

Your reference: Stockland, Vincentia - Bushfire [6376B]

Our reference: 10SGBBUS-0035/43



ABN 87 096 512 088

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Dear David,

Forms part of Eco Logical Australia

**Re: Bushfire Protection Assessment of Proposed Section 75W Application for
Proposed Modification of Subdivision Layouts at Western and Central Precincts
Stockland Vincentia**

This letter is a Bushfire Protection Assessment of the proposed Section 75W modification to the development consent for a residential subdivision by Stockland at Vincentia.

The approved subdivision within the Western Precinct did not occupy the entire potential residential development footprint reflected in the zoning. In particular, there is a strip of land adjacent to Naval College Road in the Western Precinct that has been zoned for R2 – Residential. The land was always proposed to be rezoned, but Stockland's subdivision layout did not extend the strip of land along Naval College Road. An amendment is now proposed to the approved subdivision layout to include 21 lots in the land adjacent to Naval College Road (see Figure 1 in Appendix 1).

Furthermore, an area within the north-eastern corner of the Central Precinct is proposed to be redesigned to include some larger allotments as shown in Figure 3 and the replacement of a perimeter road with a perimeter fire trail. These proposed changes to the Stockland Vincentia development consent require assessment under PBP.

The remaining PBP (2001) provisions for access and utilities have already been approved for this development and are not impacted by the proposed s.75W modifications, aside from a future dwelling within the south-eastern most allotment in the proposed Central Precinct being slightly further than 70 m from the nearest hydrant.

Therefore, this letter addresses Asset Protection Zones (APZs) and bushfire construction levels as per AS 3959-1999 and AS 3959-2009 'Construction of buildings in bushfire-prone areas' only in the vicinity of these additional/amended lots, under the current PBP (2006). It also addresses the issue of a future dwelling on the most south-eastern allotment within the amended area of the Central Precinct being located greater than 70 m from the nearest hydrant and the proposed replacement of the perimeter road with a perimeter fire trail.

Location of subject land and bushfire hazard

The subject site is located on the northern corner of the intersection of Naval College (Jervis Bay) Road and The Wool Road, Vincentia within the Shoalhaven Local Government Area.

The site comprises Lots 801 and 802 in DP 1022286, Lots 72 – 75 in DP 874040 and Lots 326 – 334 within the Central Precinct and all public roads within these lots.

The site is bounded to the:

- south-east by The Wool Road;
- south-west by Naval College (Jervis Bay) Road and existing rural residential development;
- north-west by Jervis Bay National Park, and
- north-east by Jervis Bay National Park and the existing Council-operated Bay and Basin Leisure Centre.

The topography of the site is dominated by two north-east ridgelines dissected by three ephemeral watercourses flowing north to north-east to adjacent wetlands within Jervis Bay National Park. The terrain is flat to gently undulating with slopes being less than 5 degrees. Vegetation varieties which currently cover the site include sedgeland, heathland, woodland and open forest.

The subject land has been identified in the Jervis Bay Settlement Strategy (DIPNR 2003) as an area for urban expansion and a district level shopping centre.

Asset Protection Zones (APZs)/construction standards

The proposed Section 75W amendments to the original development consent are summarised on page one of this letter and the new proposed additional and amended lots are shown in Figures 1 and 3 respectively. These proposed changes have been assessed in accord with PBP with the vegetation and effective slopes having been determined within 140 m of the proposed development. APZs and Bushfire Attack Levels (BALs) have been determined using PBP and AS 3959-2009 for the Western Precinct using the vegetation and slope data shown in Table 1. APZs and Bushfire Attack Levels (BALs) have been determined for the Central Precinct using the 'Bush Fire Attack Assessor V1.4' (BFAA) or 'View Factor Model' as it is also known based on the vegetation and slope data shown in Table 1. The BFAA reports for the Central Precinct are contained in Appendix 2.

