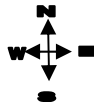
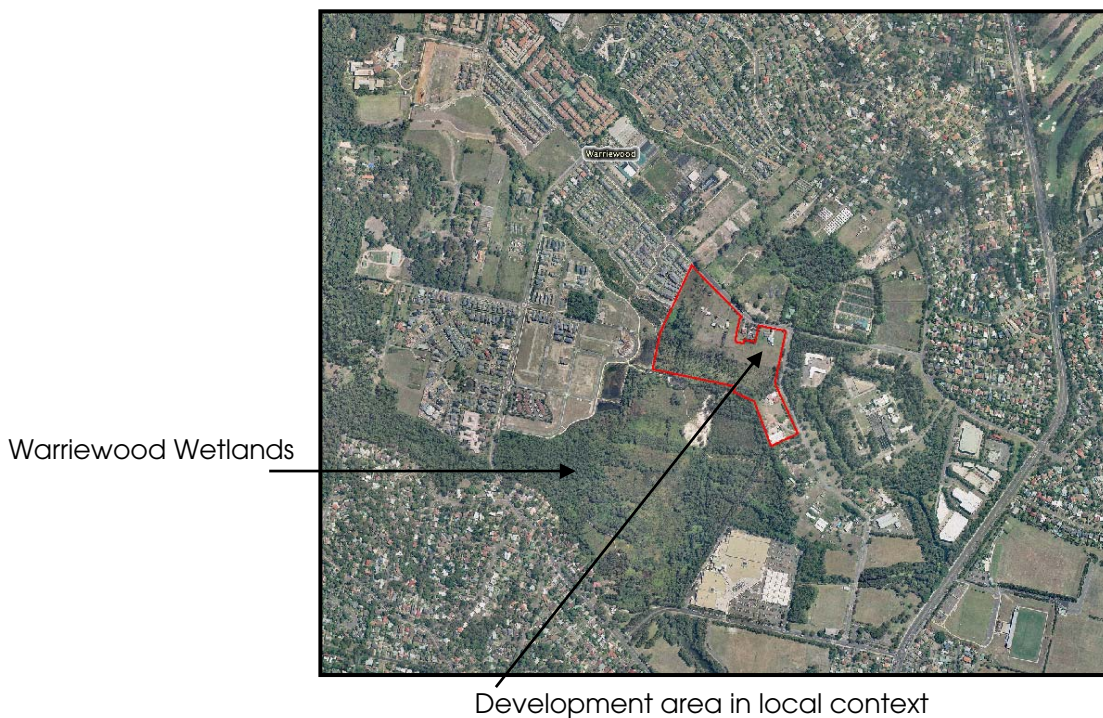


**Bushfire Risk Assessment Report**  
for  
**14-18 Boondah Road, Warriewood, NSW, 2102**  
**(Lot 20, DP 1080979)**  
**Integrated Development: 140 Torrens Title Lots**  
Prepared for  
**Meriton Apartments**  
**September 2008**  
Prepared by: Neil Falconer

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## 1 INTRODUCTION

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### Bushfire Legislation in NSW – Section 100B

#### Section 100B - *Rural Fires Act 1997* - Bush Fire Safety Authorities Background

1. The Commissioner may issue a bush fire safety authority for:  
(a) a subdivision of bush fire prone land that could lawfully be used for residential or rural residential purposes, or (b) development of bush fire prone land for a special fire protection purpose.
2. A bush fire safety authority authorises development for a purpose referred to in subsection (1) to the extent that it complies with standards regarding setbacks, provision of water supply and other matters considered by the Commissioner to be necessary to protect persons, property or the environment from danger that may arise from a bush fire.
3. A person must obtain such a bush fire safety authority before developing bush fire prone land for a purpose referred to in subsection (1).
4. **Application for a Bush Fire Safety authority is to be made to the Commissioner in accordance with the regulations.**

#### 1.1 Purpose of report

This report has been prepared for the purposes of Section 100B of the *Rural Fires Act* and Section 79C of the *EP&A Act* and provides information to enable the Commissioner of the Rural Fire Service to consider issuing a **Bushfire Safety Authority** for the proposed development. Such approval depends on being able to demonstrate that the aims and objectives of 'Planning for Bushfire Protection 2006' will be achieved.

The objectives include but are not limited to the following:

- Provide occupants' adequate protection and defensible space around any buildings
- Provide appropriate separation between a hazard and buildings which, in combination, with other measures prevent direct flame contact and material ignition.
- Provide safe operational access and egress for residents and emergency personnel
- Ongoing maintenance of Asset Protection Zones
- Ensure that utility services are adequate to meet the needs of fire fighters and other services.

