Bradley James

From: Matt Philpott <[redacted]au>
Sent: Monday, 25 November 2019 4:23 PM
To: IPCN Enquiries Mailbox
Cc: Bradley James; Matthew Somers; Ric Peterson; [redacted] Rose, Rod
Subject: [WARNING: ATTACHMENT UNSCANNED]Mundamia subdivision - Slope Analysis and Additional Bushfire Information - Attention: Bradley James - N25489
Attachments: 2016-01-27 - Rod Rose - [redacted] - Amanda Moylan, martha.dotter@rfs.nsw.gov.au, Matt Philpott - 25489 - Mundamia subdivision.msg; Mundamia; Response to IPC on bushfire

Follow Up Flag: Follow up
Flag Status: Flagged

Bradley,

With respect to the ABAC Bushfire Report that has been commissioned by IPC to assist with the assessment of the Mundamia DA I provide a number of additional pieces of information to assist with IPC's deliberation, including.

- an email from our expert bushfire consultant, Mr Rod Rose, which was sent to RFS on 27 January 2016 which explained the slope analysis undertaken;
- an email from our expert bushfire consultant, Mr Rod Rose, which was sent to RFS on 27 June 2016 which provided additional justification to the slope analysis and provided photographs of the area out from the proposed APZ;
- an email from our expert bushfire consultant, Mr Rod Rose, dated 25/11/19 which provides additional commentary on the ABAC report and the bushfire solutions proposed in the Mundamia subdivision;

I note IPCs consultant has recommended the deletion of the following draft conditions:

- A1(9)(a)(ii) – which required the temporary 100m APZ to the west;
- A1(9)(d) – which required major layout changes to provide internal rear access from each perimeter lot; and
- A1(9)(e) – which required the relocation of all the medium density lots 100m from the edge of the development.

We support this advice in relation to the above conditions.

The IPC's consultant has also recommended improvements/relaxing of requirements to the following draft conditions:

- A1(9)(b)(v) – which required parking restrictions on all perimeter roads and Road 1 south of Road 9. The outcome is that the consultant has recommended the following:
  - the parking restriction on Road 1 south of Road 9 remain to assist with evacuation
  - the parking restrictions on all perimeter roads be relaxed so that parking is acceptable on the residential side of the street but is only partially restricted on the bush/hazard side of the street

I assume the IPC's consultant is aware that (as per the Council DCP) Road 1 south of Road 9 is 11m wide and the row of dwellings fronting this road only have rear lane access so some parking out the front is critical to the suitable functioning of those dwellings. A 2.5m wide parking lane on the eastern side of the road still permits 8.5m for ingress/egress which is sufficiently wide for emergency egress.

With respect to the slope analysis(and corresponding APZ widths), it is disappointing that the consultant did not have the required information he needed to inform IPC which now leads to further delays. Unfortunately this has arisen because DPIE staff required us to liaise directly with RFS on various matters. Despite this approach, I now attach the following correspondence:

- an email from our expert bushfire consultant, Mr Rod Rose, which was sent to RFS on 27 January 2016 which explained the slope analysis undertaken;
- an email from our expert bushfire consultant, Mr Rod Rose, which was sent to RFS on 27 June 2016 which provided additional justification to the slope analysis and provided photographs of the area out from the proposed APZ;

Our records indicate that it was this refined slope analysis in the SE corner of the site that led to the RFS Bushfire Safety Authority being issued on 4 November 2016.

With respect to the area in the north of the site, the APZ's proposed on our plan reflect the increased APZ requested by the RFS.

We trust this now provides IPC with sufficient information to finalise its decision on this matter.

Regards

Matt Philpott
DIRECTOR | PLANNING MANAGER | CIVIL ENGINEER
Email: [redacted]

allen price & scarratts pty ltd
land and development consultants

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Kiama Office: 1/28 Bong Bong Street, Kiama NSW 2533 PO Box 209, Kiama 2533
tel 02 4421 6544 **fax** 02 4422 1821 **email** consultants@allenprice.com.au

Bradley James

From: Rod Rose [redacted]
Sent: Wednesday, 27 January 2016 2:50 PM
To: Amanda Moylan; martha.dotter@rfs.nsw.gov.au
Cc: Matt Philpott
Subject: Mundamia subdivision
Attachments: APZ_20150521.png; APZ_20150319_v2.pdf

HI Martha
Our client for the Part 3A Development for Preferred Project Report - 30//1198692 - George Evans & Jonsson Road, Mundamia has asked us to clear up the APZ and slope issues to the NE and East referred to in your letter dated 10th September 2-15 (Your Ref: D15/2555, DA15082898296 MD). As it is not clear where your differences in calculation of the slope come from can we discuss this please?

