

# Bushfire Assessment Report

***Proposed:***  
**Alterations &  
Additions**

***At:***  
**13 Wurringulla Avenue  
Elvina Bay NSW**

*Reference Number:* 200224

*Prepared For:*  
Ironbark Architecture

**25<sup>th</sup> September 2019**



*Prepared By:*  
**Building Code & Bushfire  
Hazard Solutions Pty Limited**

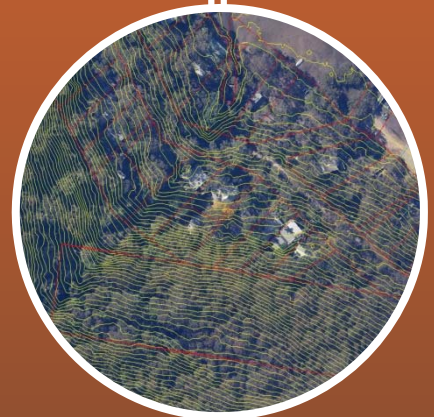
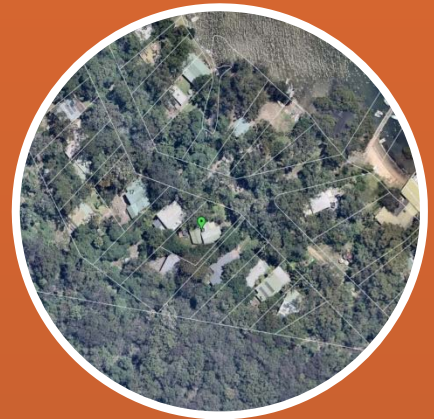
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**SILVER  
MEMBER**  
Fire Protection  
Association Australia



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S4.14 applications (under the Environmental Planning and Assessment Act 1979) and all infill development applications *may* be referred by Council to the NSW Rural Fire Service for review and concurrence during the DA process. S100B applications under the Rural Fires Act 1997 (subdivisions and Special Fire Protection Purpose Developments), Flame Zone determinations and Alternate Solutions *must* be referred by Council to the NSW Rural Fire Service for review and receipt of a Bushfire Safety Authority (BSA) or other such recommended conditions from the NSW Rural Fire Service before the consent can be granted.

The onus is on the applicant to cross reference this document with any conditions of consent issued by Council or any requirements supplied by the NSW Rural Fire Service following development approval. BCBHS can review and cross reference these documents however the onus is on the applicant to provide them to us and request this review – Building Code and Bushfire Hazard Solutions Pty. Ltd. is not in a position to track every DA through Council and we rely upon the applicant to undertake this role as project co-ordinator.

Where any discrepancy between this document and the development approval or the NSW Rural Fire Service requirements is found, the conditions of consent always take precedence until such time as an application to review, amend or vary these conditions is approved.

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Version Control				
Version	Date	Author	Reviewed by	Details
1	25/09/2019	Duncan Armour	Stuart McMonnies BPAD Accreditation No. 9400	Final Report

## List of Abbreviations:

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APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2009 as amended
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Northern Beaches Council
DA	Development Application
EP&A Act	<i>Environmental Planning and Assessment Act - 1979</i>
ESD	Ecologically Sustainable Development
FRNSW	Fire and Rescue NSW
IPA	Inner Protection Area
NSP	Neighbourhood Safer Place
OPA	Outer Protection Area
PBP	<i>Planning for Bush Fire Protection – 2006</i>
ROW	Right of Way
RF Act	<i>Rural Fires Act - 1997</i>
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

## 1.0 Introduction

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The development proposal relates to the alterations and additions to an existing sole occupancy dwelling within an existing residential allotment located at 13 Wurringulla Avenue, Elvina Bay.

The subject property has street frontage to Wurringulla Avenue to the northeast and abuts private residential allotments to the remaining aspects. The vegetation identified as being a hazard is southwest of the subject dwelling within Kuring-gai National Park and within the rear of the southern neighbouring allotment.

Northern Beaches Council's Bushfire Prone Land Map identifies the subject property as containing designated Category 1 Vegetation and therefore the application of *Planning for Bush Fire Protection* 2006 (PBP) must apply in this instance.