Table 1 – Summary of APZ and construction levels based on slope/vegetation data

Direction	Slope ¹	Vegetation ²	Minimum APZ [†]	AS 3959-2009 Construction Levels required			
				BAL-40	BAL-29	BAL-19	BAL-12.5
Western Precinct							
West	3 degrees downslope	Forest	25m	25 m - <32 m	32 m - <43 m	43 m - <57 m	57 m – 100 m
South	Level	Forest	20m	20 m - <25 m	25 m - < 35 m	35 m - <48 m	48 m – 100 m
Central Precinct							
North and east	1 degree downslope	Forest	22m*	22 m - <27 m*	27 m - <37 m*	37 m - < 50 m*	50 m - 100 m*
South	1 degree upslope	Tall heath (scrub)	13m*	13 m*	13 m - <19 m*	19 m - <27 m*	27 m – 100 m*

¹ Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

² Predominant vegetation is identified, according to PBP and “Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate” (AS 3959-2009 vegetation classification).

[†] Assessed using PBP.

* Assessed using the ‘Bush Fire Attack Assessor V1.4’ (reports attached in Appendix 2)

The minimum APZs for the Western Precinct range from 20 m – 25 m while the minimum APZs for the Central Precinct range from 13 m – 22 m. Bushfire construction levels required for future dwellings within the proposed allotments as per AS 3959-2009 ‘Construction of buildings in bushfire-prone areas’ will vary from BAL-40 down to BAL-12.5 as outlined in Table 1 and Figures 2 and 4.

Water Supply for Central Precinct

The proposed Central Precinct subdivision will be serviced by reticulated water. A future dwelling within the south-eastern most proposed allotment within the Central Precinct will be located such that it will be greater than 70 m from the nearest hydrant as required by the previous subdivision approval.

However, the previous approval was based on a bushfire assessment under Planning for Bushfire Protection 2001 and PBP 2006 is now the current document guiding development in bush fire prone areas. Under PBP 2006, the RFS will now accept a dwelling being located within 90 m of the nearest hydrant provided that a fire appliance may be parked in line between the hydrant and the dwelling. This will be the case with the south-eastern allotment in the Central Precinct and the current proposed subdivision will comply with the PBP 2006 requirements for reticulated water supply.

Perimeter Access for Central Precinct

The proposed Central Precinct subdivision was originally approved with a perimeter road separating proposed allotments from the forest to the north and west and the tall heath vegetation to the south. The new proposed layout for this area contains larger allotments and a perimeter fire trail is now proposed in place of the perimeter road.

The perimeter fire trail will be located within the APZ within the Water Sensitive Urban Design (WSUD) reserves and these reserves and the fire trail will be maintained by Shoalhaven City Council. The perimeter fire trail proposed complies with all PBP requirements as outlined in Appendix 3.

Conclusion

In the author's professional opinion, the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development, a standard that is consistent with 'Planning for Bushfire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.



