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Building Construction in Bush Fire Prone Areas

Preliminary
Bushfire Hazard Assessment Report

REF No. 13.03.31

Address	Lot 2 DP 270237 1059a Grose Vale Road, Kurrajong. NSW 2758
For	C. Galea
The site was inspected on	12th March, 2013

Report Preparation

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Grad Dip Design for Bushfire Prone Areas
FPAA Certified BPAD-A Practitioner

Executive Summary

We have been engaged by C. Galea the owner of the subject land to prepare a preliminary bush fire hazard assessment report to be a supplement for inclusion in a Rezoning Application to Hawkesbury City Council.

The site has been identified as being bushfire prone land and therefore the legislative requirements for any future proposed development would be applicable.

The purpose of this report was establish if there are any major constraints from a bushfire regulatory perspective for the subdivision of lands (subject to rezoning) and then the construction of residential dwellings upon the created allotments.

This report has found that whilst there would be bushfire related consent conditions applied to the lands at both subdivision and construction phases of development none of these should ultimately be overly restrictive or prohibit development approval by bushfire regulatory provisions.

1.0 Introduction

We have been engaged by C. Galea the owner of the subject land to prepare a preliminary bush fire hazard assessment report to be a supplement for inclusion in a Rezoning Application to Hawkesbury City Council over the subject land.

The site has been identified as being bushfire prone land and therefore the legislative requirements for the proposed development would be applicable at the time of development application for both subdivision and any future construction.

1.1 Purpose of Report

- To determine the vegetation type, the expected fire behaviour and the threat to the subject lands; and
- To assess the proposal with reference to *Planning for Bush Fire Protection* 2006; and
- To assess the proposed construction with reference to the Building Code of Australia Volume 2; and
- To determine the level of construction with reference to AS 3959-2009 *Construction of buildings in bushfire prone areas;* and
- To identify any other such measures as to improve the chances of building survival during a bushfire event; and
- To assist the consent authority Hawkesbury City Council in the determination of the rezoning application subject to this proposal.

1.2 Scope of Report

The scope of this report is limited to the Bushfire Hazard Assessment for the proposed development site and only 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 rezoning.

1.3 Regulatory Controls

The preparation of this report has given consideration to the various legislative and regulatory requirements including the *Rural Fires Act* 1997, *Environmental Planning and Assessment Act 1979*, the Building Code of Australia, *Planning for Bush Fire Protection* 2006 and AS 3959-2009 *Construction of buildings in bushfire prone areas.*

1.4 Methodology

A site inspection for the purpose of assessing bushfire related matters affecting this site was conducted on the 12th March, 2013 and a review of the proposed Concept Layout Plan as supplied and prepared by Montgomery Planning Solutions.

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 rezoning land.

The findings were related and assessed with reference to *Planning for Bush Fire Protection* 2006 Addendum to Appendix 3 and section 2 of AS 3959-2009 *Construction of buildings in bushfire prone areas* for the formulation of the preliminary bushfire hazard assessment.

1.5 The Proposal

The concept proposal has been identified on the plans supplied and this shows the subject land to be subdivided into 9 individual rural/residential allotments ranging in size from 4000m² to a maximum of 6500m².

As shown these parcels shall be accessed by a new public road leading from the north western side of Grose Vale Road and an existing community title road which is adjacent to the southwest boundary of the development parcel to provide access to Lot 7.