## 2 BUSH FIRE RISK ASSESSMENT REPORT

### 2.1 Scope of Report

The scope of this report is limited to the Bushfire Hazard Assessment for the proposed development and contains recommendations for the subject property. Where reference is made to adjacent or adjoining lands, this report does not purport to assess those lands, rather it may discuss bushfire progression on and through those lands with the possible bushfire impact to the subject property and the proposed dwellings.

### 2.2 Methodology

A site inspection for the purpose of assessing bushfire related matters affecting this site was conducted on the 1<sup>st</sup> September 2008 and a review of the proposed preliminary development master plan as supplied by Meriton Apartments has taken place.

An assessment of slope was conducted out to a distance of 100 metres and assessment of vegetation to a distance of 140 metres from the proposed development.

The findings were related and assessed with reference to 'Planning for Bushfire Protection 2006' Chapter 4 Bushfire Provisions Development Stage, Appendix 2 & 3 contained in that document, for the formulation of the Bushfire Hazard Assessment.

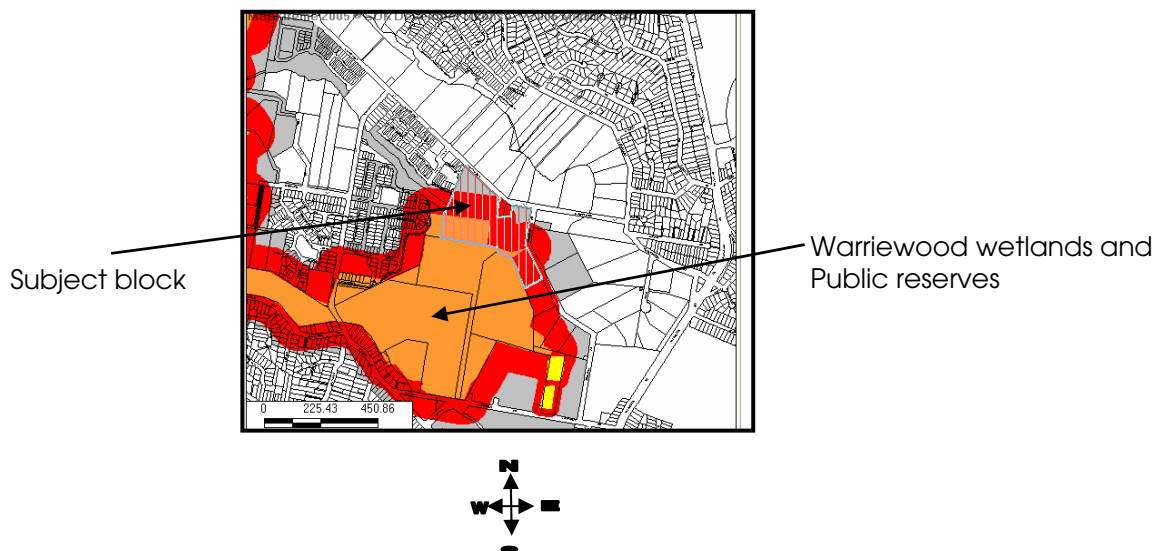
### 2.3 Property description

This report relates to the subdivision of land on the corner of Boondah Road and Macpherson Street, Warriewood, NSW, 2102

Property address:	14 -18 Boondah Road, Warriewood, NSW, 2102
Title reference:	Lot 20, DP 1080979.
Fire Danger Index (FDI) (PfBP 2006 A3.4)	100
Classification of proposed structure/s:	One and two storey dwellings
Consent Authority	Pittwater Council
Date Of Inspection	1 <sup>st</sup> September 2008

Pittwater Council's Bushfire Prone Land Map identifies this property as being within the bushfire-prone Group 1 and Buffer Zone vegetation area.

#### Extract from Pittwater Council's Bushfire Prone Land Map



## 2.4 Description of development proposal

This proposed development consists of the construction of a mixture of single and two storey dwellings to a total of 140. These dwellings are of varying sizes and on varying size allotments. Each type of dwelling will have a ground floor tiled terrace and paved carport, part of which will be covered. External cladding and roofing will utilise non-combustible materials (masonry/tiles/metal roofing).

The development plan has dwellings facing Boondah Road (a minor road) to the east, Macpherson Street (a major road) to the north and the existing developments in the vicinity of Bandicoot Close and Fantail Ave to the west.

To the south and parts of the south east sections of the development are the Warriewood wetlands, the major vegetation hazard from a bushfire point of view. From the RFS document point of view 'Planning for Bushfire Protection 2006' this vegetation will be treated as 'forested wetlands'.

The overall plan includes appropriate riparian buffers to the wetland interface acknowledging protection to the Fern Creek creek line and creating Asset Protection Zones where required in relation to the wetlands vegetation and remnant on site vegetation.

A significant area in the south west corner, currently remnant poplar plantation will be removed under Flood Protection arrangements.

