



Certified **Bushfire Assessment Report**

s.79BA 'Infill Development' – Boarding House

**Lot 2506 DP752038
Bundaleer Road Belrose NSW**

Northern Beaches LGA

**Prepared for
Vigor Master**

Nov 2016

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



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Document Control

Document Name	Project Ref	Date	Author	Status
20120802VIG BAR 1.0	20120802VIG	28-Apr-13	TO	Version 1
20161110VIG BAR 2.0	20161110VIG	10-Nov-16	TO	Version 1



1 Bushfire Assessment Certificate

Property Address	Lot 2506 Bundaleer Street, Belrose NSW
Description of Proposal	New boarding house
Plan Reference	Site Plan DWG: M101 Issue B Dated: 08/11/2013
BAL Rating	The proposed building has been assessed as requiring a maximum BAL-29 construction standard.
Does the Proposal Rely on Alternative Solutions	YES ☒ NO
Does the Proposal Require Referral to the RFS	YES ☒ NO

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 *Planning for Bush Fire Protection* 2006.

Terence O'Toole

10/11/2016

BAppSc Environmental Health
Grad. Dip Design for Bushfire Prone Areas
Director/Principal Consultant

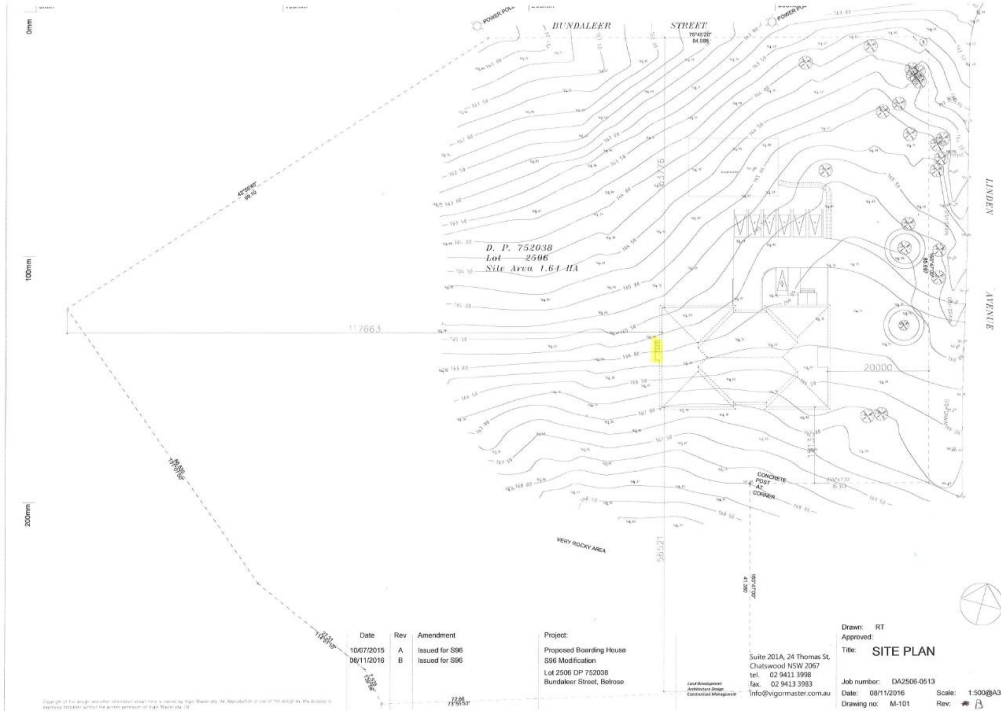
BPAD-A Certified Practitioner BPD-PA-13734
Corporate Member No. 13734 Fire Protection Association Australia





2 Assessment Details

The site is within the bushfire prone land on the **Warringah LGA Bush Fire Prone Land Map**.

Description	Construction of a new boarding house
Plan	 Plans shows extent of bushfire hazard and assessed transects. White line denotes edge of vegetation. Purple lines denote transects. Yellow line denotes boundary. Grey dashed lines denote driveways  Plan of proposed boarding house. Site Plan DWG: M 101 Issue B Dated: 08/11/2016



Asset Protection Zones and AS3959 construction

Complies

APZ determined in accordance with Appendix 2, construction in accordance with Appendix 3

Fire Danger Index (FDI) Greater Sydney Region (100)

