-12.5	BAL-12.5	BAL-12.5	BAL-12.5



Services Compliance with	h s.4.1.3. for services
Water	 A reticulated mains water network is currently available to the site. An existing hydrant is located within 50m of the building. No additional hydrants would be required to provide suitable coverage. The entire residential building is within 90m of the hydrant and as such complies with AS29419.1 – 2005 distances (20m from hydrant to tanker, 60m of hose and a 10m jet of water = 90m) All above ground pipes and fittings are to be metal.
Electricity	 Power transmission lines external to the site are above ground. All new power lines within the site should be located underground.
Gas	 No information provided. Should gas be provided then it must comply with appropriate standards. All above ground pipes and fittings should be metal
Access Compliance with	h s.4.1.3(1)

Compliance wit	11 3.4.1.3(1)	
	 Perimeter Roads (interfacing with the bushland) No perimeter road is proposed by this development application 	Yes
	 Non-Perimeter Roads No non-perimeter roads are proposed by this development application 	Yes
	One Way Access Roads No one-way access roads are proposed by this development application	Yes
Public access road	Dead Ends No dead-end road is proposed by this development application	Yes
	All Roads No roads are proposed by this development application 	Yes
	 Hydrants and Parking No hydrants or parking are proposed by this development application 	Yes
Property access	 The property access road is not required to comply with the provisions of section 4.1.3 (2) of <i>Planning</i> for Bush Fire Protection 2006 as the building less than 70m from the nearest road. The road speed limit is not greater than 70kph. The driveway should be 4m wide (min) (not mandatory) Due to the short length of the driveway no turning head, turning bay or the like is warranted. 	Yes
Fire Trails	No perimeter fire trails are proposed by this development application	Yes
Landscapin Compliance wit		
Landscaping	 No landscape plan has been reviewed for this report. Any new landscaping within the development should adopt (where practical) the following principles: Moisture content of leaves should be high (250-400% of dry oven weight) 	

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	 Volatile oil content of leaves should be low 	
ALTER A CARGO AND	 Mineral content of leaves should be high 	
	• Leaves should be thick (broad) with low area to volume ratio	
	 Density of foliage should be high and less permeable to air flow 	
	• Continuity of plant form should be broken or separated	
	• Height of lowest foliage above ground should be maximised	
	 Size of plant should be wide spread rather than tall and narrow 	
	• Dead foliage on the plant should be minimal	
	 Bark texture should be tight and smooth 	
	 Quantity of ground fuels should be minimised 	
	• Fineness of ground fuels should be minimised	
	• Compaction ability of ground fuels should be maximised	
	 Mineral content of ground fuel should be maximised 	
Other		
Environmental Impact	None noted	
Other BPMs	No additional measures	
Deviations	 The assessment does not deviate from the standards, specific objectives and performance criteria of Planning for Bush Fire Protection 2006 	



4 SEPP (Exempt & Complying Development Codes) 2008 Part 3 General Housing Code, Subdivision 9

Clause 3.36B Development standards for bush fire prone land

Part 3A Rural Housing Code, Subdivision 9

lause 3A.37 Development standards for bush fire prone land

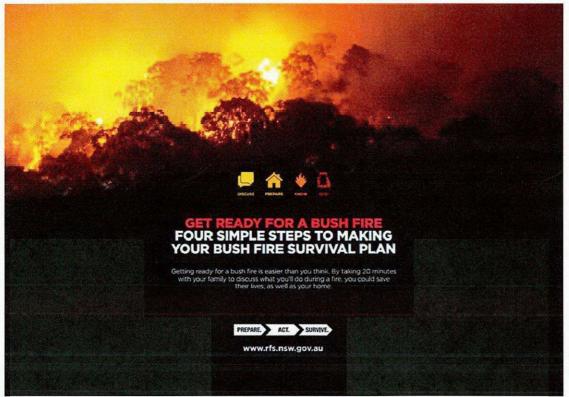
Sub Clause	Determination	Compliance
2(a)	 The development conforms to the specifications of Planning for Bush Fire Protection 2006 and Addendum Appendix 3 	Yes
2(b)	 The development is not within bushfire attack level – 40 (BAL-40) or the flame zone (BAL- FZ). 	Yes
2(c)	3. The lot has direct access to the public road.	Yes
2(d)	4. A reticulated water supply is connected to the lot	Yes
2(e)	5. Hydrant is located within 60m of the development	Yes
2(f)	6. Mains electricity is connected to the site	Yes
2(d)	7. The development is within 200m of the public road	Yes
2(e)	 The property access road complies with s.4.1.3. (2) of Planning for Bush Fire Protection 2008 	Yes
2(f)	9. A 20,000L water storage tank is provided with 65mm Storz fitting.	Yes
2(g)	 Bottled gas is installed and maintained in accordance with Australian Standard AS/NZS 1596:2002: 'The storage and handling of LP gas' and the requirements of relevant authorities 	Yes
2(h-j)	11. Gas cylinders are provided. Gas cylinders kept close to the building shall have release valves directed away from the building and be located at least 2 metres away from any combustible material. Connections to and from gas cylinders are to be metal. There are no polymer sheathed flexible gas supply lines to gas meters adjacent to the dwelling	Yes



