



REZONING INVESTIGATIONS - BUSHFIRE STUDY

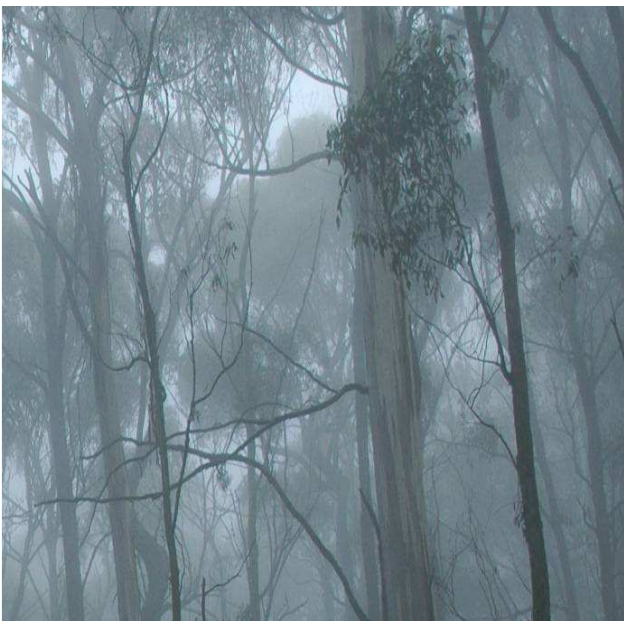
Lots 1-2 DP 797732 and Lots 1-4 DP 758563

Lilly Pilly Way, Kiama

Prepared for

White Constructions Pty Ltd

4 October 2012





Rezoning Investigations – Bushfire Study

Lots 1-2 DP 797732 and Lots 1-4 DP 758563, Kiama

Rezoning Investigations of Lots 1- 2 DP 797732 and Lots 1-4 DP 758563 Lilly Pilly Way, Kiama

PREPARED FOR	White Constructions Pty Ltd
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Executive Summary

The land (Lots 1 – 2 in DP 797732) is located west of the NSW South Coast village of Kiama in the Kiama Local Government Area (LGA) (Figure 1). The study site is currently zoned as Rural Land under the Kiama Local Environmental Plan 1985 (KLEP) (Kiama Council 2011). The current zoning does not permit urban development within the study site.

The client is undertaking investigations of the study area to determine if the subject land may be rezoned to allow for urban development. The risk of bushfires and the requirements of bushfire planning legislation was one of the detailed investigations identified as necessary for the possible urban development of the land.

The bushfire investigation and assessment includes the following:

- Assessment of the level of bushfire threat and risk to potential urban development;
- Investigation of the bushfire protection requirements in accordance with NSW planning legislation, and particularly 'Planning for Bush Fire Protection 2006' (Rural Fire Service (RFS) 2006);
- Identification of bushfire related constraints and opportunities for development of the study area; and
- Identification of the bushfire protection measures required to achieve the legislative standards and development opportunities.

Bushfire risk and threat

The Kiama LGA has a moderate incidence of bushfires and it has been some time since major bushfire events have affected the general locality of the study area. However, with the right seasonal and localised weather conditions, high intensity bushfire could affect the study area in the future. Extensive areas of bush fire prone land are located in the vicinity of the study area including bushland on both public and private lands. The bushland patterns in the locality mean that bushfire attack could come from any direction, but is most likely from a sector running from north through west to south-west. The bushfire risk in the study area is not expected to be reduced significantly in future years e.g. through clearing of the hazard.

Assessment of the investigation area

While the majority of the study area is not currently mapped as Bush Fire Prone Land by Kiama Council (see Figure 2) vegetation adjacent the western and eastern boundaries of the study site will have an effect on the bushfire protection requirements for future residential development within the site.

The rezoning of the study area requires support from the RFS (Section 117 of the *Environmental Planning and Assessment Act, 1979* Ministerial Direction 4.4 - *Planning for Bush Fire Protection*), and any future residential development must comply with the specifications and requirements detailed within the RFS (2006) document 'Planning for Bush Fire Protection 2006' (PBP).

PBP provides the current standards for bushfire protection for built assets applicable in NSW. It has been used to assess the following:

- Access to and from the development for evacuation and fire fighting;
- The provision of an adequate water supply for fire fighting;
- Building setbacks, including the provision of Asset Protection Zones (APZs);
- Design staging and siting of a development; and
- Assessment of the building construction standards under Australian Standard AS 3959-2009 'Construction of buildings in bushfire-prone areas' (Standards Australia 2009).

Constraints and opportunities

The primary development constraints with regards to bushfire protection is the provision of APZs around areas of vegetation within and adjacent the study site. The required APZs range from 20 m to 25 m wide within the study area, however, across the majority of the site careful design of future development will accommodate the required APZs.