Our 22 May 2015 BPA report (Section 2.1) identified the following process as having occurred:

> *Detailed GIS slope analysis using 2 m contours was undertaken along the south-eastern boundary. 11 transects of 100 m each were used to determine the effective slope, with the slope ranging from 1.1^{o} to 8.8^{o} downslope. The steepest slope of 8.8^{o} (rounded up to 9^{o}) was used to model the width of the required APZ.*

The contours used in our assessment were obtained from surveyor provided 2m contour data, and analysed in ArcGIS through point to point measurement. It is accepted that this measurement process in some cases relies on the GIS extrapolating heights between contours, however is also a limiting factor in manual methods i.e. estimating the height of a point between contours. GIS provides a reasonable algorithm to determine slope from point to point whereas manual methods are pretty much guesswork. Nevertheless a conservative approach was utilised in our work applying the steepest slope of the 10 transects when for the SE portion and many of the transects had lower slope grades (see slope data in Table below). Whilst steeper slopes occur beyond the 100m slope assessment line (measured 100 m out from the green line which represents the building line of the development, also attached is a clearer copy of the contour data) these steeper downslopes are either short in length i.e. 20 -50m, and therefore will NOT be the effective slope when >100 m from the building line (this can potentially be demonstrated with view factor modelling if required) or the steeper slopes are considerably further than 150 m away as in the SE portion of the boundary survey. NB: the attached contour map can be enlarged for more accurate measurement.

Our slope calculation data was originally undertaken in GIS is considered accurate however a manual approach has also been undertaken to cross check these as shown in Table 1 below.

Transect #	GIS slope used in BPA	Horizontal distance (m)	Vertical fall (m)	Manual Slope Assessment	Comment
1	4^{0}	100 m	7 m	4^{0}	Average slope used
2	5.1^{0}	100 m	9 m	5.1^{0}	Average slope used
3	8^{0}	100 m	14 m	7.9^{0}	Average slope used
4	6.8^{0}	100 m	13 m	7.4^{0}	Average slope used
5	7.6^{0}	100 m	13 m	7.4^{0}	Average slope used
6	8.8^{0}	100 m	15 m	8.5^{0}	Average slope used
7	8.5^{0}	100 m	12 m	6.8^{0}	Average slope used
8	2.5^{0}	100 m	10 m	5.7^{0}	Average slope used
9	7.4^{0}	100 m	11 m	6.2^{0}	Average slope used
10	2.3^{0}	100 m	5 m	2.9^{0}	Average slope used

CONCLUSION

Both the manual and GIS methods of slope assessment provide a similar maximum slope to the south-east of the property on Transect 6 (i.e. 8.8^0 and 8.5^0 respectively). As our report utilises 9^0 this is considered conservatively appropriate as it is nearly three degrees higher than the average of slopes on the eastern side of 6.2^0 and is higher than the highest recorded effective slope. Furthermore, the highest recorded effective slopes only exist associated with narrow gullies or small cliffs (evident on site) and it can be argued with reasonable science/expert judgement that that these small cliffs and narrow bolder-filled gullies will reduce fire intensity not increase them.

If a higher effective slope of say 10 degrees was to be used in the APZ calculations the height differential over 100 m would need to be 18 m and there is clearly no place in the 2 m contour data that shows 9 * 2m contour intervals.