5 Bushfire Protection Measures - recommendations

Performance Criteria	Recommendation	
APZ	 The residential lot shall be managed to inner protection area standards as described in the RFS documents <i>Planning for Bush Fire Protection</i> 2006 and <i>Standards for Asset Protection</i> <i>Zones</i>. 	Yes
Construction	 The new additions and alterations to the residential building and the new deck shall be constructed to the requirements of AS3959-2009 for BAL-12.5 The existing residential building shall be upgraded to provide ember protection consistent with the RFS <i>Best Practice Guide – Upgrading of Existing Buildings</i> 	Yes
Access	4. None	Yes
Services	5. All services shall comply with Section 4.1.3 of Planning for Bush Fire Protection 2006	Yes
Landscaping	6. None	Yes
Emergency	7. The developer is encouraged to prepare a NSW RFS Bush Fire Survival Plan (Appendix A)	NA

Appendix A – Bush Fire Survival Plan



http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0003/36597/GetReadyforaBushFire.pdf

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Appendix B – Asset Protection Zone Standards

Planning for Bush Fire Protection 2006

Asset Protection Zone	Inner Protection Area	Outer Protection Area
(p.10)Buffer zone between bush fire hazard and buildings. Managed progressively to minimise fuel loads and reduce bushfire attack.	(p.10) Closest to buildings, incorporating the defendable space and for managing heat intensities at the building surface	(p.10) reducing the potential length of flames by slowing the rate of spread, filtering embers and suppressing crown fire
(p.10) defendable space is a subset of APZ	(p.50) The IPA is critical to providing a defendable space and managing heat intensities at the building surface. The IPA may be increased at the expense of the OPA	(p.50) the OPA serves to reduce the potential length of flames by slowing the ROS, filtering embers and reducing the likelihood of crown fires
(p.12) fuel reduced physical separation. Based on keeping radiant heat levels at buildings below 29kWm ⁻²	 (p.51) An IPA should provide a tree canopy cover of less than 15% and should be located >2m from any part of the roofline of a dwelling. Garden beds and flammable shrubs are not to be located under trees and should not be located <10m from an exposed window or door. Lower limbs should be pruned to a height of 2m above the ground 	(p.51) An OPA should provide a tree canopy cover of less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season
(p.13) Where an APZ easement is established to the benefit of Community Title is shall be maintained in accordance with a PoM	Biogram	2
(p.18) Intent of Measures- to provide sufficient space and maintain reduced fuel load, so as to ensure radiant heat levels at the building are below critical limits and to prevent direct flame contact with a building		
(p.18) APZ is designed to minimise the presence of fuels which could become involved in a fire		
(p.19) APZs are managed and maintained to prevent the spread of fire towards the building. In accordance with the requirements of Standards for		

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Asset Protection Zones	
(RFS,2005)	
Location of APZs on slopes >18	
is not supported for new	
development on wooded	
vegetation due to	
environmental constraints and	
difficulties in management. In	
addition, vegetation could carry	
a canopy fire without the	
support of understorey fuel	
(p.71) Retention of taller trees	
will assist in filtering out	
embers	
Tree canopy is not contiguous	