Aspect	Vegetation	Slope	current Setback	Min Req'd Setback	BAL	Comply
North	Managed					
North East	Sydney Sandstone Ridgetop Woodland (DSF)	6°	106m	26m*	12.5	Yes
East	Managed					
South East	Managed					
South	Remnant Sydney Sandstone Ridgetop Woodland (Rainforest)	8°(U)	23m	11m^	12.5	Yes
South West	Remnant Sydney Sandstone Ridgetop Woodland (Rainforest)	0°	42m	11m^	12.5	Yes
West	Coastal Sandstone Heath (Scrub)	4°	47m	15m^*	12.5	Yes
North West	Coastal Sandstone Heath (Scrub)	5°	90m	15m^	12.5	Yes

*denotes minimum complying setback derived from Method 1 of AS3959-2009

*denotes minimum complying setback derived from view factor modeling using Method 2 of AS3959-2009 (see Appendix C).

AS3959-2009 provides two methods to determine complying Bushfire Attack Levels (a simple and a detailed procedure). The detailed Method 2 procedure has been adopted for this assessment of the NE and W. It was not applied to the NW due to the large setback and not to the S & SW due to the remnant nature of the vegetation.

Area near southern boundary is naturally maintained to outer protection area standards due to extensive rock outcrops. This has not been factored into the assessment.

Setbacks based on management of the lot to APZ standards. Adjoining residential lots to the east and south are managed.

Previous RFS approvals for this site were based on Dry Sclerophyll Forest to the north and Heath to the west.

Boarding Houses are limited to a maximum BAL-29 construction standard.

Current clearing of the site will support BAL-12.5 construction standard

Access

Complies

Compliance with s.4.1.3(2) and s.4.2.7 for internal roads

Public access road	- Existing road 6.5m paved - Speed limited to <70kph
Property access	- The most distant external portion of the building is within 70m of the public road which is rated at no greater than 70kph and as such no specific access requirements apply. - Building is within 24m of road (and no greater than 55m) - Driveway is all weather & two wheel drive - Driveway is 3.5m wide and extends for 40m from the paved public road. - There are no overhanging obstructions within 4m (vertical) - Access grade is less than 10 degrees with crossfall less than 10 degrees - Access does not traverse wetlands and is not subject to periodic inundation - Surface is able to support 15t fire fighting vehicles - Tankers are able to comply with AS2419 distances (20m hydrant+ 60m hose + 10m jet = 90m)



	without entering the lot.	
	No hydrants are located within driveway	
Services Compliance with s.4.1.2. for services		Complies
Water	100mm reticulated ring mains network located within northern road reserve (Bundaleer St) - Hydrant located 58m north of the building and within 86m of the most distant portion of the new works - No hydrants are located within driveways - Onsite water storage tank is not required - All above ground pipes and fittings are metal	
Electricity	- Power transmission lines external to the site are above ground - Power transmission lines within the site will be underground	
Gas	- Gas services were not identified on the site. Exposed pipes should be metal or shielded. - No gas bottles were identified on the site or in the proposed plans - No information provided. Should gas be provided then it must comply with appropriate standards and ensure that it is shielded from direct bushfire impacts. Bottled gas vents should be directed away from the building.	
Landscaping Compliance with Appendix 5		Complies
Landscaping	- There is no continuity between vegetation on the site and the bushfire hazard vegetation - The site has not been landscaped; however there is little available space for a significant bushfire hazard to develop. - Landscaping within the development should adopt (where practical) the following principles: - Moisture content of leaves should be high (250-400% of dry oven weight) - Volatile oil content of leaves should be low - 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	
Environmental Impact	No details of any threatened or endangered species or communities were provided for this assessment. No details about aboriginal or heritage listed sites were provided for this assessment.	



3 Bushfire Protection Measures - recommendations

Performance Criteria	Recommendation	Compliance
Defendable Space	1. Ensure that clear pedestrian access is provided about the perimeter of the proposed building.	Yes
APZ	2. The lot shall be maintained to inner protection area standards as described in the RFS documents; PBP2006 and Standards for Asset Protection Zones to the following distances: • North 26m • East to boundary • South 11m • West 15m	Yes
Siting and Design	3. None	Yes
Construction	4. New building construction should comply with design and material recommendations detailed in section 7 of AS3959-2009 for BAL-29	Yes
Access	5. None	NA
Services	6. None	Yes
Landscaping	7. Landscaping within the development should adopt (where practical) the principles detailed in Appendix 5 of PBP2006. a. Moisture content of leaves should be high (250-400% of dry oven weight) b. Volatile oil content of leaves should be low c. Mineral content of leaves should be high d. Leaves should be thick (broad) with low area to volume ratio e. Density of foliage should be high and less permeable to air flow f. Continuity of plant form should be broken or separated g. Height of lowest foliage above ground should be maximised h. Size of plant should be wide spread rather than tall and narrow i. Dead foliage on the plant should be minimal j. Bark texture should be tight and smooth k. Quantity of ground fuels should be minimised l. Fineness of ground fuels should be minimised m. Compaction ability of ground fuels should be maximised n. Mineral content of ground fuel should be maximised	Yes
Emergency	8. The occupier is encouraged to develop a Home Fire Escape Plan (see Appendix B).	NA