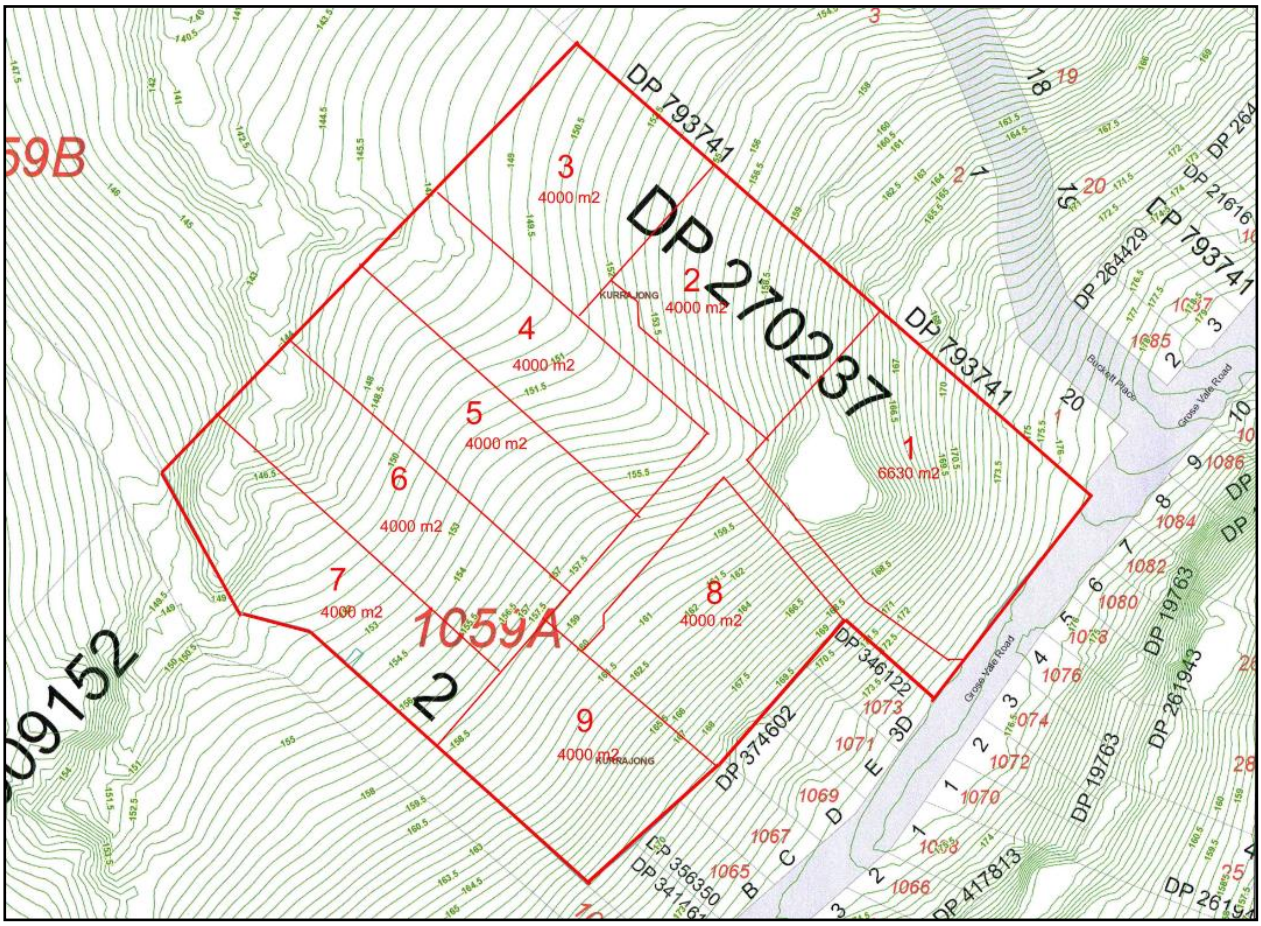

Figure 1; Concept Layout ex Montgomery Planning Solutions

2.0 Site and Adjacent Developments

The following seeks to describe the site, the adjoining lands and land uses effective upon the development proposal.

2.1 Site Description

The site is identified as Lot 2 DP 270237
1059a Grose Vale Road,
Kurrajong. NSW 2758
LGA Hawkesbury City Council