Standards for Asset Protection Zones

Asset Protection Zone	Inner Protection Area	Outer Protection Area
APZ is a fuel reduced area surrounding a built asset or structure		
APZ should be wholly located within your land		
Fallen ground fuels <6mm dia and bark should be removed on a regular basis		
Grasses need to be kept short and where possible green		
Separate tree crowns by 2-5m		
Canopy should not overhang within 2-5m of a dwelling		
Native trees and shrubs should be retained as clumps or islands and should maintain a covering of <20% of the area.		
Ensure there is no contiguous fuel path to the dwelling		
Fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts, and vegetable gardens are permitted in an APZ		



Appendix C – Bushfire Assessment Table

Transect	101	102	103	TOA
Vegetation Type	Dry Sclerophyll Forest	Dry Sclerophyll Forest	Remnant	Dry Sclerophyll Forest
Table 2.4.2 Vegetaion code	А	Α	F	А
Proposed Setback	60.40m	65.60m	57.25m	87.53m
Near Elevation	12.50m	19.00m	12.50m	12.00m
Far Elevation	30.50m	38.00m	19.00m	18.50m
Fall	-18.00m	-19.00m	-6.50m	-6.50m
Run	102.33m	62.06m	40.01m	83.39m
Slope	-9.98°	-17.02°	-9.23°	-4.46°
Up/Down	US	US	US	US
Table 2.4.2 Slope Range	US/Flat	US/Flat	US/Flat	US/Flat
Target Table A2.4 Setback				
Table A2.4 compliance				
Target Table 2.4.2 Setback Range	48-<100m	48-<100m	23-<100m	17-<24m
Actual Table 2.4.2 Setback Range	48-<100m	48-<100m	23-<100m	35-<100m
Actual Table 2.4.2 BAL	BAL-12.5	BAL-12.5	BAL-12.5	BAL-12.5
Table 2.4.2 BAL-29 compliance	Yes	Yes	Yes	Yes
Site Slope Near Elevation		•	-	-
Site Slope Far Elevation		L. B.		
Site Slope Length			-	
Site Slope	-			-
Up/Down	-		-	-
Flame width	100.00m	100.00m	100.00m	100.00m
Surace Fuel Load				
Elevation of Reciever	Default	Default	Default	Default
Radiant Heat Flux	-		-	-
Flame Length	•		•	
Flame angle		-	an a	-
Method 2 BAL	NA	NA	NA	NA

Appendix D – Extract from Best Practice Guidelines

BUILDING ELEMENT	MINIMAL PROTECTION MEASURES	ADDITIONAL PROTECTION MEASURES
GENERAL	 Seal all gaps (>3mm) around the house (excluding subfloor) with: appropriate joining strips; flexible silicon based sealant; or mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium. 	 Install a bush fire sprayer system. (Please contact a bush fire consultant or relevant industry expert to discuss options) Seal all gaps (>3mm) around the house (excluding subfloor) with: appropriate joining strips flexible silicon based sealant; or mesh with a maximum aperture of 2mm,
		made from corrosion resistant steel, bronze or aluminium.
WALLS	Install sarking with a flammability index of not more than 5 behind weatherboards or other external cladding when they are being replaced for maintenance or other reasons.	 Replace wall materials with non- combustible materials Install sarking with a flammability index of not more than 5 behind weatherboards or other external cladding.
SUBFLOOR	Removal of combustible materials and keeping areas clear and accessible.	 Enclose subfloor with non- combustible material.
DOORS	Install weather strips, draught excluders or draught seals at the base of side- hung doors.	 Replace external doors with non- combustible or solid timber doors with minimum thickness of 35mm. Replace or over-clad parts of door frames less than 400mm above the ground, decks and similar elements or fittings with non-combustible material. Install weather strips, draught excluders or draught seals at the base of side-hung doors.
VENTS & WEEPHOLES	Seal vents and weepholes in external walls with mesh (with an aperture size of 2 mm) of corrosion resistant steel, bronze or aluminium.	 Seal vents and weepholes in external walls with mesh (with an aperture size of 2 mm) of corrosion resistant steel, bronze or aluminium.
ROOFS	Seal around roofing and roof penetrations with a non-combustible material. Install sarking with a flammability index of not more than 5 beneath existing roofing when it is being replaced for maintenance or other reasons. If installed, gutter and valley leaf guards shall be non-combustible.	 Replace fascia and roof materials with non-combustible materials. Seal around roofing and roof penetrations with a non-combustible material. Install sarking with a flammability index of not more than 5 beneath existing roofing. If installed, gutter and valley leaf guards shall be non-combustible.
WINDOWS	Install mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium to all external doors and openable windows	 Installing appropriately tested shutters to doors and windows Install mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium to all external doors and windows Replacing glass with toughened or laminated safety glass Replace overhead glazing with 'grade a' safety glass
EXTERNAL STRUCTURES		 External structures to be located >10 metres from the main dwelling.
DECKING		Replace decking with non- combustible material