Regards

Rod Rose
Director

Eco Logical Australia P/L

Tel: 02 42012267
Fax: 02 4443 6655
Mob: [redacted]
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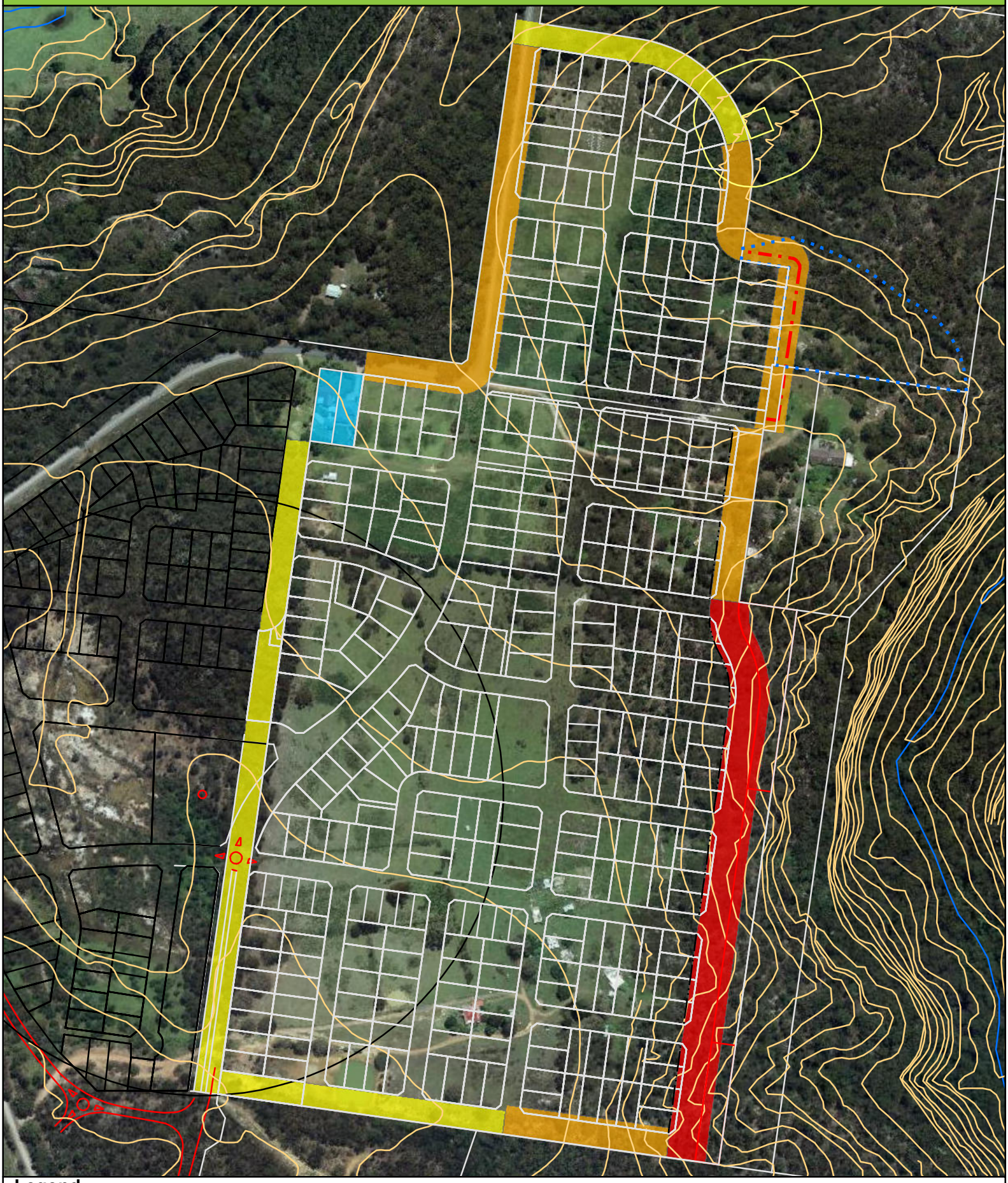
Asset Protection Zones



Legend

- Adjacent Lots
- Site Plan
- Contours - 2m
- Possible Detention Area
- Proposed Road
- Waterways
- Sewer Pumping Station
- Bushfire Trail
- Existing Asset Protection Zone
- Asset Protection Zone - 20m
- Asset Protection Zone - 25m
- Asset Protection Zone - 33m