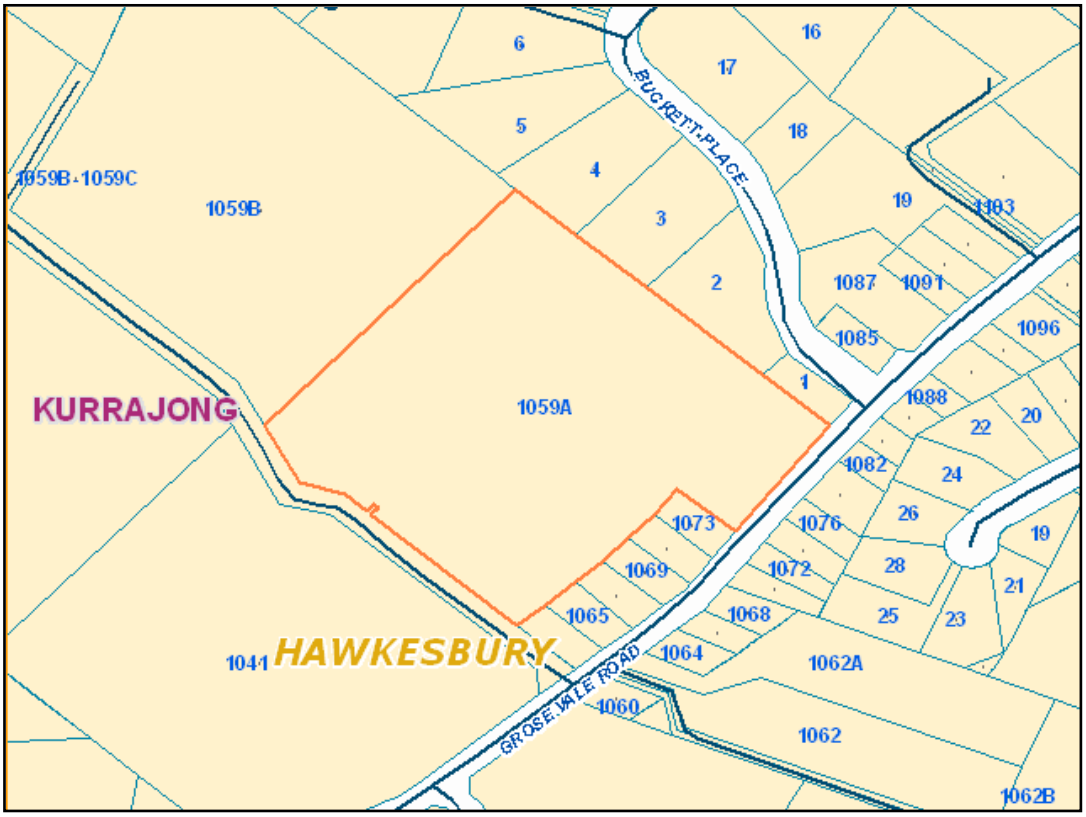

Figure 2: Address validation ex Dept of Lands

The site is at present a rural allotment of approximately 4.1 hectares located on the north western side of Grose Vale Road approximately. This site is located to be on the south western extent of the existing residential development associated with the Kurrajong village.

The area in which the proposal is located is generally residential, rural/residential and rural developments that have been established for many years.

Provision of mains reticulated water supply, electricity and phone is available to the proposed area of development from services located within Grose Vale Road.

The subject allotment is located within an area that should be considered as having a limited direct interface to bushfire hazardous vegetation located within the western area of the site and on adjoining lands to the northwest and southwest.

The subject allotment is located on the north westerly aspect slopes above an unnamed topographical drainage feature that flows in a northerly direction into Little Wheeny Creek.

At present the site has no structural improvements.

In terms of vegetation the vast majority of the allotment is best described as being open grasslands with scattered shade trees apart from a relatively narrow section of forest vegetation as previously noted to be within the western section of the subject allotment.

It is my understanding that this section of forest is effectively preserved and maintained by an existed section 88b instrument.

The site is shown upon the Hawkesbury Bushfire Prone Land Map (Figure 2) to be wholly within category 1 vegetation (shown orange).

However the site inspection and interpretation of aerial photography for the allotment confirms that the area of category 1 vegetation is significantly overstated and this vegetation is limited to the northwest corner of the allotment and vast majority of the site would be more accurately described as being category 2 vegetation which encapsulates grassland.

