

ABN 47 857 816 658

Building Construction in Bush Fire Prone Areas

Preliminary Bushfire Hazard Assessment Report

REF No. 12.10.117

Address Lot 2 DP 607906
396 Bells Line of Road,
Kurmond. NSW 2757

For 101 Property Pty Ltd

The site was inspected on 15th October, 2012

Report Preparation

Craig Burley

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



Executive Summary

We have been engaged by 101 Property Pty Ltd, the owners 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 101 Property Pty Ltd, the owners 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 15th October, 2012 and a review of the proposed concept layout plans as supplied by Montgomery Planning Solutions and prepared by North Western Surveys 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 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 proposal has been identified as the Hunter Ridge Estate and as indicated by consultation with the proponents and perusal of concept plans supplied shows the subject lands to be subdivided into 27 individual rural/residential allotments ranging in size from 4000m² to a maximum of 8200m².

These parcels shall be serviced by a central public road leading from the northern side of the Bells Line of Road. This road shall be a no through road that terminates at a turning circle within the northern most section of the estate.

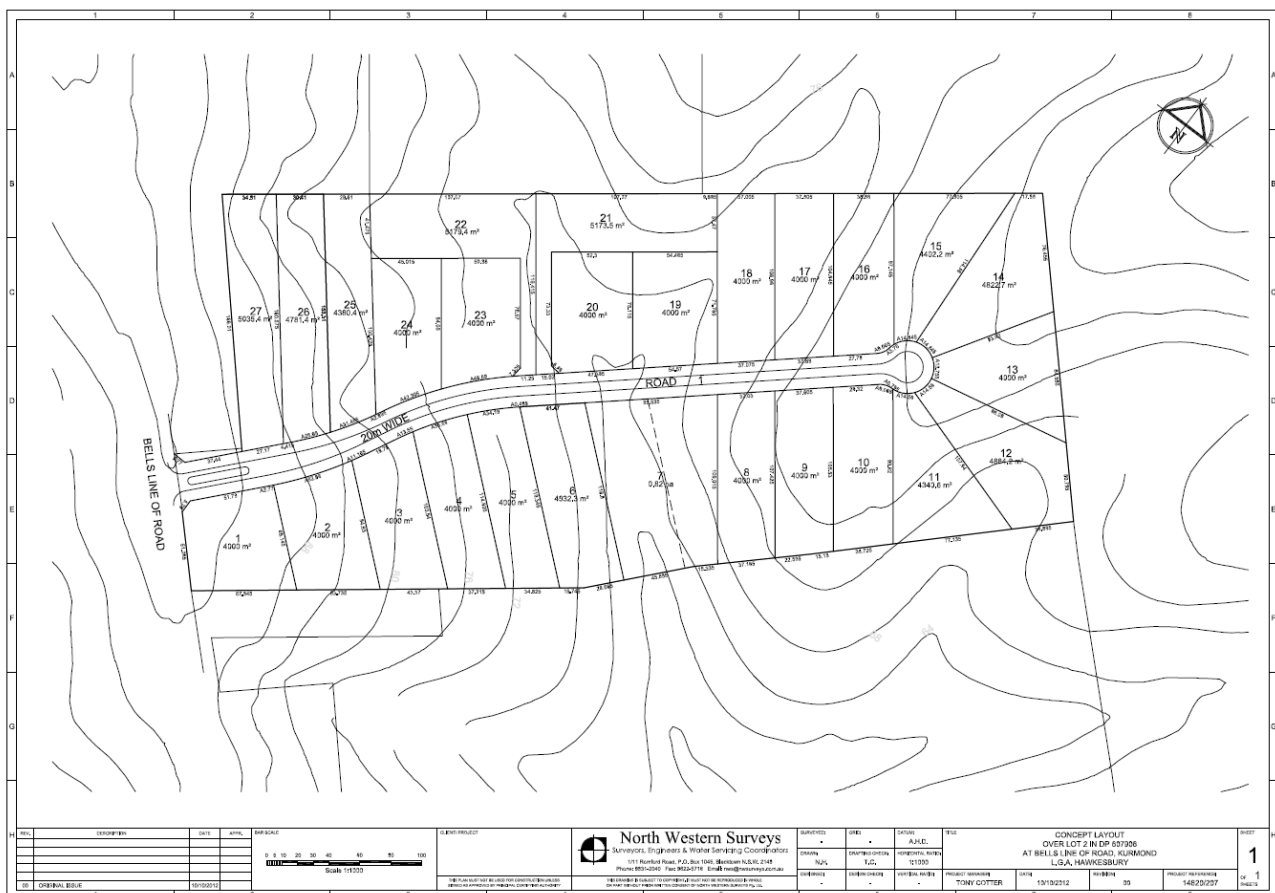


Figure 1; Concept Layout ex North Western Surveys

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 607906
 396 Bells Line of Road,
 Kurmond. NSW 2757
 LGA Hawkesbury City Council

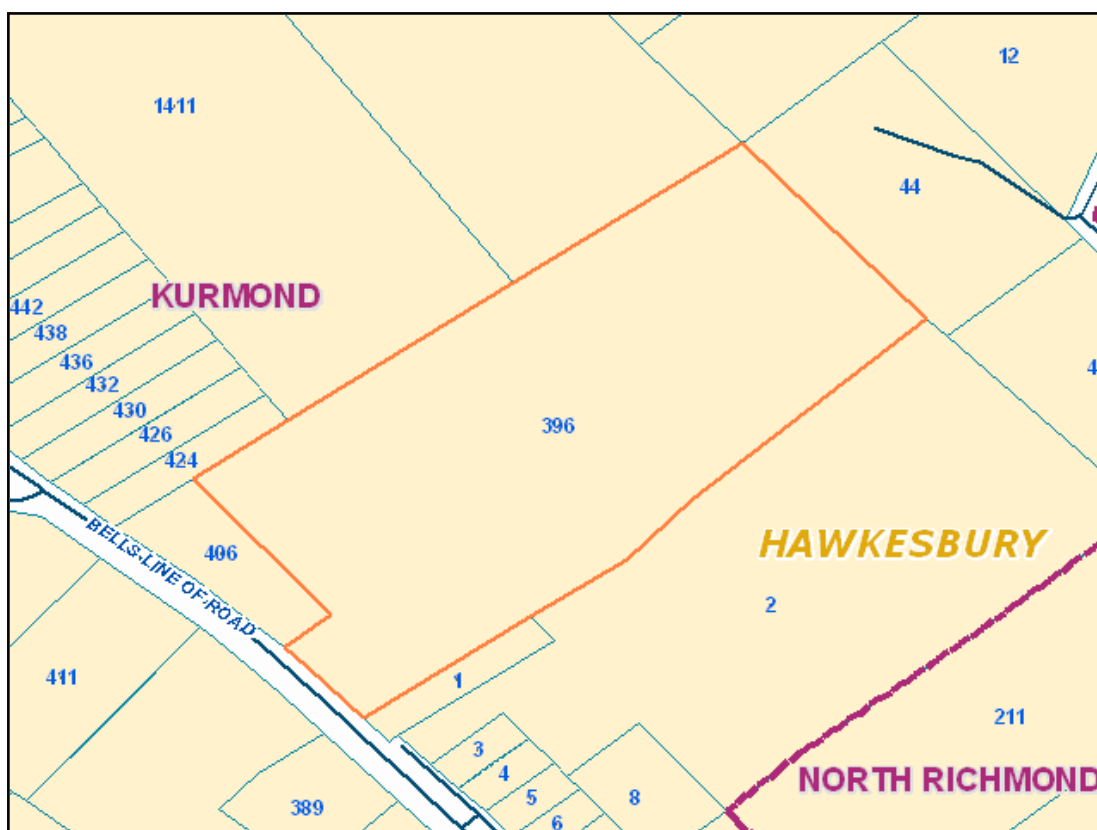


Figure 2: Address validation ex Dept of Lands

The site is at present a rural allotment of approximately 13.07 hectares located on the northern side of Bells Line of Road approximately 1.0 kilometre to the southeast of the existing residential development associated with the Kurmond village.