0 45 90 180

Metres

Datum/Projection:
GDA 1994 MGA Zone 56
Imagery: Land and Property Information

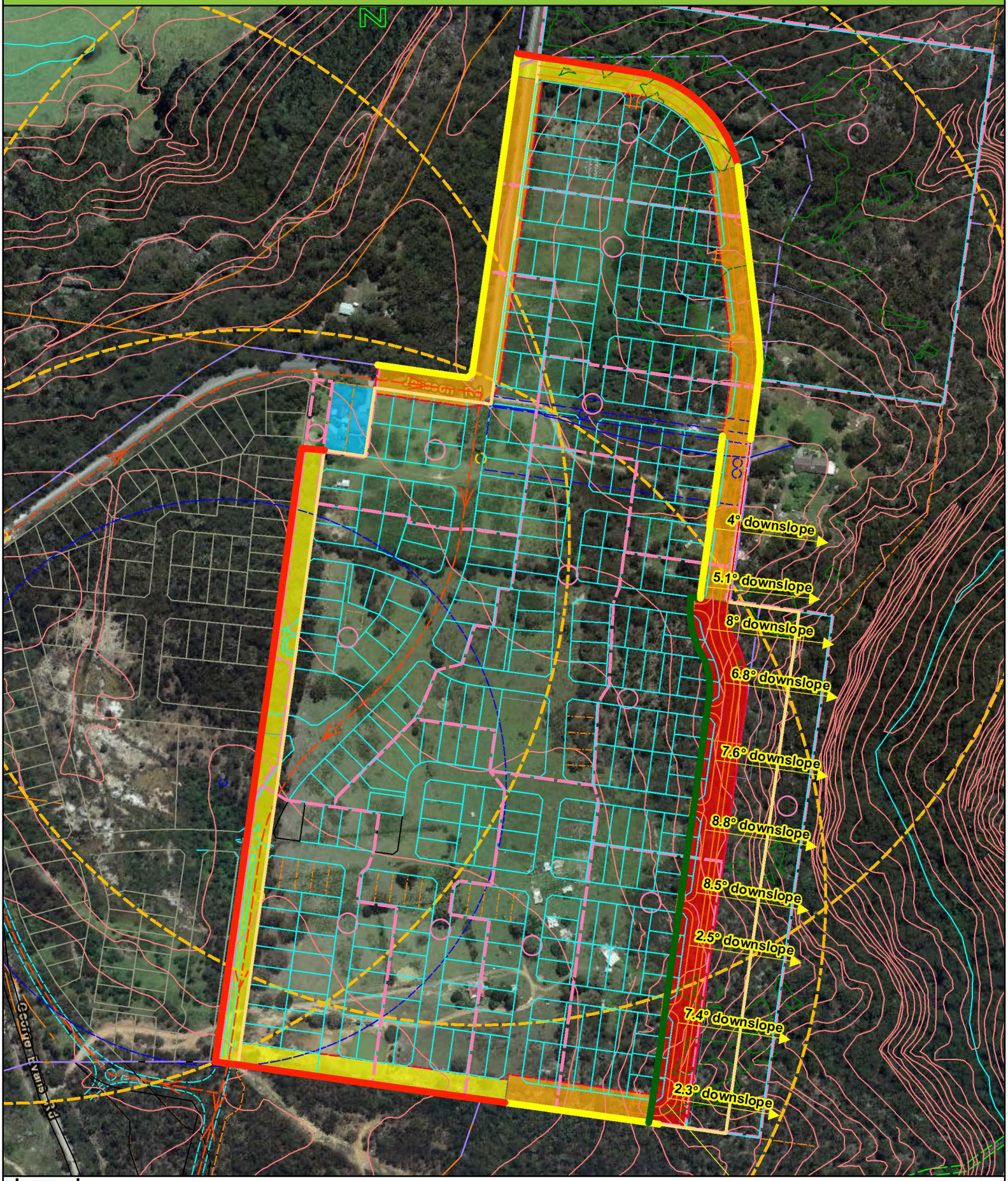
N

eco logical AUSTRALIA

www.ecoaus.com.au

Prepared by: DE Date: 19/03/2015

Asset Protection Zones



Legend

- Existing Asset Protection Zone
- Asset Protection Zone - 20m
- Asset Protection Zone - 25m
- Asset Protection Zone - 33m

Interface

- Forest - Upslope
- Forest - 0-5° downslope
- Forest - 9° downslope

0 45 90 180
Metres

Datum/Projection:
GDA 1994 MGA Zone 56
Imagery: Land and Property Information

N

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Prepared by: DE Date: 21/05/2015

Bradley James

From: Rod Rose [redacted]
Sent: Monday, 27 June 2016 12:39 PM
To: Martha Dotter
Cc: Matt Philpott
Subject: Mundamia
Attachments: rptBushfireAttackReport 19.04.2016.pdf; Slope1.jpg; escarpment is a fire barrier in some locations.jpg; escarpment rock 5.jpg; exposed rock platforms.JPG; more rock platform.JPG; more escaprment rock 4.jpg; more escarpment rock 3.jpg; more escarpment rock.jpg; rock escarpment.jpg; short length to watercourse below escarpment.jpg