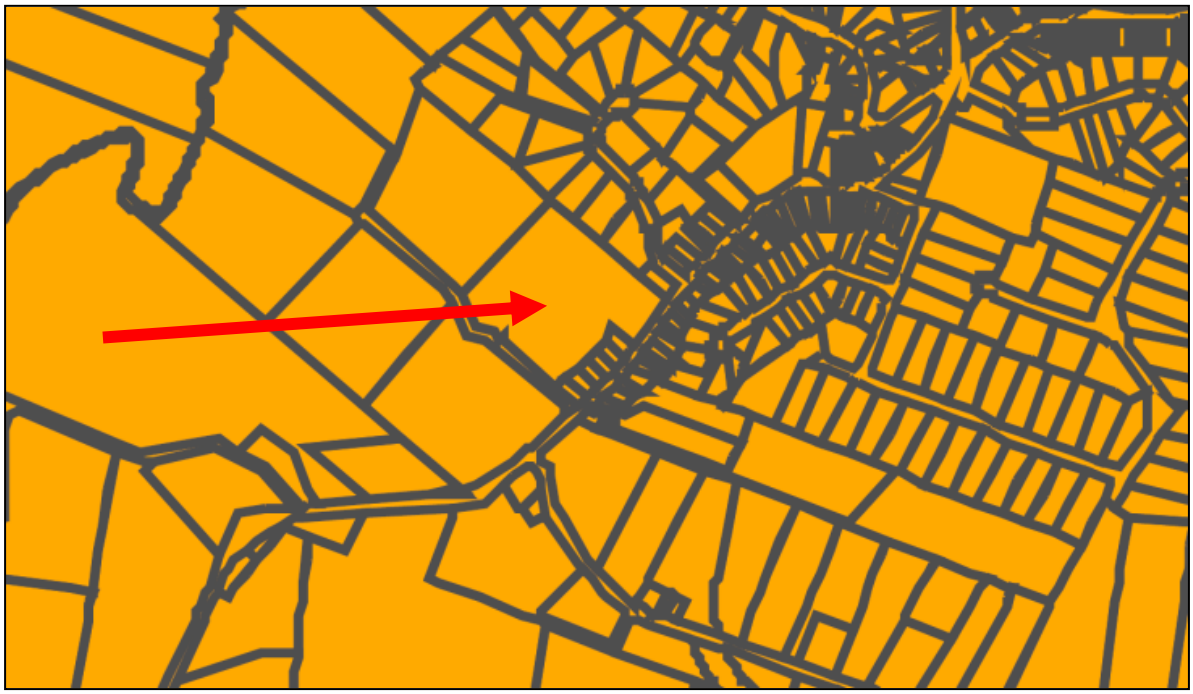

Figure 3; Section Hawkesbury LGA Bushfire Prone Land Map

2.2 Description of Adjoining Lands

To the northeast and southeast of the subject allotment is rural/residential and residential developments associated with the village of Kurrajong. In either of these directions there are no sections of bushfire or grassfire fuels which would adversely affect the proposed development.

To the southwest and northwest of the subject allotment is a combination of forest and grasslands. The forest is restricted to be a relatively narrow section along either side of an unnamed drainage feature which passes through the northwest section of the subject allotment.

This section of forest is contiguous with that section of vegetation located within the subject allotment and noted as being preserved by an existing section 88b instrument.

Directly beside the southwest boundary of the subject allotment is a community title road that services approximately five (5) rural parcels to the west and northwest. The road is a sealed surface that provides adequate separation from the grasslands on the parcel directly to the southwest.

Figure 3: Aerial photo depicting localised terrain and adjoining allotments

3.0 Environmental Considerations

The scope of this report has not been to provide an environmental survey.

However the establishment of asset protection zones would not require the removal of any standing or woody vegetation within the site and as previously noted the only section of forest vegetation is preserved by an existing section 88b instrument.

The creation of asset protection zones and ongoing maintenance would be easily achieved by regular mowing of the grasslands.

4.0 Bushfire Hazard Assessment

The bushfire hazard assessment was conducted for the proposed development, using the procedures as outlined in *Planning for Bush Fire Protection* 2006, Addendum to Appendix 3 and section 2 of AS 3959-2009 *Construction of buildings in bushfire prone areas* procedure to determine the bushfire attack level (BAL) likely upon the development.

The assessment was conducted on the assumption of the allotments being positioned as described in section 1.5 The Proposal of this report and the site plan.

4.1 Classification of Vegetation, Distance from Proposed Development

The vegetation was assessed for a distance of 140 metres from the proposed development in each of the following directions. To the northwest, northeast, southeast and southwest being the general direction adjacent and away from the proposed development site.