The buffer zone alongside the proposed access road from Boondah Road (largely Swamp Oak Forest) is to be preserved as a potential wildlife corridor to the off site vegetation to the east.

The 20 metre vegetation buffer strip along the southern boundary of the proposed development facing the wetlands has been requested by Pittwater Council at the pre-development meeting held on 17<sup>th</sup> March 2008. This and other vegetation buffer strips will need to observe the specifications appropriate to **Inner Protection Areas** as described by the NSW Rural Fire Service.<sup>1</sup> An Inner Protection Area is characterised by:

- Minimal fine fuel at ground level
- Vegetation that does not provide a continuous path to the building for the transfer of fire
- Shrubs and trees that do not form a continuous canopy and vegetation is planted/cleared into clumps rather than continuous rows.
- Species that retain dead material or deposit excessive quantities of ground fuel area avoided
- Shrubs and trees are pruned or removed so they do not touch or overhang the building and
- Vegetation is located far away enough from the building so that plants will not ignite the building by direct flame contact or radiant heat emission.

An IPA can include suitable impervious areas such as courtyards, driveways and roadways etc.

The overall area to be developed will be mostly cleared and can be considered as a 'cleared - disturbed' area.

This development includes 3 different types of roads, ie local street, access street and access laneway.

This report will describe localised conditions to Asset Protection Zone (APZ) availability for several interface dwellings. Where an APZ cannot be achieved the level of construction will be increased as described in 'Planning for Bushfire Protection 2006'.

---

<sup>1</sup>See attached description



## Background to the bushfire assessment matrix:

### 2.5 Vegetation

This development site is within the Warriewood Valley and adjacent to the Warriewood Wetlands and public reserves to the south and the Fern Creek riparian area in the south west corner.

The **on site** vegetation is primarily exotic pasture grass, garden plantings, poplar forest and minor areas of regrowth exotic weeds. This vegetation will largely be removed with site works and be replaced in the south and south western wetlands interface with a careful selection of species with appropriate gaps in any resultant canopy and species that will have the effect of separating ground and canopy fuel layers. The selection of species and landscaping plan is designed to ensure that any re vegetation will also provide the appropriate Asset Protection Zone performance and depth (25m).

From a Bush Fire point of view the **off site** re-vegetation and the offsite hazard determined (RFS 'Planning for Bushfire Protection 2006') as 'forested wetlands' is used as the prime hazard description within the 100 m vegetation review zone required by 'Planning for Bushfire Protection 2006'.

The remnant Swamp Oak Forest at the Boondah Road access/egress is considered separately.



On site remnant poplar stand



On site exotic weeds

The **off site** vegetation to Boondah Road is associated with the Warriewood Sewerage Treatment Plant and a Sydney Water maintenance depot and consists of stands of pine trees with little understorey and vacant and utilised land. Low density residential area and a substantial new development offer very limited vegetation along Macpherson Street to the north.



Off site pine trees along Boondah Rd



Adjacent off site forested wetlands



## 2.6 Slope of Land

The water table of the wetlands is located close to the surface across the site and the overall slope is  $< 5^\circ$  to the wetlands from the Macpherson St Area. The on site water retention projects provide for very little slope across the site and beyond.



Typical slope  $< 5^\circ$

## 2.7 Fire history

Anecdotal references suggest that the wetland site and the public reserve areas are not regularly subject to wildfires.

## 2.8 Fire Response Services

Rural Fire Services are based at Terrey Hills

The nearest NSW Fire Brigades is at Mona Vale about 2 kilometres away.

## 2.9 Water Supplies

This new development will include reticulated water supply as per appropriate standards.

## 2.10 Significant Environmental Features

This site is on disturbed rural style land and, in some cases and off site along Boondah Rd, light industrial land. The adjacent Warriewood Wetland area is a significant sand plain and provides for a variety of habitats for local fauna. The presence of Swamp Oak Forest and powerful owl observations (Total Earth Care P/L) highlight the need for preservation of riparian and buffer zones to the wetlands. These buffer zones are a contributing part of the available Asset Protection Zone and special and careful integration of bio-diversity and Asset Protection Zone specifications will be required along the interface and in the 'Swamp Oak Forest' area.

### 3 BUSH FIRE RISK ANALYSIS

#### 3.1 Principles of Protection (Appendix 5 Planning for Bushfire Protection)

*'Bushfire attack takes essentially five forms; wind, smoke, ember, radiant heat and flame.*

*Overall the intention of bush fire protection measures should be to prevent flame contact to a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimise the potential for wind driven embers to cause ignition and reduce the effects of smoke on residents and firefighters.*

#### 3.2 Bush Fire Risk Assessment Matrix -

The following table describes the major hazard in all directions out to 140 metres **from the overall building envelope**: (Appendix 2 PfbP - 2006).