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

Provision of mains reticulated water supply, electricity and phone is available to the proposal by existing infrastructure.

The subject allotment is located within an area that should be considered as having a limited direct interface to bushfire hazardous vegetation but is exposed to substantially more areas of grassland hazardous fuels.

The subject allotment has both north easterly and south westerly aspect slopes on either side of a centrally located naturally occurring topographical drainage feature that passes through the allotment from the north western boundary to the south eastern boundary. The drainage conditions flow in a south easterly direction into Redbank Creek.

At present the site has structural improvements limited to being an existing Class 1a residential dwelling located within the southern most section of the parcel in close proximity to the Bells Line of Road.

In terms of vegetation the vast majority of the allotment is clearly showing signs of being entirely cleared of any substantial forest vegetation and would recently have been best described as being open grasslands with scattered shade trees.

However the site to some degree has been allowed to revegetate and whilst still having substantial areas of open grasslands other areas have significant sections of what is clearly regrowth trees being particularly black wattle species.

The site is shown upon the Hawkesbury Bushfire Prone Land Map (Figure 2) to be within category 1 vegetation (shown orange) and category 2 vegetation (shown yellow) together with some very limited sections of buffer zone (shown red).

However the site inspection and interpretation of aerial photography for the site confirms that the area of category 1 vegetation particularly in the northern section of the subject allotment is quite overstated and significant sections of this area would be better described as being category 2 vegetation.



Figure 3; Section Hawkesbury LGA Bushfire Prone Land Map

2.2 Description of Adjoining Lands

To the northwest, northeast and southeast from the subject allotment are lands that appear to be predominantly used for grazing purposes for both horses and cattle.

These lands are in the majority best described as being open grasslands with scattered shade trees over gently undulating slopes within the upper catchment areas of Redbank Creek.

There is a limited section of land adjacent to the central area of southeast allotment boundary that does have a more consistent spatial arrangement of standing trees which this report has considered to be best described as a woodland vegetation formation. This area is further discussed within section 4 of this report.

Adjacent to the southwest subject allotment boundary is single rural residential development on a parcel of land approximately 6000m² and a non-operating restaurant which was recently closed by damage from a structural fire event.

Beyond these two allotments is the carriageway of the Bells Line of Road and beyond this is open grazing lands similar to those previously described as being adjacent to the subject allotment.

Additionally it is worth noting that consistently along the north eastern side of the Bells Line of Road is other rural residential allotments that are similar in size to those proposed within the concept layout plan.

The closest section of forest vegetation is located to be not closer than approximately 250 metres to the southeast of the subject allotment which is therefore located well in excess of the mandated study area required by *Rural Fires Act 1997*, NSW Rural Fire Service and the document *Planning for Bush Fire Protection 2006*.



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.

It is envisaged that some vegetation removal will be required to provide for areas of asset protection zones and that studies will be undertaken by others to assess the effects of the rezoning from a flora and fauna perspective which is beyond the expertise of the author of this report.

However such findings should be considered when establishing areas of asset protection zones for future development.

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 building footprint 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



It is assumed by this report that any bushfire or grassfire hazardous vegetation would be reduced within the subject allotment to a level which satisfies the provisions for an asset protection zone and therefore the only areas of fuels would potentially be located off site.

The areas identified as being developed lands contain no significant sections of bushfire or grassfire hazardous vegetation.

However there are significant sections of the development allotment that interface with grassland fuels and a small section of woodland adjacent to the south eastern boundary.

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 section 2 of AS 3959-2009 *Construction of buildings in bushfire prone areas*.