Your Refs: D15/2555, DA 15082898296 MD

Dear Martha

As per our discussion on the slope assessment at Mundamia, please find the additional information you required below:

1. **Modelling of the RHF**

We have completed the additional slope analysis requested (i.e. analysis of slopes out to 150 m from the building line). As predicted the highest radiant heat flux resulting from the steeper slopes produces a RHF of 17 kW/m2 well under the 29 kW/m2 achieved with the more gentle slopes nearer the development (see attached modelling report, using the slopes from the nine 50 m transect extensions shown in green in the attached Figure). These results occur because radiant heat decreases exponentially with distance and although steeper slopes may produce higher intensities this is overshadowed in this instance by the increased separation distances.

It is also my expert judgement (as a former FCO within Shoalhaven City and having managed over 1600 bushfires) that the short lengths of steeper slopes beyond 100 m will not result in fire intensities that will carry through any distance of consequence within the APZ. The steeper slopes are often 20 m or so in length and covered in a heavy rock cover on average about 25% of ground surface and >30% of surface within 50 m nearest the building line (see example photographs showing rocky escarpment creating most of the average slope issues), this rock cover and the short length of slope up from the bottom of the watercourse (see final photo) significantly mitigates fire spread and intensity. These site conditions and the exponential decrease in radiant heat with distance means the steeper slopes beyond 100m are NOT the effective slope.

2. **Future BAL management arrangements**

Elizabeth Downing from Shoalhaven City Council included the RFS in an email to Matt Philpott dated 27th April 2016 which stated the following:

> *Council understands that a performance based approach, prepared by Rod Rose, is to be utilised for the proposed major project at Mundamia Urban Release Area, ensuring all lots will have a maximum BAL rating of BAL29. Such solution would be then also be taken into consideration of the assessment of future dwelling applications on the individual lots, as per the proposed restrictions as to user.*
>
> *Please also refer to previous comments provided to DoPE dated 17 September, 2015 with regard to other APZ matters, and other issues.*

It is therefore proposed to:

- to place a restriction as to user on the title of relevant lots with words to the effect that a performance based bushfire solution will be required to meet the BAL29 level; and

- to prepare a report outlining the performance-based bushfire solution for these allotments prior to Subdivision Certificate which will be provided to future lot owners which they can utilise for their DA's if they so choose.

I trust that this meets the further information you require to issue a Bush Fire Safety Authority.

Regards

Rod Rose
Director

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NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Print Date: 19/04/2016 **Assessment Date:** 19/04/2016

Site Street Address: Mundamia Subdivision (14SGBBUS-0093), Mundamia

Assessor: ; Ecological Australia

Local Government Area: 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: Run 1 (Previous slope 4 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	19.3 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	175

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	VERY LOW	**Peak Elevation of Receiver(m):**	35.65
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	205471
Radiant Heat(kW/m2):	4.25	**Flame Angle (degrees):**	66
Flame Length(m):	78.06	**Maximum View Factor:**	0.082
Rate Of Spread (km/h):	11.36	**Inner Protection Area(m):**	134
Transmissivity:	0.684	**Outer Protection Area(m):**	41

Run Description: Run 10 (Previous slope 2.3 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	6.1 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	106

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	VERY LOW	**Peak Elevation of Receiver(m):**	16.3
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	82641
Radiant Heat(kW/m2):	4.73	**Flame Angle (degrees):**	74
Flame Length(m):	33.9	**Maximum View Factor:**	0.086
Rate Of Spread (km/h):	4.57	**Inner Protection Area(m):**	80
Transmissivity:	0.722	**Outer Protection Area(m):**	26

Run Description: Run 2 (Previous slope 5.1 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	20.7 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	150

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	VERY LOW	**Peak Elevation of Receiver(m):**	37.41
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	226309
Radiant Heat(kW/m2):	6.61	**Flame Angle (degrees):**	61
Flame Length(m):	85.55	**Maximum View Factor:**	0.124
Rate Of Spread (km/h):	12.51	**Inner Protection Area(m):**	113
Transmissivity:	0.704	**Outer Protection Area(m):**	37