## 2.0 Purpose of Report

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The purpose of this Bushfire Assessment Report is to provide the owners, The Rural Fire Service and Council with an independent bushfire hazard determination together with appropriate recommendations for both new building construction and bushfire mitigation measures considered necessary having regard to construction within a designated 'bushfire prone' area.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that Council and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject Development Application.

## 3.0 Scope of this Report

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The scope of this report is limited to providing a bushfire assessment and recommendations for the subject property. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject property.

Where Council considers a bushfire risk is associated with surrounding private lands or lands owned by an authority, Council could seek to issue notice under Section 66 of the *Rural Fires Act* on any or all surrounding properties for the purposes of reducing and maintaining safe levels of vegetation and thus reducing the possibility of bushfire impact to the subject property and any adjoining properties.

## 4.0 Referenced Documents and Persons

---

Comments provided are based on the requirements of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), the RFS document known as 'Planning for Bush Fire Protection – 2006' for the purposes of bushfire hazard determination and Australian Standard 3959 'Construction of buildings in bushfire-prone areas' – 2009 as amended for building/structural provisions.

A company representative has made a site inspection of the subject property and the surrounding area. The site plan prepared by Ironbark Architecture + Design, Sheet 01, Dated 26<sup>th</sup> August 2019 has been relied upon for this assessment.

## 5.0 Assessment Table & Notes

The following table sets out the projects compliance with *Planning for Bush Fire Protection 2006*.

	Northeast	Southeast	Northwest	Southwest
<b>Vegetation Structure</b>	Maintained curtilages	Maintained curtilages	Maintained curtilages	Forest
<b>Slope</b>	N/A	N/A	N/A	>15 degrees up
<b>Existing Asset Protection Zone</b>	N/A	N/A	N/A	22 metres
<b>Significant Environmental Features</b>	Maintained grounds / Wurringulla Avenue	Maintained grounds	Maintained grounds / Wurringulla Avenue	Maintained grounds / Kuring-gai Chase National Park
<b>Threatened Species</b>	APZ Existing	APZ Existing	APZ Existing	APZ Existing
<b>Aboriginal Relics</b>	APZ Existing	APZ Existing	APZ Existing	APZ Existing
<b>Bushfire Attack Level</b>	N/A	N/A	N/A	BAL 19*
<b>Required Construction Level</b>	BAL 12.5	BAL 19	BAL 19	BAL 19

\*Bushfire Attack Level determination from bushfire design modelling.

### Asset Protection Zones Compliance

The subject property was found to have hard surface areas, maintained landscaping and gardens around the existing dwelling. The separation from the hazard interfaces includes maintained land within the subject property and land equivalent to an APZ within neighbouring residential allotments.

### Construction Level Compliance

The highest Bushfire Attack Level to the proposed alterations and additions to the existing dwelling was determined from bushfire design modelling (report attached) consistent with Appendix 2 of Planning for Bush Fire Protection 2006 and Table 2.4.2 of AS3959 – 2009 to be 'BAL 19'. The proposed works are required to comply with section 3 and BAL 19 section 6 under AS 3959 – 2009 and the addendum to Appendix 3 of PBP.

In applying section 3.5 of AS3959-2009 new works facing northeast have been downgraded to BAL 12.5 due to shielding provided by the dwelling itself.

## Access and Services

Guideline Ref.	Proposed Development Determinations
Property Access	The existing access will not be altered as part of this development and is considered acceptable.
Water Supply	There is no pressured reticulated mains water supply provided to Elvina Bay and therefore a Static Water Supply is required.  There are currently numerous water tanks located onsite with a concrete tank fitted with a storz coupling next to the subject dwelling. Attending fire services can also draught directly from Elvina Bay for fire suppression activities.
Evacuation	Evacuation is possible by utilising existing road infrastructure and by boat via the existing waterways. It is encouraged that the occupants complete a Bush Fire Safety Plan addressing "Prepare, Act, Survive" as advocated by the NSW RFS <a href="http://www.rfs.nsw.gov.au/">http://www.rfs.nsw.gov.au/</a> under publications / bushfire safety.
Electrical Supply	Supply provided.