	North and West (sketch area 1)	South West (sketch area 2)	East (sketch area 3)	South East Interface (sketch area 4)
<b>Predominant Vegetation Formation:<sup>1</sup> (off Site)</b>	Infill development (Macpherson St) Infill development (Bandicoot Close neighbourhood)	<b>Forested Wetlands</b>	Woodland/ Managed lands (Boondah)	<b>Forested Wetlands</b>
<b>Slope of maximum hazard within 100m</b>	Level	<b>Downslope 3°</b>	Upslope 1 °	<b>1° upslope</b>
<b>Minimum Required APZ (APZ modelling report) (29 kw/m<sup>2</sup> level 3)</b>	Infill	<b>16 m</b>	11 m	<b>16 m</b>
<b>Planned Separation distance - interface buildings to hazard vegetation</b>	Infill	<b>25 to 80 m</b>	25 m	<b>25m</b>
<b>Category of bushfire risk (see also Bushfire Attack Assessor Reports)<sup>2</sup></b>	Infill	<b>Medium</b>	Medium	<b>High</b>
<b>Construction level required by AS 3959<sup>4</sup></b>	Level 1	<b>Level 1</b>	Level 1	<b>Level 2</b>
<b>Modelled Radiant Heat Flux (RFS Assessor) with minimum separation</b>	Infill	<b>3.78 kw/m<sup>2</sup></b>	10.85 kw/m <sup>2</sup>	<b>16 kw/m<sup>2</sup></b>
<b>Additional fire protection measures required (radiant heat more than 29 kw/m<sup>2</sup>)</b>	No	<b>No</b>	No	<b>No</b>

#### Explanatory Notes regarding the above matrix

1. Determined by reference to 'Planning for Bushfire Protection - 2006' and describes the predominant vegetation at the interface and off site (wetlands).
2. The categories of bushfire risk were confirmed by reference to the Bushfire Attack Assessor programme available from the Rural Fire Service.
3. The likely path of a bushfire impacting on the proposed buildings will be from the south west and to the south east. - Interface with Boondah Road dwellings.
4. Any development on Bush Fire Prone Land has a minimum construction level of level 1 AS 3959-1999. Level 2 construction is required as described for the south east interface.

The Asset Protection Zone (assessment area 2 on the site sketch) to the south west towards the wetland and Fern Creek varies from 25 m near the water easement to over 80 metres directly south including carriageway, retention pond and riparian zone.

The south east interface (assessment area 4) provides 25 m along the access road.  
The APZ is currently cleared managed land. The Buffer Zone includes the 4 m bicycle route.

Assessment area 3 includes the carriageway and verges of Boondah Road.



## **Special Note Re Areas A and B**

### **Assessment Area A**

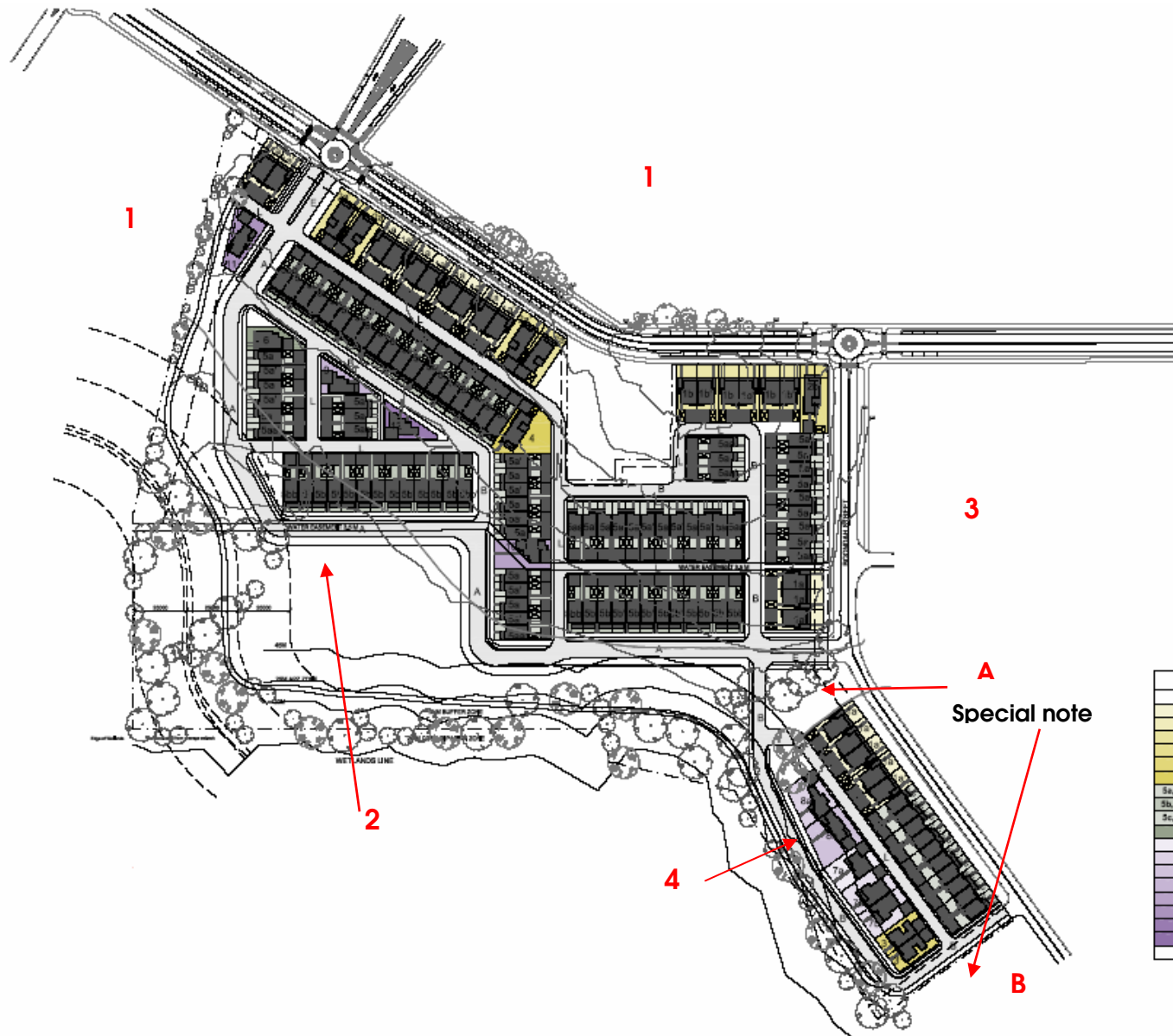
House 1 (a) south of this access road from Boondah will abut the Swamp Oak Forest that will remain in place. An Inner Protection Area of 11 metres should be prepared adjacent to the fence line. If a fence is provided at this point it should be metal. House 1 (a) should be constructed to level 3 AS 3959-1999.