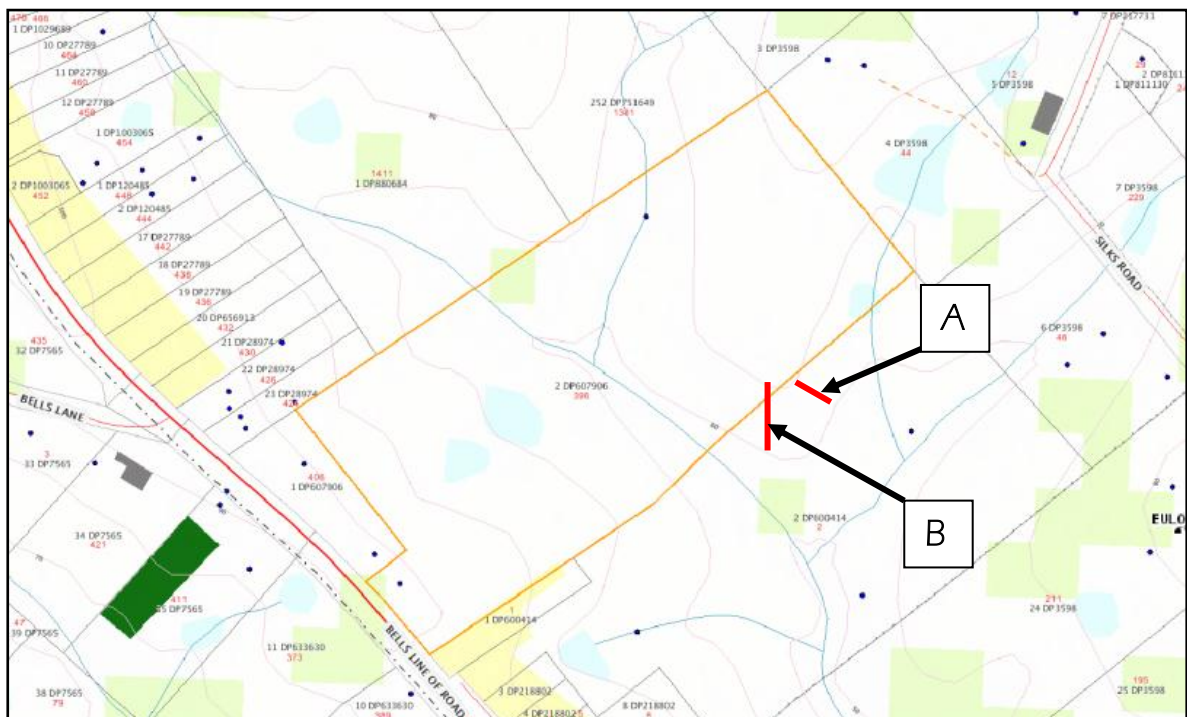


Figure 5; Slope assessment study area Image ex Dept Lands

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 > 10 to 15 degrees to the southeast – A (Woodland)
- Downslope > 5 to 1 degrees to the south – B (Woodland)

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.

For the allotments effected by the woodland vegetation 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 (offsite) will need to be provided within the proposed development.

For the balance of 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 very easily achieved and it is actually envisaged that distances of separation would ultimately be well in excess of the minimum requirements of *Planning for Bush Fire Protection* 2006.

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*.

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.

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.

The site inspection undertaken for the purposes of the rezoning application noted the site is primarily dominated by regrowth vegetation of which black wattle is quite abundant. This species has a short life span and it is evident that many of these trees were at or approaching life termination.

The other native trees were reasonably sparse in spatial arrangement and it would not be likely that a substantial number would need removal to accommodate asset protection zones arising from any future development.

In terms of shrub and ground layer fuels these are easily managed by regular slashing or mowing.

It is my opinion that the provision of adequate and complying areas asset protection zones could be easily achieved over the subject allotment in the context of the Concept Layout Plan supplied for consideration.

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 Class 1a 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 2006*.

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

5.4 Access / Egress

5.4.1 To the Proposed Development

The access to the subject site is from Bells Line of 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.

Bells Line of 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 that terminates within the northern section of the 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.

5.5 Utility Supplies

5.5.1 Water

This section of Kurmond 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 allotment. 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.



Craig Burley

Grad.Dip. Building in Bushfire Prone Areas (UWS)
FPA Australia Certified BPAD-A Practitioner

Caveat

Quote from *Planning for Bush Fire Protection 2006*, 'notwithstanding 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. & Rudolph 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