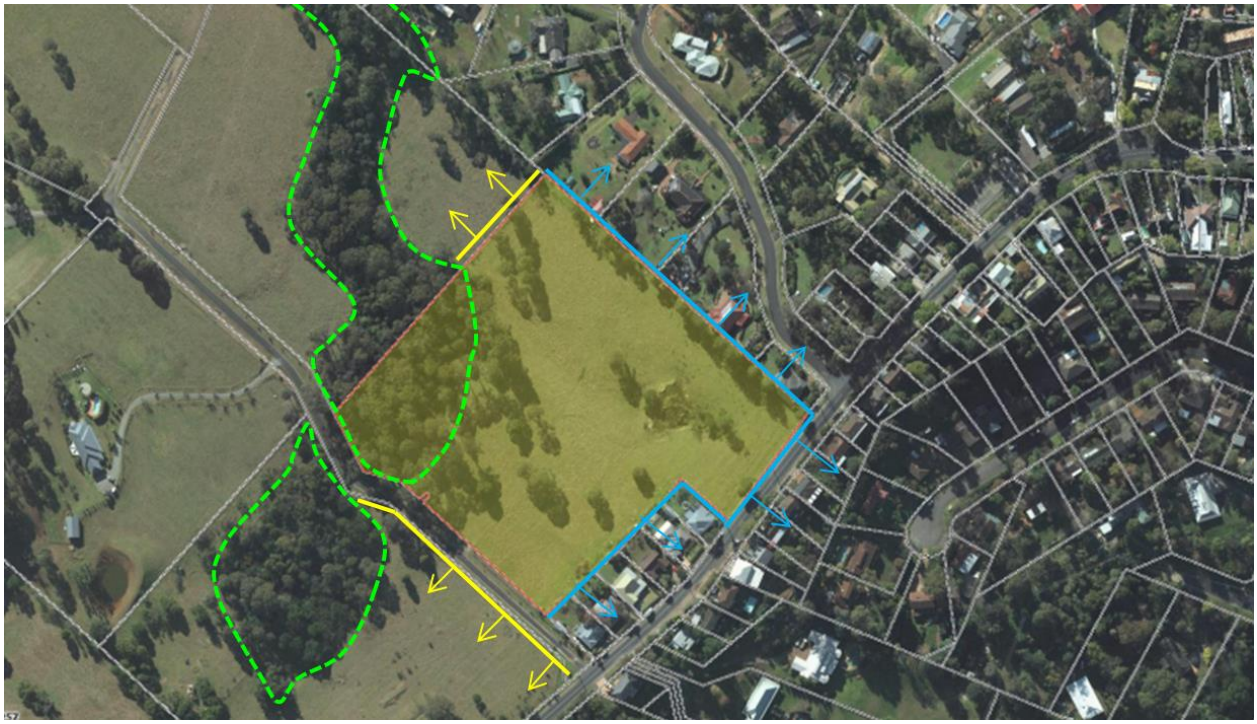

Figure 4: Vegetation study area 140 metre approx. buffer

Developed lands — Grassland — Forest - - -

It is assumed by this report the area of forest located adjacent to the unnamed topographical drainage feature within the northeast corner of the subject allotment will not be modified, reduced or removed as this area is protected by an 88b instrument.

Additionally it is recognised that the areas of forest identified as being beyond the subject allotment boundaries to the northwest and southwest will also remain.

Therefore this report has considered these sections of vegetation to be the effective sections of bushfire hazardous vegetation.

Also considered by this report are the areas of grassland hazard adjacent to the northwest corner boundary line and also the area located beyond the community title road positioned directly beside the southwest boundary of the subject allotment.

Whilst recognising that currently the actual subject allotment also has a significant section of grassland fuels over the majority of the site this report recommends that as a component of any future development consent the site would be maintained as an asset protection zone (apart from the forest area) which therefore removes the grassland fuels from within the subject allotment.

4.2 Slope Assessment

The slope was assessed for a distance of 100 meters within the bushfire hazardous vegetation and reference to slope classifications has been undertaken considering the procedure specified within appendix 2 of *Planning for Bush Fire Protection* 2006.