### **Assessment Area B**

The vegetation abutting special note B is mixed use industrial and managed land. The Asset Protection Zone provided by the road, verge and cycleway allows level 1 construction to this interface.

# Bushfire Risk Assessment Matrix Assessment Areas

## Site Sketch



PROPOSED HOUSES			
	TYPE	DIMENSION	QUANTITY
1a, 1a'	Semi Duplex Lot	10 X 28 m	18
1b, 1b'	Semi Duplex Lot	10 X 27.5 m	8
2a, 2a'	Detached Dwelling Lot	13 X 28 m	4
2b	Detached Dwelling Lot	13.5 X 33 m	1
3, 3'	Semi Duplex Lot	10 X 24 m	2
4	Miscellaneous Lot	~831 sqm	1
5a, 5a', 5a'', 5a'''	Terrace Lot (Dual Key)	7 X 28 m	44
5b, 5b', 5b'', 5b'''	Terrace Lot (Dual Key)	7 X 28 m	44
5c, 5c', 5c'', 5c'''	Terrace Lot	7 X 28 m	10
6	Miscellaneous Lot	~262 sqm	1
7a	Miscellaneous Lot	14 X 24 m	1
7b	Miscellaneous Lot	14 X 24 m	2
8a	Miscellaneous Lot	~373 sqm	1
8b	Miscellaneous Lot	~490 sqm	1
9	Miscellaneous Lot	~257 sqm	1
10	Miscellaneous Lot	13.5 X 28 m	1
11	Miscellaneous Lot	~347 sqm	1
12	Miscellaneous Lot	~290 sqm	1
TOTAL			140

### 3.3 Bushfire Assessors



## BUSHFIRE ATTACK ASSESSMENT REPORT

For Site Located At: **14-18 Boondah Rd, Warriwood, NSW, 2102**

Created By: **Web-based Bushfire Attack Assessor Version 2.0**

---

### 1. User's Inputs

Local Government Area: **Pittwater**

In Alpine Areas: **No**

Vegetation: **Forested wetlands**

Effective Slope (degree): **3** (Downslope)

Separation Distance (m): **80**

### 2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **83** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **15**

Overall Fuel Load (t/ha): **20**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **4.14** (determined by the built-in algorithm)

### 3. Program Outputs

Category of Attack: **Medium**

Level of Construction Required: **Level 1**

Rate of Fire Spread (km/h): **2.21** (Noble et al., 1980)

Fire Intensity (kW/m): **22878**

Transmissivity: **0.737** (Fuss and Hammins, 2002)

Flame Length (m): **16.79** (RFS PBP, 2001)

Radiant Heat Flux (kW/m<sup>2</sup>): **3.78**

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Assessment Date: **15/9/2008**