Compliance Summary of Bushfire Protection Measures Assessed			
Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.05
Construction Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8.05
Access	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.07
Water Supply	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.06
Gas and Electrical Supplies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.0



## 6.0 Aerial view of the subject allotment



Image 01: Aerial view of the subject area C/- Nearmap



## 7.0 Bushfire Hazard Assessment

### 7.01 Preface

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service. All property development within affected areas is subject to the conditions detailed in the document '*Planning for Bush Fire Protection 2006*' (PBP). Set back distances for the purpose of creating Asset Protection Zones (APZ's) must be applied and any buildings must then conform to corresponding regulations detailed in Australian Standard 3959 'Construction of buildings in bushfire prone areas' 2009.

*Planning for Bush Fire Protection 2006*, (PBP) formally adopted on the 1<sup>st</sup> March 2007 and amended May 2010 (Appendix 3) provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

The thrust of the document is to ensure that developers of new properties or sub-divisions include the constraints associated with the construction of buildings in bushfire prone areas within their proposed development sites. PBP is applicable to proposed development located on land identified as containing Category 1, 2 or 3 vegetation and / or their buffer zones.

The document also acknowledges 'infill' developments associated with re-development of existing properties and allows some higher levels of building safety where the increased 'set backs' (APZ's) may not be achievable.

The subject development relates to the alterations and additions to an existing sole occupancy dwelling within an existing residential allotment. To accord with PBP the development is classified as infill development and assessed as a 4.14 application under the *Environmental Planning and Assessment Act 1979*.



Image 02: Extract from Northern Beaches Council's Bushfire Prone Land Map

## 7.02 Location

The subject property is known as 13 Wirringulla Avenue, Elvina Bay (Lot 1 DP 224643) and is a residential allotment located within Northern Beaches Councils Local Government Area. The subject property has street frontage to Wirringulla Avenue to the northeast and abuts private residential allotments to the remaining aspects.

The vegetation identified as being the hazard is to the southwest of the subject dwelling within Kuring-gai Chase National Park and within the rear of the southern neighbouring allotment.

Subject dwelling



Photograph 01: View of the subject dwelling within the subject property



Image 03: Extract from StreetDirectory.com



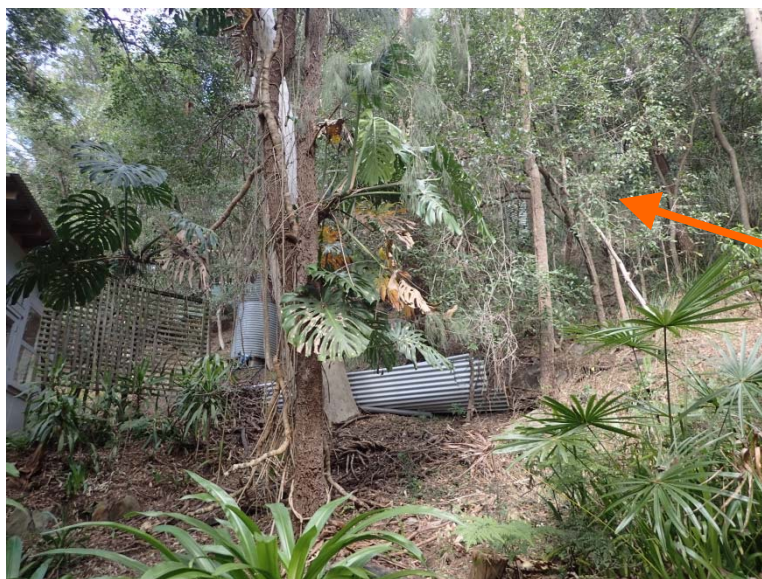
### 7.03 Vegetation

The predominant vegetation found within the subject property and neighbouring private residential allotments was found to consist of built upon areas surrounded by landscaped gardens and mown lawns.

The vegetation posing a hazard to the subject dwelling is located to the southwest within Kuring-gai Chase National Park and within the rear of the southern neighbouring allotment.