NSW RFS DEVELOPMENT ASSESSMENT 0914

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Appendix E – Fast Fact 4/10

NSW RURAL FIRE SERVICE

COMMUNITY RESILIENCE FAST FACTS



Building Elements not addressed in AS3959-2009

This Fast Fact outlines the requirements of the NSW Rural Fire Service (RFS) for the following elements of buildings located on bush fire prone land that are not specifically addressed by AS3959 (2009) - Construction of buildings in bushfire-prone areas:

- · Timber supports, posts and beams
- Fascia and Bargeboards for Bushfire Attack Level (BAL) 40.

Timber Supports, Post and Beams

AS3959 (2009) - Construction of buildings in bushfire-prone areas does not address construction requirements for exposed timber supports, posts and beams for uses such as verandas, carports and awning roofs. As such, there is a need to adopt a practical approach to the matter and ensure that the intent of AS3959 and *Planning for Bush Fire Protection 2006* (PBP) is applied.

Specifically:

- timber posts supporting the roof load only and not supporting a deck;
- exposed timber beams supporting the roof load only;
- timber posts and exposed beams which are purely decorative and offer no structural support to the dwelling (such as pergolas)

Application

In determining the type of timber appropriato in those circumstances, the requirements of AS3959 and Addendum Appendix 3 of PBP for other similar building elements have been considered. Therefore, the NSW RFS provides the following advice in regards to the applications described above;

BAL 12.5 and BAL19

a) non combustible material, or

- b) a timber species identified in Paragraph E1, Appendix E of AS3959; or
- c) bush fire resisting timber identified in Appendix F of AS3959,or
- d) timber logs of a species with a density of 680kg/m3 or greater at a 12 % moisture content,; of a minimum nominal thickness of 90mm and a minimum thickness of 70mm and gauge planed; or
- e) a combination of a), b), c) or d)

BAL 29

a) non combustible material, or

- b) bush fire resisting timber identified in Appendix F of AS3959,or
- c) a combination of a) and b)



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NSW RURAL FIRE SERVICE

COMMUNITY RESILIENCE FAST FACTS



BAL 40

- d) Non combustible,
- e) comply with 1530.0.1,
- f) combination of a) and b)

BAL FZ - Performance based - Generally, non combustible construction materials are permitted. Materials that comply with 1530.8.2 and do not support flaming are also considered appropriate.

Please note that the above requirements are deemed necessary regardless of whether the timber supports / posts / beams are load bearing or non-load bearing. These requirements attempt to mitigate the ignition of timbers and the spread of fire to other building components (e.g. windows, eaves, roof cavity) as well as addressing any issues associated with structural integrity of the building when exposed to bush fire.

In the opinion of the NSW RFS, the above measures will ensure that the requirements for exposed timbers as per AS3959 and PBP are applied consistently and that building occupants are provided with what is currently considered best practice for bush fire protection.

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A performance based solution should be undertaken in situations where alternative timber baced products are proposed (e.g. glue laminated members). The performance based solution will need to demonstrate that the product can perform as well as one of the recognised bush fire resisting timber species. It is recommended that testing in accordance with Appendix F of AS3959 form part of any performance based solution.

BAL-40 Fascia and Bargeboards

The RFS understands that limited, if any, testing of products for suitability for fascia has occurred.

Following a review of AS3959 and the provisions for BAL-40, it is the opinion of the RFS that, as an interim measure (until turther testing in accordance with 1530.8.1 occurs), the requirements for external walls (section 8.4 of AS3959) are considered appropriate for fascia and bargeboards. Please note that the requirements for protection of openings still apply to fascia and bargeboards.

Should you wish to obtain a second opinion on these matters, the NSW RFS would encourage you to contact Standards Australia directly.

Disclaimer: Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above



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