Appendix A - Construction recommendations

Element	BAL-Low Standard	BAL-12.5	BAL-19	BAL-29	BAL-40	Housing construction and design option
Subfloor Supporting Posts, Columns, Stumps, Piers and Poles	x	✓	✓	✓		Principal building only - Non-combustible materials or bushfire resisting timber or a totally enclosed sub-floor space with external wall or mesh with aperture no greater than 2mm
					✓	Principal building only - Non-combustible materials or a totally enclosed sub-floor space with external wall
Slab Floors	✓	✓	✓	✓	✓	A concrete slab-on-the-ground
Elevated Floors, Bearers and Joists	x	✓	✓	✓		Unenclosed and <400mm from ground level – Bearers, joists and flooring are non-combustible or bushfire resisting timber or flooring maybe lined with sarking type material or mineral wool insulation
					✓	Unenclosed – Bearers , joists and flooring are non-combustible materials or lined with non-combustible materials (FC or metal sheets)
External Walls	x	✓	✓			<400mm from ground level– non-combustible or fibre cement external cladding or bushfire resisting timber or timber from Table E1
				✓		Non-combustible material or 6mm FC clad/steel sheet/bushfire resisting timber with sarking lined frames
					✓	Non-combustible material or 9mm FC clad/steel sheet with sarking lined frames
	x	✓	✓	✓	✓	All cladding joints provide gaps no greater than 3mm or Framed wall with non-combustible sarking or insulating material, and
Bushfire Shutters	x	✓	✓			Non-combustible material, fire resisting timber or Table E1 timber
				✓		Non-combustible material or fire resisting timber
					✓	Non-combustible material
Screens	x	✓	✓	✓		Corrosion resistant steel, bronze or aluminium mesh with an aperture no greater than 2mm
					✓	Corrosion resistant steel or bronze mesh with an aperture no greater than 2mm
Windows	x	✓				Protected by a bushfire shutter or externally screened or bushfire resisting timber, Table E1 timber, metal or metal reinforced PVC-U framing, metal sash, (where below 400mm from ground) Grade A 4mm safety glass or glass blocks or (where not below 400mm) annealed glass and openable portions of windows are screened
			✓			Protected by a bushfire shutter or externally screened or bushfire resisting timber, Table E1 timber, metal or metal reinforced PVC-U framing, metal sash, (where below 400mm from ground) 5mm Toughened glass or glass blocks or (where not below 400mm) annealed glass and openable portions of windows are screened
				✓		Protected by a bushfire shutter or bushfire resisting timber, metal or metal reinforced PVC-U framing, metal sash, 5mm toughened glass glazing, (where below 400mm from ground) this portion of glazing is screened and openable portions of windows are screened
					✓	Protected by a bushfire shutter or metal framing, 5mm toughened glass glazing, openable & fixed portions of windows are screened with corrosion resistant steel or bronze mesh with an aperture no greater than 2mm, seals of material with flammability index no greater than 5
External Doors	x	✓				Protected by a bushfire shutter or externally screened or door made from non-combustible material or solid timber (35mm thick) or hollow core with non-combustible kickplate (lower 400mm) or fully glazed door framed (or lower 400mm of part of door assembly) with non-combustible material, bushfire resisting timber, Table E1 timber, metal, metal reinforced PVC-U and glazing as per windows. Tight fitting to door frame with weather strips or draught excluders and draught seals.
			✓			Protected by a bushfire shutter or externally screened or door made from non-combustible material or solid timber (35mm thick) or hollow core with non-combustible kickplate (lower 400mm) or fully glazed door framed (or lower 400mm of part of door assembly) with non-combustible material, bushfire resisting timber, Table E1 timber, metal, metal reinforced PVC-U and 5mm toughened glass. Where door frame is >400mm from ground it is of non-combustible material, bushfire resisting timber, Table E1 timber, metal, metal reinforced PVC-U. Doors tight fitting to door frame with weather strips or draught excluders and draught seals.