Assessed By: **Flamezone Consultants**



## BUSHFIRE ATTACK ASSESSMENT REPORT

For Site Located At: **14-18 Boondah Rd, Warriwood, NSW, 2102**

Created By: **Web-based Bushfire Attack Assessor Version 2.0**

---

### 1. User's Inputs

Local Government Area: **Pittwater**

In Alpine Areas: **No**

Vegetation: **Forested wetlands**

Effective Slope (degree): **1** (upslope)

Separation Distance (m): **25**

### 2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **74** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **15**

Overall Fuel Load (t/ha): **20**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **5.97** (determined by the built-in algorithm)

### 3. Program Outputs

Category of Attack: **High**

Level of Construction Required: **Level 2**

Rate of Fire Spread (km/h): **1.68** (Noble et al., 1980)

Fire Intensity (kW/m): **17360**

Transmissivity: **0.822** (Fuss and Hammins, 2002)

Flame Length (m): **13.32** (RFS PBP, 2001)

Radiant Heat Flux (kW/m<sup>2</sup>): **16**

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Assessment Date: **15/9/2008**

Assessed By: **Flamezone Consultants**



## BUSHFIRE ATTACK ASSESSMENT REPORT

For Site Located At: **14-18 Boondah Rd, Warriwood, NSW, 2102**  
Created By: **Web-based Bushfire Attack Assessor Version 2.0**

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### 1. User's Inputs

Local Government Area: **Pittwater**

In Alpine Areas: **No**

Vegetation: **Woodlands**

Effective Slope (degree): **1** (upslope)

Separation Distance (m): **25**

### 2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **79** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **10**

Overall Fuel Load (t/ha): **15**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **4.02** (determined by the built-in algorithm)

### 3. Program Outputs

Category of Attack: **Medium**

Level of Construction Required: **Level 1**

Rate of Fire Spread (km/h): **1.12** (Noble et al., 1980)

Fire Intensity (kW/m): **8680**

Transmissivity: **0.819** (Fuss and Hammins, 2002)

Flame Length (m): **9.08** (RFS PBP, 2001)

Radiant Heat Flux (kW/m<sup>2</sup>): **10.85**

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Assessment Date: **15/9/2008**

Assessed By: **Flamezone Consultants**



## 4 STANDARDS FOR BUSH FIRE PROTECTION MEASURES FOR RESIDENTIAL AND RURAL RESIDENTIAL SUBDIVISIONS

### 4.1 Asset Protection Zones

**Intent of Measures: to provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building**

Performance Criteria	Acceptable solutions	
<ul style="list-style-type: none"> <li>radiant heat levels at any point on a proposed building will not exceed 29 kW/m<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>an APZ is provided in accordance with the relevant tables/ figures in Appendix 2 of this document</li> <li>the APZ is wholly within the boundaries of the development site. Exceptional circumstances may apply (see section 3.3)</li> </ul>	<p>A significant proportion of the planned dwellings face away from the prime hazard being parts of the wetlands interface and the wetlands themselves. The planned interface core riparian zone will be situated along the boundary and in some cases off site depending on the actual wetlands edge. The prime Asset Protection Zone of 25 m includes a 10 m buffer between the core riparian zone and the buildings/flood storage areas. This APZ extends to over 80 m directly south of the Flood Storage basin. There is only 1 section of the interface (dwelling 1(a) next to the remnant Swamp Oak forest where the radiant heat flux may approach 29 kW/m<sup>2</sup>). This will be mitigated by an APZ/metal fence and level 3 construction.</p>
<ul style="list-style-type: none"> <li>APZs are managed and maintained to prevent the spread of a fire towards the building.</li> </ul>	<ul style="list-style-type: none"> <li>in accordance with the requirements of Standards for Asset Protection Zones (RFS, 2005) <i>Note: A Monitoring and Fuel Management Program should be required as a condition of development consent.</i></li> </ul>	<p>The prime Asset Protection Zones for this development are the varying interfaces with the wetlands. The landscape plan requires regular on site maintenance to ensure that the riparian and buffer zones are maintained to avoid vegetation over growth. An area requiring specific maintenance will be the area near to the buildings in the Boondah Road section adjacent to the 'Hop and Step' wildlife corridor and the remnant Swamp Oak forest.</p>
<ul style="list-style-type: none"> <li>APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.</li> </ul>	<ul style="list-style-type: none"> <li>the APZ is located on lands with a slope less than 18 degrees.</li> </ul>	<p>The overall slope to the wetland from the proposed building site is &gt;5° downslope. The type of retained full growth vegetation in some sections of the interface would not support crown fires running to any on site buffer.</p>

## 4.2 Access (1) Public Roads

**Intent of Measures: to provide safe operational access to structures and water supply for emergency services personnel, while residents are seeking to evacuate from an area.**