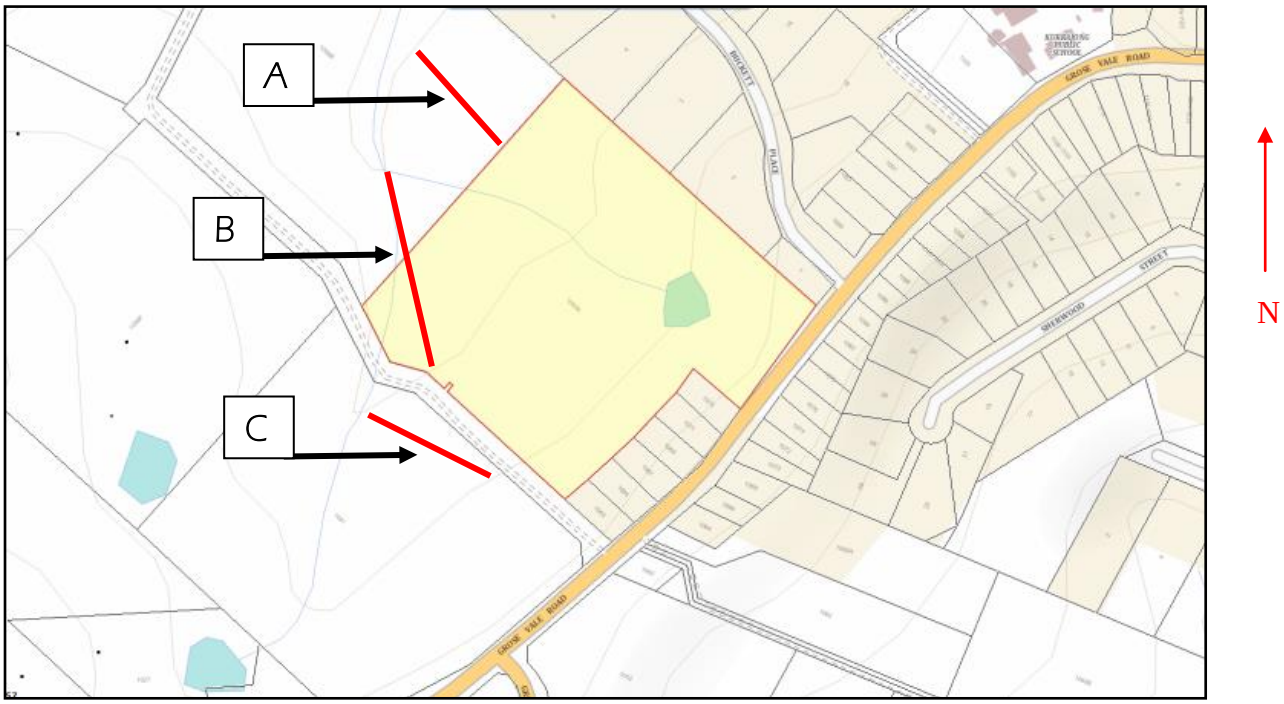

Figure 5; Slope assessment study area Image ex Dept Lands

The **effective slope** of the land, out to a distance of 100 metres from the proposed scope of works (that is, the slope of the land most likely to influence bushfire behaviour for the purposes of calculating the Category of Bushfire Attack and Asset Protection Zones), has been assessed (using a clinometer) and desktop analysis as being;

- Downslope > 0 to 5 degrees to the north – **A (Grassland)**
- Downslope > 0 to 5 degrees to the northwest – **B (Forest)**
- Downslope > 5 to 10 degrees to the southwest – **C (Grassland)**

For the areas of grassland vegetation the slope ranges from 0 to 15 degrees downslope however the requirements of *Planning for Bush Fire Protection* 2006 do not alter over the differing slope ranges. However it should be noted that at the time of actual construction the requirements for slope consideration for grasslands will apply by the provisions of AS 3959-2009 *Construction of buildings in bushfire prone areas.*

4.3 Category of Bushfire Attack

The bushfire attack level (BAL) for the proposed development was determined by using the information gathered with respect to the separation distances, the classification of the vegetation, the effective slope and provision of asset protection zones specified in this report.

The separation distances nominated have determined by reference to Appendix 2 Table A2.4 of *Planning for Bush Fire Protection* 2006 – Minimum Specifications for Asset Protection Zones for Residential and Rural Residential Subdivision Purposes (for Class 1 and 2 buildings) in Fire Danger Index (FDI) 100 Fire Areas to achieve less than 29kW/m² radiant heat exposure on any building element.

This maximum permissible level of radiant heat exposure is a baseline requirement of the NSW Rural Fire Service within the subdivision approval process. It is also referred to within AS 3959-2009 *Construction of buildings in bushfire prone area* as Bushfire Attack Level (BAL) 29.