Susan Courtney

Senior Bushfire Planner

Appendix 1 – Figures

Figure 1: Asset protection zones



Figure 2: Building construction standards

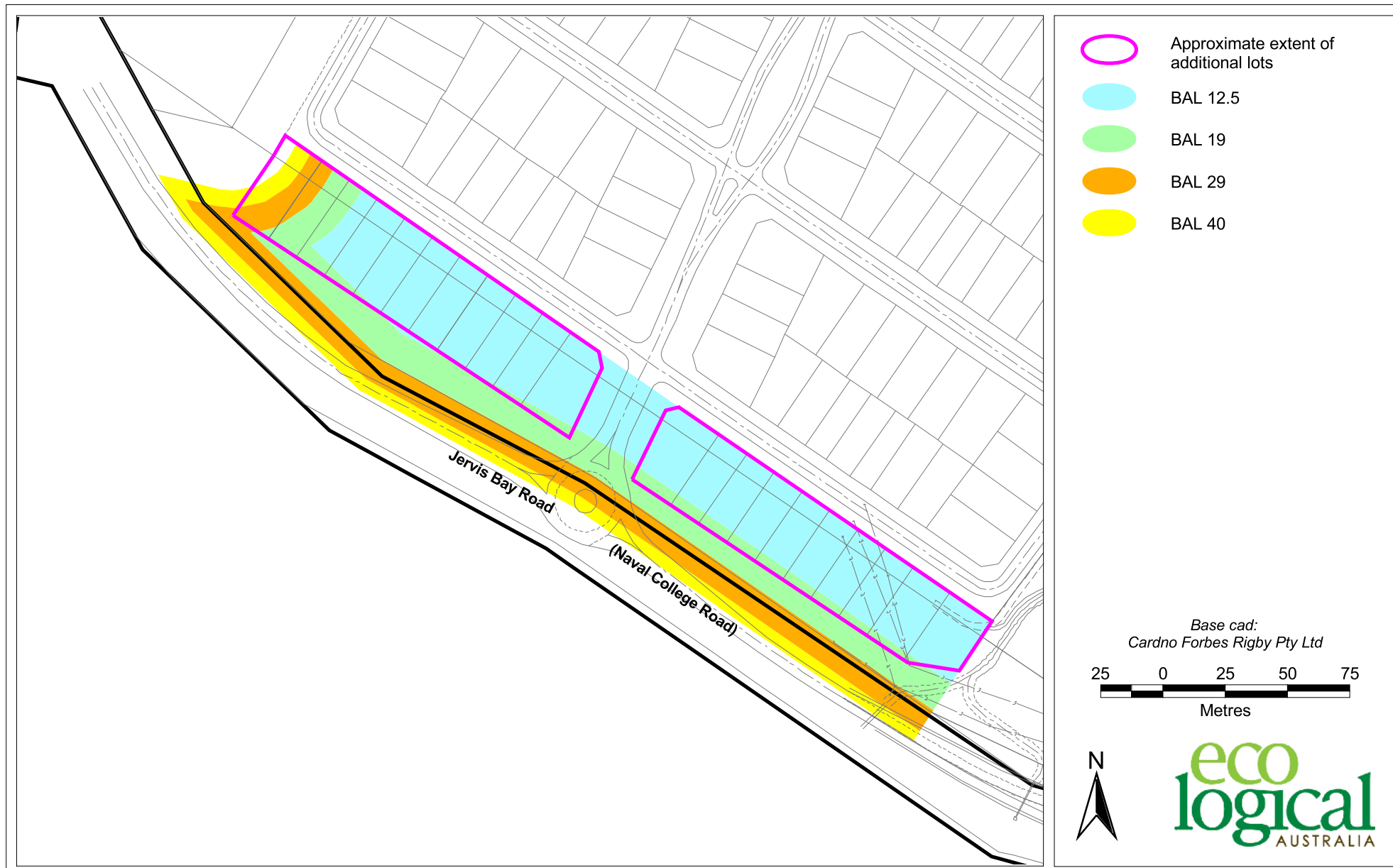


Figure 3: Asset