Performance Criteria	Acceptable solutions	
<ul style="list-style-type: none"> <li>• firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)</li> </ul>	<ul style="list-style-type: none"> <li>• public roads are two-wheel drive, all weather roads.</li> </ul>	The internal and access road to this development are sealed roads.
<ul style="list-style-type: none"> <li>• public road widths and design that allow safe access for firefighters while residents are evacuating an area.</li> </ul>	<ul style="list-style-type: none"> <li>• urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle).</li> <li>• the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas.</li> <li>• traffic management devices are constructed to facilitate access by emergency services vehicles.</li> <li>• public roads have a cross fall not exceeding 3 degrees</li> <li>• all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard.</li> <li>• curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.</li> <li>• the minimum distance between inner and outer curves is six metres.</li> <li>• maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.</li> <li>• there is a minimum vertical clearance to a height of four metres above the road at all times.</li> </ul>	The master plan includes 3 types of roads within the site. The main thoroughfare is the 'local' street (16m) (A) supported by access streets (B) 10 m and laneways of 7 m. All the streets will allow Fire Services access as appropriate. All roads and laneways are 'through' roads and the overall site is relatively level ensuring appropriate cross fall specifications. There are no bridges and there are no challenges to the 4 metre height availability.
<ul style="list-style-type: none"> <li>• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.</li> </ul>	Both 'A' and 'B' roads and the laneway will be constructed to carrying capacity of approximately 15 tonnes.

<ul style="list-style-type: none"><li>roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties that are clearly numbered.</li></ul>	<ul style="list-style-type: none"><li>public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.</li><li>public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.</li></ul>	Properties will be clearly numbered and hydrants will not be located in parking spaces but rather in the verge to allow ready access for Fire fighters.
<ul style="list-style-type: none"><li>parking does not obstruct the minimum paved width</li></ul>	<ul style="list-style-type: none"><li>parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays.</li><li>public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.</li></ul>	The final road design will include this specification. The roll top kerbway will only be required where the IPA interfaces with the roadway along the southern interface.

#### 4.3 Services – Water, electricity and gas

**Intent of Measures: to provide adequate services for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building**

Performance Criteria	Acceptable solutions	
<b>The intent may be achieved where:</b>		
<b>Reticulated water supplies</b> <ul style="list-style-type: none"> <li>water supplies are easily accessible and located at regular intervals.</li> </ul>	<ul style="list-style-type: none"> <li>access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads.</li> <li>fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.</li> <li>the provisions of public roads in section 4.1.3 in relation to parking are met.</li> </ul>	The completed plan will confirm the following: <ul style="list-style-type: none"> <li>Hydrants and water pressure – As 2419.1-2005</li> <li>Will not locate hydrants within carriageways</li> <li>Above ground services to be constructed of metal and provisions in regard to parking on public roads are met (i.e these must remain clearways at all times).</li> </ul>
<b>Electricity</b> <ul style="list-style-type: none"> <li>location of electricity services will not lead to ignition of surrounding bushland or the fabric of buildings or risk to life from damaged electrical infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>electrical transmission lines are underground.</li> </ul>	Underground supply to dwellings is planned. There are no vegetation issues with this layout.
<b>Gas</b> <ul style="list-style-type: none"> <li>location of gas services will not lead to ignition of surrounding bush land or the fabric of buildings</li> </ul>	<ul style="list-style-type: none"> <li>reticulated or bottled gas is installed and maintained in accordance with AS 1596 - 2002 and the requirements of relevant authorities. Metal piping is to be used.</li> <li>all fixed LPG tanks are kept clear of all flammable materials and located on the non hazard side of the development.</li> <li>If gas cylinders need to be kept close to the building, the release valves must be directed away from the building and away from any combustible material, so that they do not act as catalysts to combustion.</li> <li>polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.</li> </ul>	Where gas is installed it will be in accordance with AS 1596-2002.

## 5 CONCLUSION AND RECOMMENDATIONS IN REGARD TO THIS PROPOSAL

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*(how the development complies with acceptable solutions and performance requirements and relevant specific objectives with Chapter 4 'Planning for Bushfire Protection – 2006')*

A considerable bulk of the 140 planned dwellings are positioned away from the wetlands and interface hazard vegetation. The road system provides safe access and egress for Fire Services and residents. The provision of riparian areas and buffer zones maintain a level of hazard vegetation in some cases and this interface vegetation should be maintained in the first instance as Inner Protection Areas whilst not diminishing the planned environmental and bio-diversity outcome. The availability of these Asset Protection Zones allows the entire site (except for house 1(a) Boondah Road South) to be built to level 1 AS 3959-1999.<sup>2</sup> The full standard should be consulted for complete details.

Given that the plan considers appropriate Asset Protection Zones, access, egress, adequate defendable space and appropriate building levels (level 1 AS 3959-1999) the development meets or exceeds appropriate Bushfire Protection measures for this type of development.