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				✓		Protected by a bushfire shutter or externally screened or door made from non-combustible material or solid timber (35mm thick) or hollow core with screen or fully framed glazed door of non-combustible material/bushfire resisting timber and 5mm toughened glass (below 400mm screened). Door frame is non-combustible material, bushfire resisting timber, Table E1 timber, metal, metal reinforced PVC-U. Doors tight fitting to door frame with weather strips or draught excluders and draught seals. Fittings are metal.
					✓	Protected by a bushfire shutter or door made from non-combustible material or solid timber (35mm thick) (below 400mm screened) or fully framed glazed door of non-combustible material and 6mm toughened glass (below 400mm screened). Tight fitting to metal door frame with weather strips or draught excluders and draught seals (silicone). Fittings have FRL -/30/-.
Sliding Doors	x	✓				Protected by shutters or fully screened or Grade A safety glass with optional screens on the openable portion. Tight fitting in frame.
			✓			Protected by shutters or fully screened or 5mm toughened glass with optional screens on the openable portion. Tight fitting in frame.
				✓		Protected by shutters or fully screened or doorframes of bushfire resisting timber/metal with metal fittings, 6mm toughened glass except where screened on the openable and fixed portion. Tight fitting in frame.
					✓	Protected by shutters or doorframes of metal with metal fittings, glazing meets FRL -/30/- except where screened on the openable and fixed portion. Seals are silicone. Tight fitting in frame.
Garage Doors	x	✓	✓			<400mm from ground level– non-combustible or fibre cement (6mm) or fire resistant timber or timber from Table E1, fitted with weather strips, draught excluders, draught seals or guide tracks with gaps no greater than 3mm, roller doors with guide track gaps no greater than 3mm and fitted with nylon brush, no ventilation slots
				✓		Doors are non-combustible or bushfire resisting timber or 6mm fibre cement, fitted with weather strips, draught excluders, draught seals or guide tracks with gaps no greater than 3mm, roller doors with guide track gaps no greater than 3mm and fitted with nylon brush, no ventilation slots
					✓	Doors are non-combustible, fitted with weather strips, draught excluders, draught seals or guide tracks with gaps no greater than 3mm, roller doors with guide track gaps no greater than 3mm and fitted with nylon brush, no ventilation slots
Vents and Weepholes	x	✓	✓	✓	✓	Gaps greater than 3mm are screened
Roofs	x	✓	✓	✓	✓	Roof tiles and sheets are non-combustible, the roof/wall junction shall be sealed with gaps no greater than 3mm, roof ventilation openings shall be screened.
	x	✓	✓	✓	✓	Tiled roofs shall be fully sarked with material with flammability index of not more than five (5) and located directly below the battens covering the entire roof area including ridge with no gaps
	x	✓	✓	✓	✓	Sheeted Roofs shall be fully sarked or have no gaps greater than 3mm with under the corrugations sealed with mesh or non-combustible material
	x	✓	✓	✓	✓	Roof penetrations shall be sealed with a non-combustible material
	x	✓	✓	✓	✓	Vented roof lights shall be screened
				✓	✓	Pipe or conduit that penetrates the roof covering shall be non-combustible
	x	✓	✓	✓		Overhead glazing (including roof light diffusers) shall be Grade A laminated safety glass
					✓	Overhead glazing (including roof light diffusers) shall have a FRL -/30/-
	x	✓	✓	✓		Evaporative cooling units fitted with butterfly closers or screened
Eaves, Facias & Gables	✓	✓	✓	✓	✓	Penetrations shall be sealed with a non-combustible material, openings greater than 3mm shall be fitted with ember guards of mesh as per screens. Joints may be sealed with plastic joining strips or timber moulds
				✓		Facias and bargeboards are bushfire resisting timber or metal fixed at 450 centres. Linings are of 4.5mm fibre cement or bushfire resisting timber
					✓	Facias and bargeboards shall comply with AS1530.8.1. Linings are of 6mm fibre cement or 6mm calcium silicate sheet
Gutters	Optional	Optional	Optional	Optional	Optional	Non combustible
Verandas and Decks	✓	✓	✓	✓	✓	May be spaced (3mm recommended)

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	x	✓	✓	✓	✓	Subfloor may be enclosed as per walls and gaps greater than 3mm screened with mesh
	x	✓	✓	✓		Unenclosed decks - All support posts, columns, stringers, piers, poles, framing, decking, stair treads and trafficable surfaces are non-combustible or bushfire resisting timber
					✓	Unenclosed decks - All support posts, columns, stringers, piers, poles, framing, decking, stair treads and trafficable surfaces are non-combustible or comply with AS1530.8.1
	x	✓	✓	✓		Parts of handrails and balustrades less than 125mm from glazing or combustible walls shall be non-combustible or bushfire resisting timber
					✓	Parts of handrails and balustrades less than 125mm from glazing or combustible walls shall be non-combustible
Service Pipes	x	✓	✓	✓	✓	All exposed pipes shall be metal
	x	✓	✓	✓	✓	Pipes of other material must be buried below the ground level
Fence	Optional	Optional	Optional	Optional	Optional	Fences are not addressed in AS3959-2009. Fences may be constructed from any standards materials. No bushfire related restrictions.