Run Description: Run 3 (Previous slope 8 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	9.1 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	130

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	VERY LOW	**Peak Elevation of Receiver(m):**	19.58
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	101647
Radiant Heat(kW/m2):	3.86	**Flame Angle (degrees):**	74
Flame Length(m):	40.74	**Maximum View Factor:**	0.072
Rate Of Spread (km/h):	5.62	**Inner Protection Area(m):**	99
Transmissivity:	0.707	**Outer Protection Area(m):**	31

Run Description: Run 4 (Previous slope 6.8 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	22.2 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	100

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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):**	35.08
Level of Construction:	BAL 19	**Fire Intensity(kW/m):**	250987
Radiant Heat(kW/m2):	17.87	**Flame Angle (degrees):**	48
Flame Length(m):	94.42	**Maximum View Factor:**	0.315
Rate Of Spread (km/h):	13.88	**Inner Protection Area(m):**	71
Transmissivity:	0.746	**Outer Protection Area(m):**	29

Run Description: Run 5 (Previous slope 7.6 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	3.3 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	100

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	LOW	**Peak Elevation of Receiver(m):**	13.92
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	68122
Radiant Heat(kW/m2):	4.43	**Flame Angle (degrees):**	76
Flame Length(m):	28.69	**Maximum View Factor:**	0.08
Rate Of Spread (km/h):	3.77	**Inner Protection Area(m):**	75
Transmissivity:	0.725	**Outer Protection Area(m):**	25

Run Description: Run 6 (Previous slope 8.8 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	9.1 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	100

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	LOW	**Peak Elevation of Receiver(m):**	19.14
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	101647
Radiant Heat(kW/m2):	6.42	**Flame Angle (degrees):**	70
Flame Length(m):	40.74	**Maximum View Factor:**	0.116
Rate Of Spread (km/h):	5.62	**Inner Protection Area(m):**	75
Transmissivity:	0.727	**Outer Protection Area(m):**	25

Run Description: Run 7 (Previous slope 8.5 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	9.5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	100

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

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:	LOW	**Peak Elevation of Receiver(m):**	19.62
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	104491
Radiant Heat(kW/m2):	6.6	**Flame Angle (degrees):**	70
Flame Length(m):	41.76	**Maximum View Factor:**	0.119
Rate Of Spread (km/h):	5.78	**Inner Protection Area(m):**	75
Transmissivity:	0.727	**Outer Protection Area(m):**	25

Run Description: Run 8 (Previous slope 2.5 degrees)

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	8.2 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	100