The vegetation posing a hazard to the southwest was found to consist of trees to 10 - 20 metres in height with a 30 - 70% foliage cover and an understorey of shrubs and ferns.

In accordance with A2.3 of PBP, the vegetation posing a hazard to the southwest has been determined to be Forest.



Forest

Photograph 02: View of the vegetation hazard to the southwest of the subject property



Forest

Photograph 03: View of the vegetation to the southwest of the subject property



## 7.04 Slope and Topography

The slope that would most significantly influence fire behaviour must be assessed for a distance of 100 metres from within the hazard.

The slope to the southwest was found to be  $>15^\circ$  upslope away from the subject property.

The slope that would most significantly influence bushfire behaviour was measured onsite using an inclinometer and verified from topographic imagery of the subject area and found to be:

- $>15$  degrees up slope within the hazard to the southwest

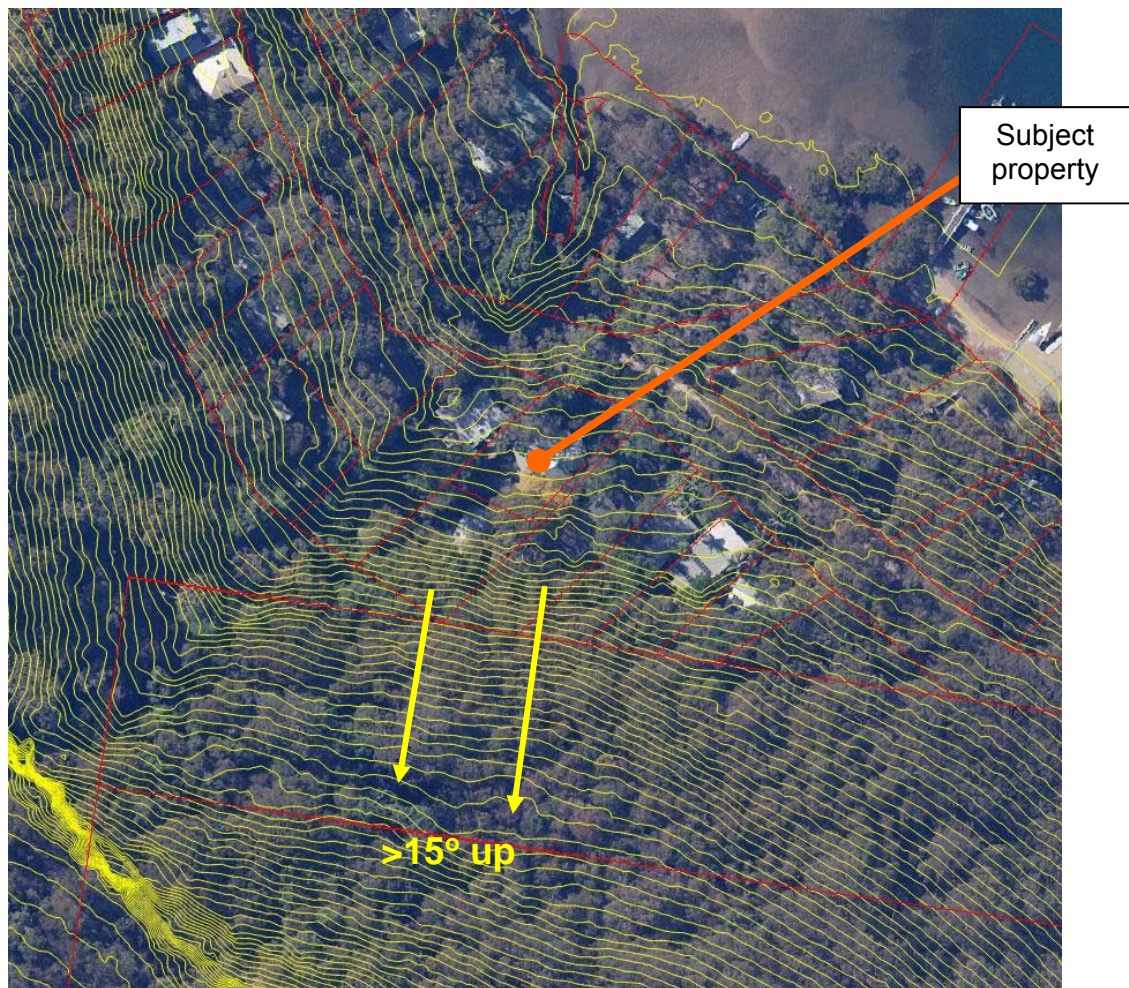


Image 04: Extract from ELVIS – 1 metre contours



## 7.05 Asset Protection Zones

The proposed works are within the existing pattern of development and extend no closer to the bushfire hazard than the existing building footprint. The proposed works were found to be located 22 metres from the hazard interface to the southwest. The existing Asset Protection Zone includes maintained land within the subject property and land equivalent to an APZ within neighbouring allotments.

The grounds surrounding the subject dwelling are required to be maintained as an Asset Protection Zone (inner protection area) in accordance with Appendix 5 'Landscape and Property Maintenance' of PBP. This will allow for gardens (including native trees and shrubs) in the APZ managed as clumps or islands, covering no more than 20% of the area.

## 7.06 Fire Fighting Water Supply

There is no pressured reticulated mains water available at Elvina Bay. There are currently numerous water tanks located onsite with a concrete tank fitted with a storz coupling next to the subject dwelling. The combined capacity of these tanks would exceed the minimum 10kL specified in Section B5.6 of the Pittwater DCP 21.

Attending fire services can also draught directly from Elvina Bay for fire suppression activities. The water supply is considered suitable for first attack firefighting.