Appendix B - Home Fire Escape Plan



NSW RURAL FIRE SERVICE

HOME FIRE ESCAPE PLAN

Revised 27/04/2005



FACT

Of the 144 home fatalities caused by fire that have occurred in NSW between 2000 and June 2005, the NSW Fire Brigades Fire Investigation and Research Unit advise that based on case study research, approximately one third to half those fatalities MAY have been prevented if the people concerned had, and had practised a home escape plan. (Statistics correct as of 24/08/2005)

HOME FIRE ESCAPE PLAN CHECKLIST

Every home and workplace should have a fire escape plan. Accidental home fires by their very nature can catch people unawares. Without an escape plan you are placing your life and your families' lives in jeopardy. For a safer home regularly practice the following escape tips:

- Know two safe ways out of every room
- Draw your escape plan on paper and discuss your escape plan with your family
- As you escape make sure you close internal doors behind you
- Decide on a safe outside meeting place eg. Near the letterbox
- Make sure that your windows and doors can quickly open if and when required
- Install smoke alarms: test them regularly and change the batteries at least every year
- Smoke alarms can alert you to a fire, an escape plan can then help get you out alive
- Practise your escape plan regularly with all your family members / householders
- If there is a fire in your home, do not wait, EVERY SECOND COUNTS, escape immediately and then call 000 from a neighbours home
- Once you get out, STAY OUT, never go back inside a burning building
- Remember to consider the special needs of children, the elderly or the disabled when developing your escape plan

A COLLABORATION OF THE NSW FIRE BRIGADES, NSW RURAL FIRE SERVICE, ACT FIRE BRIGADE AND ACT RURAL FIRE SERVICE

SAFETY TIPS

- Remember that smoke from a fire will make you confused and that you cannot see in smoke
- When asleep you will not smell smoke and it will in fact put you into a deeper sleep
- Oil, gas or wood heating units may require a yearly maintenance check
- Only ever use fuses of the recommended rating and install an electrical safety switch
- Home fire safety is important for the whole family and preparation can prevent a tragedy





Appendix C

Detailed Method 2 BAL Assessment

Appendix B of AS3959-2009 details the procedure for calculating bushfire attack levels (BALs) using site specific parameters.

The following parameters were used:

Aspect/Transect	North East (A)	North East (B)	West
Vegetation	Sydney Sandstone Ridgetop Woodland (Dry sclerophyll forest)	Sydney Sandstone Ridgetop Woodland (Dry sclerophyll forest)	Coastal Sandstone Heath (Scrub)
Slope	6°	6°	4°
Setback	35m	26.29m	14.76m
Flame angle	63°	55°	63°
Elevation of receiver	6	6	6
Site slope	3m	3m	0m
Flame width	80m	80m	100m
Flame temperature	1090K	1090K	1090K
Emissivity	0.95	0.95	0.95
Surface fuel load	20t/ha	20t/ha	25t/ha
Overall fuel load	25t/ha	25t/ha	25t/ha
Vegetation height	15m	15m	3m
Fire danger index	100	100	100
Wind speed	45	45	45
Ambient temperature	35°C	35°C	35°C
Relative humidity	25%	25%	25%
Heat of combustion	18600	18600	18600
Atmospheric attenuation	Yes	Yes	Yes

The following was calculated using the parameters above as applied to Method 2

Rate of spread	3.63km/h	3.63km/h	5.49km/h
Fire intensity	46899kW/m	46899kW/m	70921kW/m
Transmissivity	0.807	0.835	0.858
View factor	0.3248	0.4568	0.4448
Flame length	26.6m	26.6m	13.2m
Radiant heat flux	19.94kWm ⁻²	29kWm ⁻²	29kWm ⁻²

- North East (A) represents the calculations for a 35m APZ
- North East (B) represents the calculations for a BAL-29 setback
- Fuel loads based on PBP2006 for dry sclerophyll forest and AS3959 Table B2 for Scrub