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

Calculation Parameters

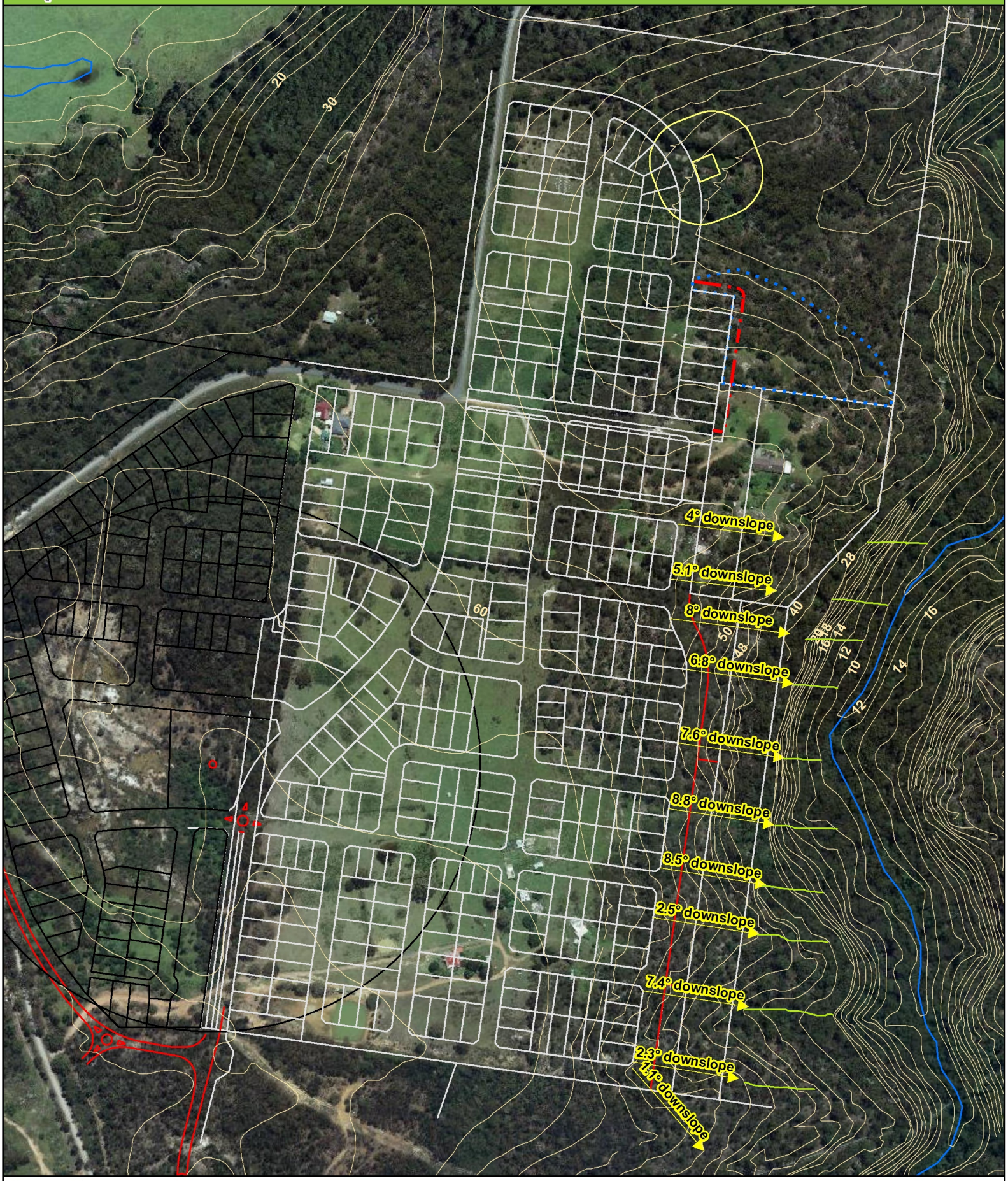
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100

Program Outputs

Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	18.22
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	95526
Radiant Heat(kW/m2):	6.05	**Flame Angle (degrees):**	71
Flame Length(m):	38.54	**Maximum View Factor:**	0.109
Rate Of Spread (km/h):	5.28	**Inner Protection Area(m):**	75
Transmissivity:	0.727	**Outer Protection Area(m):**	25

Run Description:	Run 9 (Previous slope 7.4 degrees)		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	4.2 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	95
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1090
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:	LOW	**Peak Elevation of Receiver(m):**	14.61
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	72487
Radiant Heat(kW/m2):	5.14	**Flame Angle (degrees):**	75
Flame Length(m):	30.26	**Maximum View Factor:**	0.093
Rate Of Spread (km/h):	4.01	**Inner Protection Area(m):**	71
Transmissivity:	0.728	**Outer Protection Area(m):**	24

Slope



Legend

- Adjacent Lots
- Site Plan
- Contours - 2m
- Possible Detention Area
- Proposed Road
- Waterways
- Sewer Pumping Station
- Bushfire Trail
- Slope

0 50 100 200

Metres

Datum/Projection:
GDA 1994 MGA Zone 56
Imagery: Land and Property Information

N

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Prepared by: DE Date: 14/04/2016

Bradley James

From: Rose, Rod [redacted]
Sent: Monday, 25 November 2019 12:11 PM
To: Matt Philpott
Cc: Ric.peterson; Matthew Somers
Subject: Response to IPC on bushfire

Hi Matt
Below is my initial response to the ABAC bushfire consultant report. I have not addressed the minor issues throughout the report, rather the conclusions and recommendations that differ from that we seek.

1. **Alternate Solution 1: BAL 40 concerns** (bottom of p. 19 and top of p. 20). The APZs for the perimeter Lots were determined using Performance Solutions and modelling results accepted by the RFS and these resulted in a BAL 29 outcome, not a BAL 40. ABAC has assumed a BAL 40 based upon an Acceptable Solution approach by future lot owners. The Performance Solution report provided by Eco Logical Australia and approved by the RFS will be made available to future Lot owners to demonstrate the BAL 29 rating. Therefore, this is not a matter of a higher BAL assessment but that future lot owners may not be able to replicate the modelled BAL 29 outcome accepted by the RFS. Providing a BAL report for future lot owners using the approved Performance Solution resolves this matter.