In this regard the overall development would be suitable for the Commissioner of the Rural Fire Service to issue a **Bush Fire Safety Authority**.

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Neil Falconer  
**Bush Fire Risk Consultant**

### Disclaimer

Please note that all due care is exercised in the preparation of this document and is produced in good faith. However, no warranty, express or implied, is intended as far as adoption of these recommendations impacts on the survivability of the property that is the subject of this report.

The impact of bushfire is unpredictable due to the vagaries of conditions on the day; the level of fuel build up on and near the site; property and building maintenance; and the presence or absence of active fire suppression by fire services or owners before, during and after the fire event.

Appropriate construction techniques, siting, landscaping and maintenance all have a role to play. Adoption of these measures should improve survivability, but not guarantee it.

*"NOTE: Although the Standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion"* **Section 1.3 AS 39599 Construction of Buildings in Bushfire Prone Area**

*"Notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains."* **Section 1.1.4 Limitations – Planning for Bush Fire Protection, 2001, NSW Rural Fire Service**

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<sup>2</sup> The RFS level 1 summary is attached.



## 6 METHODOLOGY

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FlameZone Bushfire Consulting used the following methodology to determine the bushfire risk for the subject property:

- Conducted a site visit and observed the property and surrounding areas.
- Measured the property to establish slope and distance to significant vegetation to calculate Asset Protection Zones.
- Sought input from the owner/applicant for information and declarations
- Sought input where appropriate from Rural Fire Service, Local Council and Department of Meteorology for historical and prevailing conditions (if available)
- Applied the hazard evaluation methods detailed in *Planning for Bushfire Protection 2006*, with reference to Appendix 2 and Appendix 3.
- Obtained plans, aerial photographs and significant photographs of the site to demonstrate and validate observations and conclusions

### Referenced documents

Pittwater Council Bushfire Prone Land Map  
 Pittwater Council Local Environmental Plan  
 Environmental Planning & Assessment Act, 1979 (NSW), s79 and 80A (*EP&A Act*)  
 Building Code of Australia, Sections 2.3.4 and 3.7.4 (as amended) (*BCA*)  
 Australian Standard AS 3959-1999 Construction of buildings in bushfire-prone areas (*AS 3959*)  
 Planning for Bushfire Protection 2006, Rural Fire Service (*PfBP*)  
 Ocean Shores to Desert Dunes – D Keith  
 Rural Fires Act 1997 (NSW) (*Rural Fires Act*)  
 NSW RFS "Australian Standard AS 3959-1999 Summary Table"  
 Total Earth Care P/L Flora and Fauna Assessment  
 Site plans  
 Building plans  
 Site photographs dated 1st September 2008  
 Aerial photograph printed 1<sup>st</sup> September 2008

### Acknowledgements

Pittwater Council  
 Planning NSW GeoSpatial Portal  
 Planning NSW iPlan, Plan Connect

## 7 COMPANY PROFILE

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### Who is Aqua Fire Protection Pty Limited?

Aqua Fire Protection was formed in 2000 and has quickly grown to become an independently recognised and highly regarded fire protection company.

We work in conjunction with commercial, industrial and residential property owners and managers to ensure the planned and systematic installation, inspection, testing and rectification of Fire and Life Safety Essential Services.







Due to the diversity and complexity of this area, we have structured our business to enable us to confidently provide a reliable service. Aqua Fire Protection supplies highly experienced, qualified technicians and tradesmen, computerised record documentation, and certification in accordance with relevant Australian Standards, the Building Code of Australia, State Regulations, and industry best practice where no standards exist (as in residential external water sprinkler systems).

We offer comprehensive, reliable and cost-effective solutions. Our goal is to work with our clients to ensure protection, compliance, efficiency, value for money and peace of mind.

### Who is FlameZone Consulting?

FlameZone Consulting was established as a separate division in response to a growing need for bushfire assessment and management services as a result of legislative changes in 2002.

We offer the following services:

-  Bushfire risk assessments for Development Applications
-  Bushfire mitigation strategies
-  Hazard reduction and maintenance programs
-  Bushfire evacuation planning
-  Training in pump and hose operation
-  Liaison with council and fire services regarding bushfire issues for Development Applications and generally

FlameZone Consulting has Associates operating across most of New South Wales, all of whom have significant Rural Fire Service bushfire-fighting experience at senior levels. All our consultants have completed the UTS/RFS training course and FlameZone Consulting is included on the RFS web site list of Bushfire Management Consultants.

### Who is Aqua FireShield?

Aqua FireShield, was also established as a separate division of Aqua Fire Protection to research, design and install residential external bushfire sprinkler systems capable of affording the highest possible protection to properties in bushfire-prone areas.

In addition, we supply and advise on a range of bushfire protection products and services to meet the requirements of AS 3959.

### Contact us

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