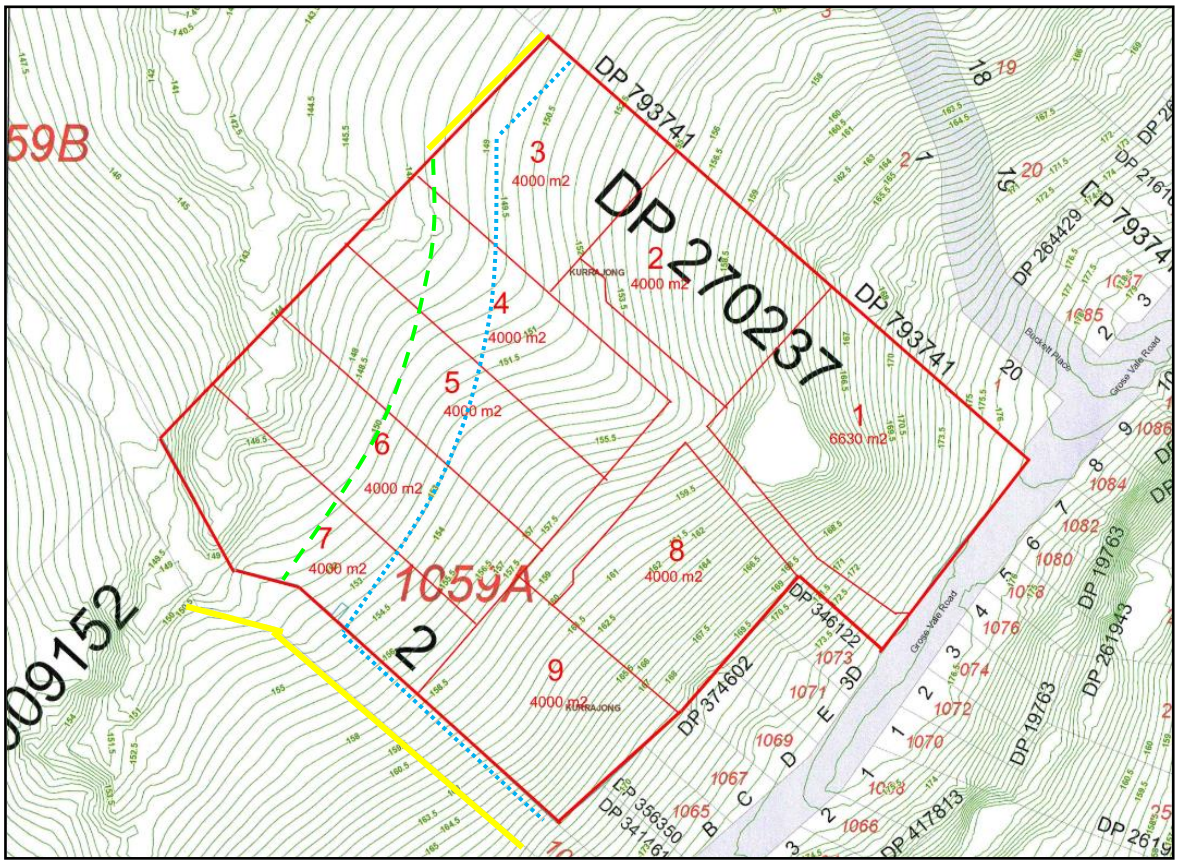

Figure 6; Required Setback distance

Forest hazard ..... Grassland hazard ——

For the allotments effected by the forest vegetation and with consideration of the effective slope beneath the vegetation, it will be a requirement that a minimum distance of 25 metres separation from a potential building footprint and the hazard will need to be provided within the proposed development.

For the allotments being effected by the grassland hazard *Planning for Bushfire Protection* 2006 only requires that 10 metres is provided in form of separation irrespective of slope.

The areas of separation shall be maintained as asset protection zones (APZ). The elements of an asset protection zone are discussed within the next section of this report.

Clearly the Concept Layout Plan supplied for perusal within the context of formulating this report, shows that these minimum separation distances are quite easily achieved and satisfy the requirements of *Planning for Bush Fire Protection* 2006 appendix 2.

5.0 Assessment of the extent to which the development potentially conforms or deviates from Chapter 4 of *Planning for Bush Fire Protection* 2006

5.1 Asset Protection Zones

The provision of asset protection zones for any future subdivision, subsequent to a rezoning, must be fully provided for onsite to satisfy the requirements of *Planning for Bush Fire Protection* 2006.

The maintenance of the majority of area upon the subject allotment currently would not satisfy the requirements of an inner protection area of an asset protection zone as contained in *Planning for Bush Fire Protection* 2006.

A report formulated for the purposes of subdivision will recommend that the entire site where not built upon is maintained to the requirements of an inner protection area of an asset protection zone and managed to these provisions for the lifetime of the development apart from the area of forest vegetation identified within the western most section of the allotment.

As previously noted the Concept Layout Plan does adequately allow for sufficient separation distance (that can be managed as an asset protection zone) for the development site.

The following is a summary of the requirements for an asset protection zone inner protection area as described within the documents *Planning for Bush Fire Protection* 2006 and NSW RFS *Standards for Asset Protection Zones*.

Inner Protection Area

An IPA should provide a tree canopy cover of less than 15% and the tree canopy should be located greater than 2.0 metres from any part of the roof line of a dwelling. Garden beds of flammable shrubs should not be located under trees and should be located not closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2.0 metres above the ground.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and where possible green.

The site inspection undertaken for the purposes of the rezoning application noted the site is primarily dominated by grassland vegetation which by mowing will easily satisfy the provisions for an asset protection zone and that no reduction of the forest area will be proposed..