Photograph 04: View of tanks within the subject property

## 7.07 Property Access – Fire Services & Evacuation

The subject property has street frontage to Wurringulla Avenue to the northeast. Persons seeking to egress the subject dwelling are able to do so via the existing access drive, road infrastructure and the existing public wharf.

Fire Services have free pedestrian access around the building footprint. Attending fire crews can access the hazard via the subject property or properties along Wurringulla Avenue for hazard reduction or fire suppression activities.

It should be noted that the local RFS Station is located opposite the subject property on the foreshore of Elvina Bay. The access will not be altered as part of this development application and is considered acceptable for occupant evacuation and fire service access.

## 8.0 Site & Bushfire Hazard Determination

### 8.01 Planning for Bush Fire Protection - 2006

'Planning for Bush Fire Protection – 2006' (PBP) is applicable to those lands determined as being within a 'bushfire prone area' in accordance with a local Bushfire Prone Land Map as provided by the Rural Fire Service and Council.

The most appropriate method of determining site bushfire hazard under the terms of PBP is to consider the site in a singular form.

*Bushfire prone areas are defined as those areas;*

- *within or within 100m of high or medium bushfire hazards; or*
- *within or within 30m of low bushfire hazards.*

In this instance the subject property has been identified as being bushfire prone land therefore it is appropriate to apply PBP as follows:

#### Southwestern Aspect:

- a) Vegetation Structure Forest
- b) Slope 15 degrees up
- c) A 22 metre APZ is available
- d) The Bushfire Attack Level was determined to be 'BAL 19'

### 8.02 Australian Standard AS 3959 – 2009 'Construction of buildings in bushfire –prone areas'

Australian Standard 3959 – 2009 'Construction of buildings in bushfire-prone areas' provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. The Australian Standard 3959 specifies construction standards for buildings within various Bushfire Attack Levels as determined by the *Planning for Bush Fire Protection – 2006* document. The NSW Rural Fire Service will not accept deemed to satisfy provisions for BAL Flame Zone and therefore have a NSW variation to the listed standard provisions of BAL FZ under AS3959 - 2009.