2. **Alternate Solution 1: Shelter in place concerns** (top of p. 20). The ABAC statement that *"… a minimum BAL 29 dwelling with a BAL 29 sized APZ is a key justification forwarded by the applicants bushfire consultant to support the separate alternate solution with respect to the NSP…"* is not correct.

   The purpose of the proposed NSP is to provide a higher standard of shelter in place than a BAL 29 dwelling and there is no need for BAL 40 dwellings; only a need to provide the BAL 29 performance solution report for future lot owner use. The Eco Logical Australia additional information report (2nd April 2019) clarified this in these statements:
   - *"Whilst 'sheltering in place' in a PBP compliant dwelling may be a suitable 'last resort' it is of a lesser standard than the national guideline within the Handbook for a Community Bushfire Shelter (ACBC[1]) or the Neighbourhood Safer Places (RFS, 2017[2]).* (page 2), and
   - *"PBP compliant dwellings therefore offer a potentially safe 'refuge of last resort', however, not all dwellings and their APZ are guaranteed to be maintained at the standard required under their development consent."* (page 3)

   The actual key justification in the Eco Logical Australia report (2nd April 2019) was stated on page 2 *"An Alternate Solution, however, can provide an 'early evacuation' to a suitable evacuation destination when a single access road is far less prone to failure and a 'shelter in place' design within a 'Neighbourhood Safer Place' as the second alternative evacuation destination."* Furthermore, the document replacing PBP 2006 will not change the outcomes of the Performance Solution used to validate the BAL 29 outcome approved by RFS, only the Acceptable Solutions. That is, the model design/algorithms within the 'new PBP' will not change and therefore the outcome will not change. The input slope and vegetation also will not change as the slope is not altered by the new PBP and if there is a change in the vegetation input it will be minor and is not relevant due to the RFS agreed conservative approach demonstrated in the additional information provided i.e. the extensive rock surfaces in the locality in question (see point 3 below).

3. **Alternate Solution 1: Use of Expert Judgment.** ABAC state (p. 19) that *"the content of the RFS letter of 4 November 2016 indicates that the RFS considers the relevant performance criteria is met based upon information before it at the time".* This is typical of how expert judgment is undertaken in bushfire protection assessments, that is an appropriately qualified bushfire consultant (Mr Rose, BPAD L3) provides information (and associated verbal communications) to the regulator (RFS) and both parties agree it meets the performance requirement under PBP 2006. Slopes within earlier reports are irrelevant, the RFS approval was based upon the 2015 report

and additional written information (see Attachment 1 showing the eco Logical Australia report dated 27.6.16) and associated verbal communications.

4. **Alternate Solution 2: NSP should accommodate all residents.** ABAC (p. 23) suggestion that all subdivision residents should be accommodated in the NSP is not supported by science or logic and simply says *"it can be reasonably assumed that"* it would be required. If all dwellings more than 100 m from the hazard are located on land that post-development will no longer be classified as Bush Fire Prone Land, then it is clearly better not to evacuate to the NSP. Remaining in a dwelling not located on Bush Fire Prone Land rather than moving a large number of additional people to a NSP is the better response and there is no requirement (implied or otherwise) under PBP 2006 or its successor to evacuate persons not located on Bush Fire Prone Land.

5. **Draft Conditions: A1(9)(a)(i) regarding APZ.** The ABAC recommendations are not necessary in light of the above information. The RFS specifically considered the additional slope information provided and this outcomes were agreed to by the RFS Assessment Officer and by the RFS Team Leader (i.e. the RFS quality assurance approval process). This means three appropriately qualified persons (including Mr Rose) validated the models and their outcomes based upon the information provided and discussed. A recommendation to revisit that process without specific information identifying an error is an unnecessary requirement of the RFS and the applicant and will significantly delay the current process with the RFS backlog of work emanating from the NSW bushfires. The RFS Bushfire Safety Authority is *'the clear statement"* confirming their acceptance of the models, slope inputs and required APZ outputs. The BAL of the future dwellings reliant on the models will all comply with BAL 29 and future lot owners will have access to the BAL assessment using the performance solution for lodgement with their Development Application.

Regards

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