protection zones

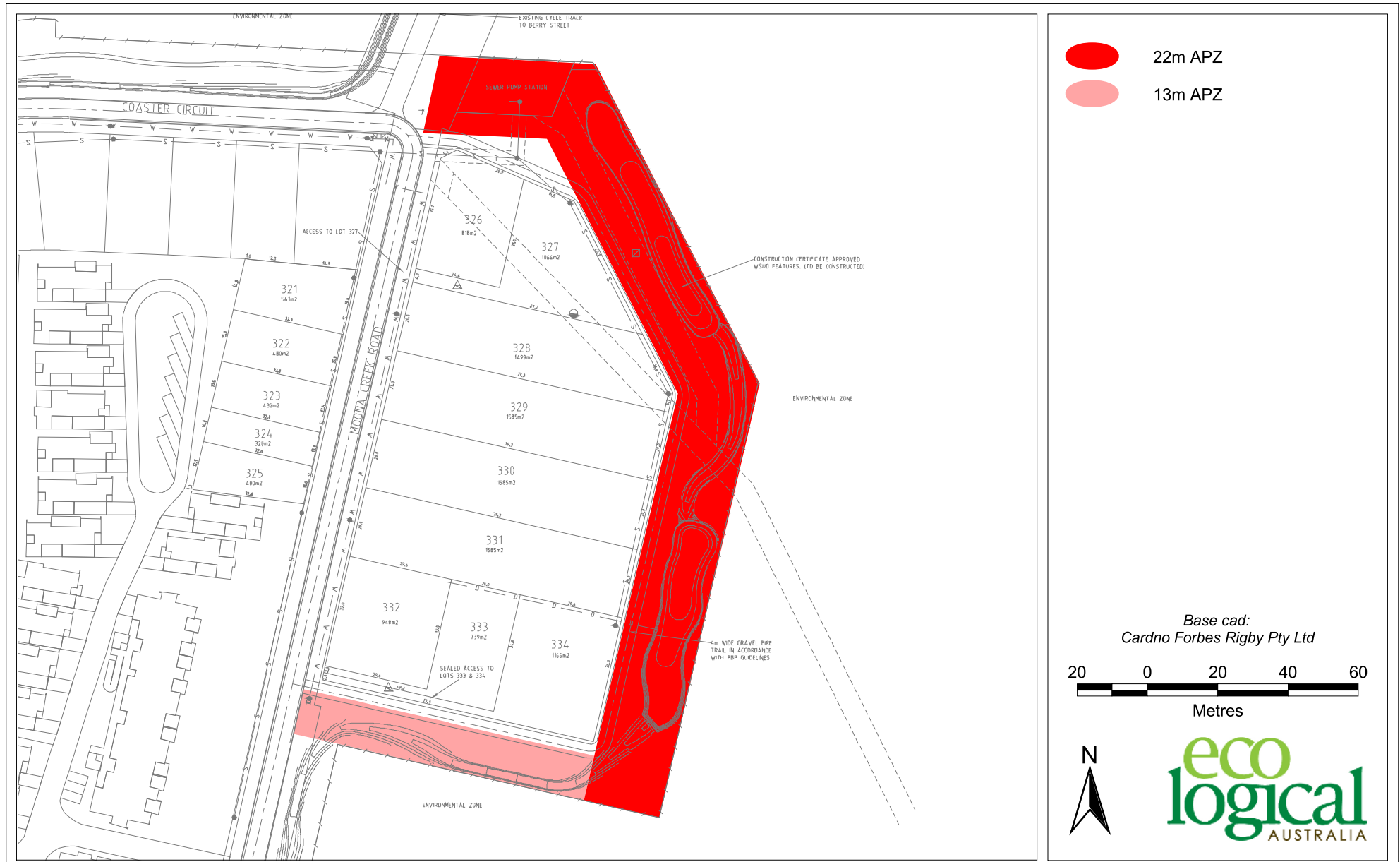
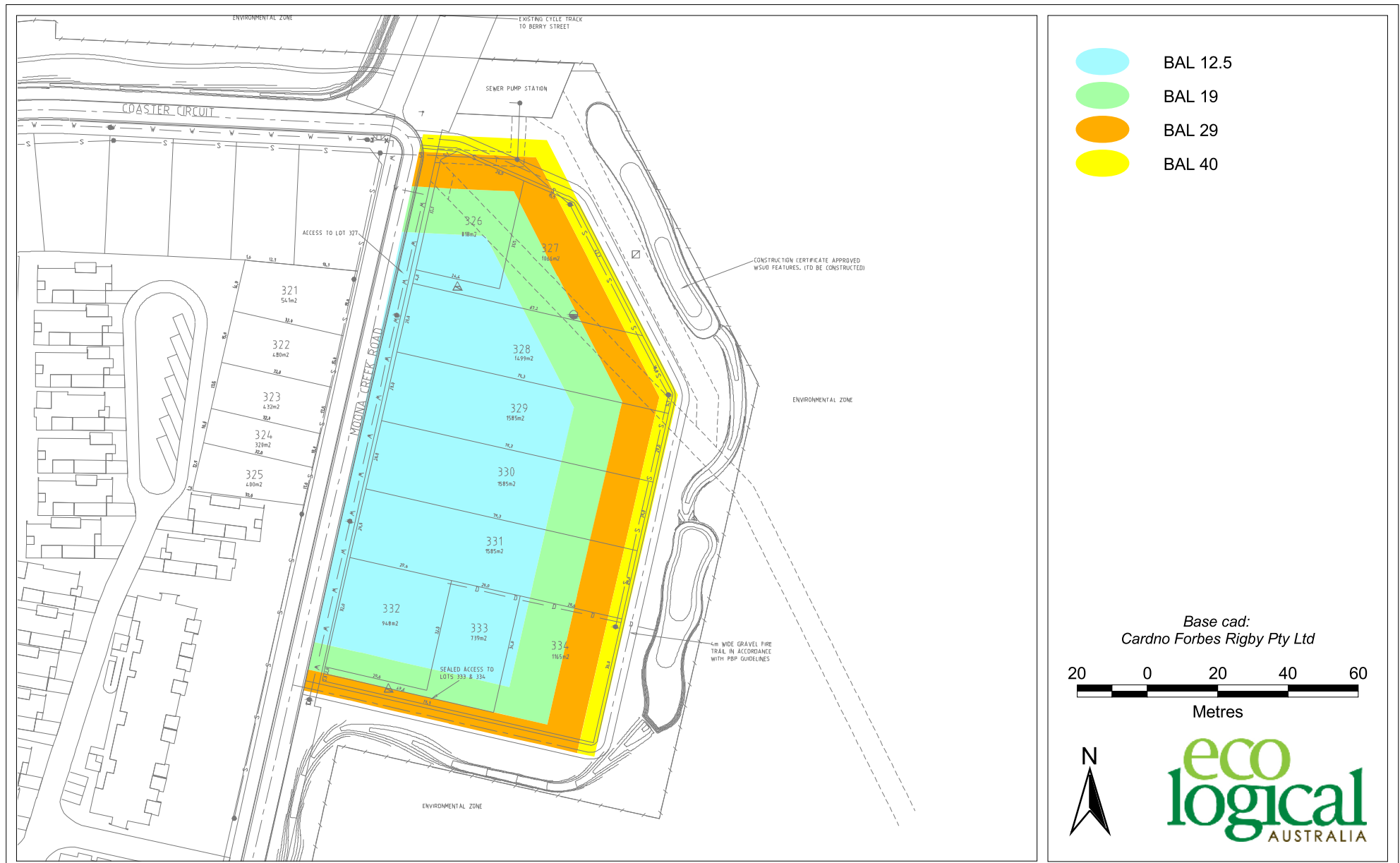