### 8.03 Correlation between bushfire impact and AS3959

Bushfire Attack Level	Maximum radiant heat impact (kW/m <sup>2</sup> )	Level of construction under AS3959-2009
Low		No special construction requirements
12.5	≤12.5	BAL - 12.5
19	12.6 to 19.0	BAL - 19
29	19.1 to 29.0	BAL - 29
40	29.1 to 40.0	BAL - 40
Flame Zone	>40.0	BAL FZ No deemed to satisfy provisions

## 8.04 Site Specific Bushfire Hazard Determination

All property development must be assessed on an individual basis as broad-brush approaches of documents such as PBP may not be applicable in every instance. The proposed development located at 13 Wurringulla Avenue, Elvina Bay was assessed against the requirements of *Planning for Bush Fire Protection* 2006 noting the following:

- a) Access to the subject property is available from Wurringulla Avenue.
- b) The proposed development is within the existing pattern of development.
- c) Recommendations to maintain the Asset Protection Zones within the subject property will be included.

## 8.05 Viable Construction Method

The objectives of *Planning for Bush Fire Protection* – 2006 are for the protection of life including fire fighters. Provided these objectives can be met the construction of buildings is feasible and both the Rural Fire Service and Council should be in a position to consider such applications.

The highest Bushfire Attack Level to the proposed alterations and additions to the existing dwelling was determined from bushfire design modelling (report attached) consistent with Appendix 2 of *Planning for Bush Fire Protection* 2006 and Table 2.4.2 of AS3959 – 2009 to be 'BAL 19'. The proposed works are required to comply with section 3 and BAL 19 section 6 under AS 3959 – 2009 and the addendum to Appendix 3 of PBP.

In applying section 3.5 of AS3959-2009 new works facing northeast have been downgraded to BAL 12.5 due to shielding provided by the dwelling itself.

## 9.0 Recommendations

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The following recommendations are provided as the minimum necessary for compliance with *Planning for Bush Fire Protection* 2006 and *Australian Standard 3959 'Construction of buildings in bushfire-prone areas'* 2009. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

### Asset Protection Zones

1. That all grounds within the subject property not built upon continue to be maintained in accordance with an Asset Protection Zone (Inner Protection Area) as detailed in Appendix 2 of *Planning for Bush Fire Protection* 2006 and the NSW Rural Fire Service publication 'Standards for Asset Protection Zones'.

### Landscaping

2. That any new landscaping within the subject property be in accordance with Appendix 5 'Landscaping and Property Maintenance' of *Planning for Bush Fire Protection* 2006

### Construction

3. That any new roofing and construction facing northwest, southeast and southwest shall comply with section 6 (BAL 19) Australian Standard AS3959-2009 "Construction of buildings in bush fire-prone areas" and section A3.7 Addendum Appendix 3 of "Planning for Bush Fire Protection".
4. That all new construction facing northeast shall comply with section 5 (BAL12.5) Australian Standard AS3959-2009 "Construction of buildings in bush fire-prone areas" and section A3.7 Addendum Appendix 3 of "Planning for Bush Fire Protection".



## 10.0 Conclusion

Given that the property is deemed bushfire prone under Northern Beaches Council's Bushfire Prone Land Map any development would need to meet the requirements of *Planning for Bush Fire Protection* 2006 and of the construction requirements of *Australian Standard 3959 'Construction of buildings in bushfire-prone areas'* 2009. The determination of any bushfire hazard must be made on a site-specific basis that includes an assessment of the local bushland area and its possible impact to the subject property.

The subject property is a residential allotment within an area of similar properties. The hazard was identified as being located to the southwest within Kuring-gai Chase National Park and within the rear of the southern neighbouring allotment.

The proposed works are within the existing pattern of development. The subject dwelling and proposed works were found to be located 22 metres from the hazard interface to the southwest. The Asset Protection Zone includes maintained land within the subject property and land equivalent to an APZ within neighbouring residential allotments.

The highest Bushfire Attack Level to the proposed alterations and additions was determined from bushfire design modelling consistent with Appendix 2 of *Planning for Bush Fire Protection* 2006 to be 'BAL 19'. The proposed works are required to comply with section 3 and BAL 19 section 6 under AS 3959 – 2009 and the addendum to Appendix 3 of PBP. New works facing northeast have been downgraded to BAL 12.5 due to shielding provided by the dwelling itself.

Existing access and water supply is considered adequate and will not be altered as part of this development.

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is my opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development and also satisfy both the Rural Fire Service's concerns and those of Council in this area.