5.3 Construction Level

The Building Code of Australia contains both the performance requirements and the 'deemed to satisfy' provisions relating to construction of class 1, 2 & 3 buildings that are proposed for *construction in bushfire prone areas*. To satisfy the performance provision P2.3.4 of the Building Code of Australia Vol. 2, a Class1a building that is constructed in a designated bushfire prone area must be designed

and constructed to reduce the risk of ignition from a bushfire while the fire front passes.

Australian Standard 3959-2009 *Construction of buildings in bushfire prone areas* is referenced by the BCA as the deemed to satisfy construction standard for residential dwellings in designated bushfire prone areas with the exception that the requirements shall be varied to comply with the Addendum to Appendix 3 of *Planning for Bushfire Protection 2*006.

As noted previously any construction of dwellings or proposed buildings footprints must not be exposed to greater than BAL 29 and this should be easily achieved within the context of a revised Concept Layout Plan.

5.4 Access / Egress

5.4.1 To the Proposed Development

The access to the subject site is from Grose Vale Road which is a sealed two lane road in a well maintained condition and under most conditions should provide adequate access and egress for both residents and emergency service vehicles.

Grose Vale Road links to other through roads which would afford the residents the ability to evacuate the area to a location not being directly implicated by the mechanisms of bushfire attack, although under most bushfire or grassfire conditions this would generally not be required.

5.4.2 Within the Site

The Concept Layout Plan for the subject allotment shows for the construction of a central public road system to service the proposed allotments apart from Lot 7 which shall be accessed from an existing community title road adjacent to the south western boundary of the development site.

Whilst road construction details have not been shown it is envisaged that compliance to relevant section of *Planning for Bush Fire Protection* 2006 Access (1) Public Roads can be easily achieved.

As noted that Lot 7 shall be accessed by the existing community title road located adjacent to the south western boundary. It is my understanding that there is an existing permission agreement for this form of access to be permanently available to service one allotment within the proposed development site.

5.5 Utility Supplies

5.5.1 Water

This section of Kurrajong is serviced by a mains reticulated water system and the site inspection noted that this system is within the carriageway of Bells Line of Road.

The provisions of *Planning for Bush Fire Protection* 2006 will require that if the mains water is integrated within any future development it should be undertaken to satisfy AS 2419 – 2005 *Fire hydrant installations*.

If mains reticulated water to that specification is not achieved individual Static Water Supplies (SWS) will need to be provided at individual residences at the time of future development.

5.5.2 Electricity

The preferred methodology for the connection of electricity is by underground cabling as stated within *Planning for Bush Fire Protection* 2006.

5.5.3 Gas

At the time of report preparation it was not proposed to connect gas supply to the subject allotments. However any future connection to either mains or portable gas supply should be undertaken and maintained to the provisions of AS 1596-2002 *Storage and handling of LP Gas.* All piping associated with the installation must be metal.

5.6 Landscaping

A formal landscaping plan was not supplied for perusal at the time of formulating this report however this must be undertaken to satisfy Appendix 5 of *Planning for Bushfire Protection* 2006.

6.0 Conclusion

After consideration of the aims and objectives of *Planning for Bush Fire Protection* 2006 in the context of the Rezoning Application and the Concept Layout Plan for future development of the subject allotment it is my professional opinion that the provisions of bushfire regulatory requirements could be achieved and that the consent authorities would be likely to approve the indicated development.

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Caveat

Quote from *Planning for Bush Fire Protection* 2006, '*not withstanding the precautions adopted, it should always be remembered that bushfire burn under a wide range of conditions and an element of risk, no matter how small always remains.'*

Quote from Standards Australia, '*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.'*

References

Planning for Bush Fire Protection 2006 Planning NSW in conjunction with NSW Rural Fire Service

Building Code of Australia Volume 2 2005 Australian Building Codes Board

AS 3959 –2009 Construction of buildings in bushfire prone areas Standards Australia & Australian Building Codes Board

Landscape and building Design for Bushfire Areas Ramsay C. & Rudoplh L. CSIRO 2003

Quantifying bushfire penetration into urban areas in Australia Keping Chan & McAneny J. Geophysical Research Letters, Volume 31, L12212, doi:10.1029/2004GL020244,2004

Bushfires in Australia Luke R.H. & McArthur CSIRO 1978

Performance of Building Elements in Bushfire Prone Areas Poon S.L. & England J.P. Warrington Fire Research Australia

Address Validation Search Department of Lands www.maps.nsw.gov.au

Standards for Asset Protection Zones NSW Rural Fire Service 2005

Ocean Shores to Dessert Dunes Keith D. Department of Environment and Conservation Sydney 2004