Figure 4: Building construction standards



Appendix 2 – Bush Fire Attack Assessor V1.4 Reports Central Precinct

Bushfire Attack Assessment Report

AS3959 (2009) Version
1.4.2

Print Date: 25/08/2010 **Assessment** 25/08/2010

Site Street Address: Central & Western Precinct, Vincentia
Assessor: David Peterson; Bushfire+Environmental Services
Fire Danger Index: 100 (Fire Weather Area: Illawarra / Shoalhaven)
Local Government Shoalhaven **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: Central Precinct - N & E APZ

Vegetation Information

Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	1 Degrees	Vegetation Slope	Downslope
Surface Fuel	20	Overall Fuel	25

Site Information

Site	1 Degrees	Site Slope Type:	Downslope
Elevation of	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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	HIGH	Peak Elevation of	8.4
Level of	BAL 29	Fire Intensity(kW/m):	33215
Radiant	27.86	Flame Angle (degrees):	63
Flame Length(m):	19.71	Maximum View Factor:	0.437
Rate Of Spread	2.57	Inner Protection Area(m):	22
Transmissivity:	0.839	Outer Protection Area(m):	0

Run Description: **Central Precinct - N & E BAL-40**

Vegetation Information

Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	1 Degrees	Vegetation Slope	Downslope
Surface Fuel	25	Overall Fuel	35

Site Information

Site	1 Degrees	Site Slope Type:	Downslope
Elevation of	Default	APZ/Separation(m):	27

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	HIGH	Peak Elevation of	10.5
Level of	BAL 29	Fire Intensity(kW/m):	58125
Radiant	28.21	Flame Angle (degrees):	61
Flame Length(m):	25.09	Maximum View Factor:	0.448
Rate Of Spread	3.21	Inner Protection Area(m):	18
Transmissivity:	0.828	Outer Protection Area(m):	9

Run Description: **Central Precinct - N & E BAL-29**

Vegetation Information

Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	1 Degrees	Vegetation Slope	Downslope
Surface Fuel	25	Overall Fuel	35

Site Information

Site	1 Degrees	Site Slope Type:	Downslope
Elevation of	Default	APZ/Separation(m):	37

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	MODERATE	Peak Elevation of	10.9
Level of	BAL 19	Fire Intensity(kW/m):	58125
Radiant	18.88	Flame Angle (degrees):	67
Flame Length(m):	25.09	Maximum View Factor:	0.31
Rate Of Spread	3.21	Inner Protection Area(m):	25
Transmissivity:	0.8	Outer Protection Area(m):	12

Run Description: **Central Precinct - N & E BAL-19**

Vegetation Information

Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	1 Degrees	Vegetation Slope	Downslope
Surface Fuel	25	Overall Fuel	35

Site Information

Site	1 Degrees	Site Slope Type:	Downslope
Elevation of	Default	APZ/Separation(m):	50

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	LOW	Peak Elevation of	10.99
Level of	BAL 12.5	Fire Intensity(kW/m):	58125
Radiant	12.32	Flame Angle (degrees):	71
Flame Length(m):	25.09	Maximum View Factor:	0.209
Rate Of Spread	3.21	Inner Protection Area(m):	35
Transmissivity:	0.774	Outer Protection Area(m):	15

Run Description: **Central Precinct - South APZ**

Vegetation Information

Vegetation Type:	Scrub/Tall Heath	Vegetation Group:	Shrub & Heath
Vegetation Slope:	1 Degrees	Vegetation Slope	Upslope
Surface Fuel	25	Overall Fuel	25

Site Information

Site	1 Degrees	Site Slope Type:	Upslope
Elevation of	Default	APZ/Separation(m):	13

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	HIGH	Peak Elevation of	5.25
Level of	BAL 29	Fire Intensity(kW/m):	50228
Radiant	28.49	Flame Angle (degrees):	63
Flame Length(m):	11.27	Maximum View Factor:	0.435
Rate Of Spread	3.89	Inner Protection Area(m):	13
Transmissivity:	0.862	Outer Protection Area(m):	0

Run Description: **Central Precinct - South BAL-40**

Vegetation Information

Vegetation Type:	Scrub/Tall Heath	Vegetation Group:	Shrub & Heath
Vegetation Slope:	1 Degrees	Vegetation Slope	Upslope
Surface Fuel	25	Overall Fuel	25

Site Information

Site	1 Degrees	Site Slope Type:	Upslope
Elevation of	Default	APZ/Separation(m):	13

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	HIGH	Peak Elevation of	5.25
Level of	BAL 29	Fire Intensity(kW/m):	50228
Radiant	28.49	Flame Angle (degrees):	63
Flame Length(m):	11.27	Maximum View Factor:	0.435
Rate Of Spread	3.89	Inner Protection Area(m):	13
Transmissivity:	0.862	Outer Protection Area(m):	0

Run Description: Central Precinct - South BAL-29

Vegetation Information

Vegetation Type:	Scrub/Tall Heath	Vegetation Group:	Shrub & Heath
Vegetation Slope:	1 Degrees	Vegetation Slope	Upslope
Surface Fuel	25	Overall Fuel	25