I am therefore in support of the development application.

Should you have any enquiries regarding this project please contact me at our office.

Prepared by  
Building Code & Bushfire Hazard Solutions P/L



**Duncan Armour**

Reviewed and endorsed by  
Building Code & Bushfire Hazard Solutions P/L



**Stuart McMonnies**

Manager Bushfire Section  
G. D. Design in Bushfire Prone Areas.  
Certificate IV Fire Technology  
Fire Protection Association of Australia BPAD – L3 Accredited Practitioner  
Accreditation number – BPAD 9400



## 11.0 Annexure 01

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### List of Referenced Documents

- a) *Environmental Planning and Assessment Act* - 1979
- b) *Rural Fires Act* 1997 as amended
- c) '*Planning for Bush Fire Protection*'- 2006 - NSW Rural Fire Services & Planning NSW
- d) 'Construction of buildings in bushfire prone areas' - AS 3959 – 2009 (as - amended) – Standards Australia
- e) 'Northern Beaches Council's Bushfire Prone Land Map'
- f) Acknowledgements to:  
Nearmap  
NSW Department of Lands – SIXMaps  
Street-directory.com.au
- g) Site plan prepared by Ironbark Architecture + Design, Sheet 01, Dated 26<sup>th</sup> August 2019

### Attachments

- Attachment 01: Section 4.14 Certificate
- Attachment 01: Bushfire Attack Assessment Report



# Building Code & Bushfire Hazard Solutions

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## BUSHFIRE RISK ASSESSMENT CERTIFICATE UNDER PART 4 DIVISION 4.3 SECTION 4.14 OF THE EP&A ACT 1979 NO 203

PROPERTY ADDRESS:	13 Wirringulla Avenue, Elvina Bay
DESCRIPTION OF PROPOSAL:	Alterations & additions
PLAN REFERENCE: (relied upon in report preparation)	Site plan prepared by Ironbark Architecture + Design, Sheet 01, Dated 26 <sup>th</sup> August 2019
BAL RATING:	BAL 19 <small>(If the BAL rating is FZ the application is to be referred to NSW RFS for assessment)</small>
DOES THE PROPOSAL RELY ON ALTERNATE SOLUTIONS:	<div><div>YES</div><div>NO</div></div> <small>(Circle the relevant response)</small> <small>(If YES the application is to be referred to NSW RFS for assessment)</small>
BUSHFIRE ASSESSMENT REPORT REFERENCE:	200224
REPORT DATE:	25 <sup>th</sup> September 2019
CERTIFICATION NO/ACCREDITED SCHEME	BPAD9400

I Stuart McMonnies of Building Code and Bushfire Hazard Solutions Pty Ltd hereby certify, in accordance with Part 4 Division 4.3 Section 4.14 of the *Environmental Planning and Assessment Act 1979 No 203*:

1. That I am a person recognised by the *NSW Rural Fire Service* as a qualified consultant in bushfire risk assessment; and
2. That subject to the recommendations contained in the Bushfire Risk Assessment Report the proposed development conforms specifications and requirements of the documents entitled *Planning for Bush Fire Protection* prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and any other documents as prescribed by Part 4 Division 4.3 Section 4.14 of the *Environmental Planning and Assessment Act 1979 No 203*.

I am aware that the 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 Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *Planning for Bushfire Protection 2006*.

Signature:  Date: 25<sup>th</sup> September 2019





# NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Print Date: 18/09/2019

Assessment Date: 18/09/2019

Site Street Address: 13 Wurringulla Avenue, Elivina Bay

Assessor: Stuart McMonnies; Building Code & Bushfire Hazard Solutions Pty Ltd

Local Government Area: Pittwater

Alpine Area: No

## Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: Southwest - AS3959

## Vegetation Information

Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	15 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35

## Site Information

Site Slope	12 Degrees	Site Slope Type:	Upslope
Elevation of Receiver(m)	Default	APZ/Separation(m):	22

## Fire Inputs

Veg./Flame Width(m):	100	Flame Temp(K)	1090
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## Calculation Parameters

Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	100

## Program Outputs

Category of Attack:	MODERATE	Peak Elevation of Receiver(m):	9.63
Level of Construction:	BAL 19	Fire Intensity(kW/m):	19271
Radiant Heat(kW/m2):	16.81	Flame Angle (degrees):	63
Flame Length(m):	11.13	Maximum View Factor:	0.266
Rate Of Spread (km/h):	1.07	Inner Protection Area(m):	15
Transmissivity:	0.833	Outer Protection Area(m):	7



<b>Run Description:</b> Southwest - PBP 06	
<b><u>Vegetation Information</u></b>	
<b>Vegetation Type:</b> Forest	<b>Vegetation Group:</b> Forest and Woodland
<b>Vegetation Slope:</b> 15 Degrees	<b>Vegetation Slope Type:</b> Upslope
<b>Surface Fuel Load(t/ha):</b> 20	<b>Overall Fuel Load(t/ha):</b> 25
<b><u>Site Information</u></b>	
<b>Site Slope</b> 12 Degrees	<b>Site Slope Type:</b> Upslope
<b>Elevation of Receiver(m)</b> Default	<b>APZ/Separation(m):</b> 22
<b><u>Fire Inputs</u></b>	
<b>Veg./Flame Width(m):</b> 100	<b>Flame Temp(K)</b> 1090
<b><u>Calculation Parameters</u></b>	
<b>Flame Emissivity:</b> 95	<b>Relative Humidity(%):</b> 25
<b>Heat of Combustion(kJ/kg)</b> 18600	<b>Ambient Temp(K):</b> 308
<b>Moisture Factor:</b> 5	<b>FDI:</b> 100
<b><u>Program Outputs</u></b>	
<b>Category of Attack:</b> MODERATE	<b>Peak Elevation of Receiver(m):</b> 8.58
<b>Level of Construction:</b> BAL 19	<b>Fire Intensity(kW/m):</b> 11012
<b>Radiant Heat(kW/m2):</b> 12.71	<b>Flame Angle (degrees):</b> 66
<b>Flame Length(m):</b> 8.54	<b>Maximum View Factor:</b> 0.201
<b>Rate Of Spread (km/h):</b> 0.85	<b>Inner Protection Area(m):</b> 22
<b>Transmissivity:</b> 0.83	<b>Outer Protection Area(m):</b> 0
<b>Run Description:</b> Southwest - PBP 18	
<b><u>Vegetation Information</u></b>	
<b>Vegetation Type:</b> Forest	<b>Vegetation Group:</b> Forest and Woodland
<b>Vegetation Slope:</b> 15 Degrees	<b>Vegetation Slope Type:</b> Upslope
<b>Surface Fuel Load(t/ha):</b> 22	<b>Overall Fuel Load(t/ha):</b> 36.1
<b><u>Site Information</u></b>	
<b>Site Slope</b> 12 Degrees	<b>Site Slope Type:</b> Upslope
<b>Elevation of Receiver(m)</b> Default	<b>APZ/Separation(m):</b> 22
<b><u>Fire Inputs</u></b>	
<b>Veg./Flame Width(m):</b> 100	<b>Flame Temp(K)</b> 1090
<b><u>Calculation Parameters</u></b>	
<b>Flame Emissivity:</b> 95	<b>Relative Humidity(%):</b> 25
<b>Heat of Combustion(kJ/kg)</b> 18600	<b>Ambient Temp(K):</b> 308
<b>Moisture Factor:</b> 5	<b>FDI:</b> 100
<b><u>Program Outputs</u></b>	
<b>Category of Attack:</b> MODERATE	<b>Peak Elevation of Receiver(m):</b> 9.36
<b>Level of Construction:</b> BAL 19	<b>Fire Intensity(kW/m):</b> 17491
<b>Radiant Heat(kW/m2):</b> 15.69	<b>Flame Angle (degrees):</b> 64
<b>Flame Length(m):</b> 10.43	<b>Maximum View Factor:</b> 0.248
<b>Rate Of Spread (km/h):</b> 0.94	<b>Inner Protection Area(m):</b> 22
<b>Transmissivity:</b> 0.832	<b>Outer Protection Area(m):</b> 0