Site Information

Site	1 Degrees	Site Slope Type:	Upslope
Elevation of	Default	APZ/Separation(m):	19

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	MODERATE	Peak Elevation of	5.66
Level of	BAL 19	Fire Intensity(kW/m):	50228
Radiant	18.72	Flame Angle (degrees):	71
Flame Length(m):	11.27	Maximum View Factor:	0.293
Rate Of Spread	3.89	Inner Protection Area(m):	19
Transmissivity:	0.84	Outer Protection Area(m):	0

Run Description: Central Precinct - South BAL-19

Vegetation Information

Vegetation Type:	Scrub/Tall Heath	Vegetation Group:	Shrub & Heath
Vegetation Slope:	1 Degrees	Vegetation Slope	Upslope
Surface Fuel	25	Overall Fuel	25

Site Information

Site	1 Degrees	Site Slope Type:	Upslope
Elevation of	Default	APZ/Separation(m):	27

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	18600	Ambient Temp(K):	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	LOW	Peak Elevation of	5.94
Level of	BAL 12.5	Fire Intensity(kW/m):	50228
Radiant	12.41	Flame Angle (degrees):	76
Flame Length(m):	11.27	Maximum View Factor:	0.2
Rate Of Spread	3.89	Inner Protection Area(m):	27
Transmissivity:	0.816	Outer Protection Area(m):	0

Appendix 3 – PBP Fire Trail Specifications

Table 1: Performance criteria for fire trails*¹

Performance Criteria	Acceptable Solutions	Complies
<p>The intent may be achieved where:</p>		
<ul style="list-style-type: none"> ▪ the width and design of the fire trails enables safe and ready access for firefighting vehicles 	<ul style="list-style-type: none"> ▪ a minimum carriageway width of four metres with an additional one metre wide strip on each side of the trail (clear of bushes and long grass is provided) ▪ the trail is a maximum grade of 15 degrees if sealed and not more than 10 degrees if unsealed ▪ a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches is provided ▪ the crossfall of the trail is not more than 10 degrees ▪ the trail has the capacity for passing by: <ul style="list-style-type: none"> - reversing bays using the access to properties to reverse fire tankers, which are six metres wide and eight metres deep to any gates, with an inner minimum turning radius of six metres and outer minimum radius of 12 metres; and / or - a passing bay every 200 metres, 20 metres long by three metres wide, making a minimum trafficable width of seven metres at the passing bay <p><i>Note: Some short construction in the access may be accepted where they are not less than the minimum (3.5m) and extend for no more than 30m and where obstruction cannot be reasonably avoided or removed</i></p>	<p>Complies</p> <p>Complies</p> <p>Complies</p> <p>Complies</p> <p>Complies</p>
<ul style="list-style-type: none"> ▪ fire trails are trafficable under all weather conditions. Where the fire trail joins a public road, access shall be controlled to prevent use by non authorised persons 	<ul style="list-style-type: none"> ▪ the fire service is accessible to firefighters and maintained in a serviceable condition by the owner of the land ▪ appropriate drainage and erosion controls are provided ▪ the fire trail system is connected to the property access road and / or to the through road system at frequent intervals of 200 metres or less ▪ fire trails do not traverse a wetlands or other land potentially subject to periodic inundation (other than a flood or storm surge) ▪ gates for fire trails are provided and locked with a key / lock system authorized by the local RFS 	<p>Complies</p> <p>Complies</p> <p>Complies</p> <p>Complies</p> <p>Complies</p>
<ul style="list-style-type: none"> ▪ fire trails designed to prevent ween infestation, soil erosion and other land degradation 	<ul style="list-style-type: none"> ▪ fire trail does not adversely impact on natural hydrological flows ▪ fire trail design acts as an effective barrier to the spread of weeds and nutrients ▪ fire trail construction does not expose acid-sulphate soils 	<p>Complies</p> <p>Complies</p> <p>Complies</p>

*¹ PBP page 25



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