Any proposed revegetation within the study area will require careful planning to ensure that the bushfire risk to existing buildings within and adjacent the study area is not negatively impacted particularly in relation to provision of adequate APZs.

Development potential

The bushfire constraints to development can be addressed for the majority of the study area and the required legislative standard of bushfire protection can be met. However, the area that may ultimately be developed is dependent upon other constraints interacting with the required bushfire protection measures and specifically the ability to provide APZs for future buildings within the study area.

The development potential of other portions of the study area will depend largely on future clearing and revegetation. The final area that is capable of development from a bushfire protection perspective is heavily dependent upon the final pattern of unmanaged vegetation across and adjacent the study area.

Acronyms

APZ	Asset Protection Zone
BCA	Building Code of Australia
BFRMP	Bush Fire Risk Management Plan
BFSA	Bush Fire Safety Authority
DP	Deposited Plan
EP& A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPI	Environmental Planning Instrument
IBFRMP	Illawarra Bush Fire Risk Management Plan
IPA	Inner Protection Area
KMC	Kiama Municipal Council
KLEP	Kiama Local Environmental Plan 2011
LEP	Local Environment Plan
LES	Local Environmental Study
LGA	Local Government Area
OPA	Outer Protection Area
PBP	'Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers, 2006' (RFS 2006)
RF Act	<i>Rural Fires Act 1997</i> (NSW)
RF Reg.	<i>Rural Fires Regulation 2008</i> (NSW)
RF ACT	<i>Rural Fires Act</i> (1997)
RFS	Rural Fire Service (NSW)
TSC Act	<i>Threatened Species Conservation Act 1995</i>

1 Introduction

1.1 BACKGROUND

White Constructions Pty Ltd engaged Eco Logical Australia Pty Ltd (ELA) to undertake a bushfire study of an area of land on the western side of the South Coast village of Kiama. The study will be used in the preparation of a draft Concept Plan to identify ecological values and bushfire constraints/opportunities, and inform subsequent land use planning.

1.2 SCOPE AND PURPOSE

This report has been prepared to assist White Constructions Pty Ltd investigate rezoning of the study area as shown in Figure 1. The report provides background material in support of a draft local environmental plan (LEP) to potentially rezone certain land within the study area to enable residential and rural residential development.

The report includes a general assessment of the bushfire threat and risk to the investigation area and concludes with an assessment of the likely bushfire protection measures for a future residential/rural residential development of the site in accordance with current legislative requirements and guidelines for development within bush fire prone land, that is;

- Section 100B of the *Rural Fires Act 1997* (RF Act);
- Section 79BA of the *Environmental Planning and Assessment Act 1979* (EPA Act);
- NSW Rural Fire Service (2006a) '*Planning for Bush Fire Protection: A guide for Councils, Planners, Fire Authorities and Developers*' (herein referred to as 'PBP'); and
- Section 117 (EPA Act) Ministerial Direction No.4.4 - Planning for Bush Fire Protection.

2 The study area

The study area is located to the west of the South Coast village of Kiama within the Kiama LGA and is defined as the area within 100 m of the site shown in Figure 1.

The site consists of Lots 1 – 2 in DP 797732 and Lots 1 – 4 in DP 758563 Lilly Pilly Way, Kiama. The subject land is bounded by largely cleared agricultural land to the west and north-east and by existing residential and rural residential development to the north, east and south.

The study area falls into the Kiama Council Local Environment Plan 2011 (KCLEP) and is zoned as 'RU2 – Rural Landscape'.

The Kiama Municipal Council (KMC) Bush Fire Prone Land Map maps a small portion along the eastern boundary of the study area as Bush Fire Prone Land as shown in Figure 2.



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 Subject Land

3 The planning environment

3.1 LEGISLATION

3.1.1 *Environmental Planning and Assessment Act 1979 (EPA Act)*

3.1.1.1 Section 146 Bush Fire Prone Land

Section 146 imposes a requirement for councils, where a Bush Fire Risk Management Plan (BFRMP) applies, to identify Bush Fire Prone Land. The Commissioner of the NSW Rural Fire Service (RFS) designates, through a separate guideline (RFS 2006b), what constitutes a bush fire prone area and how this is to be mapped. Councils are then required to prepare the map in accordance with the guidelines and submit the map for certification by the Commissioner. This map becomes the basis for planning for bushfire protection and bushfire related development controls under the Act (described below). The designation of bush fire prone land also gives effect to the BCA requirement for construction standards as specified in AS 3959 – 2009 ‘Construction of buildings in bushfire-prone areas’ (Standards Australia 2009).

The Kiama Municipal Council (KMC) Bush Fire Prone Land Map maps a small portion along the eastern boundary of the study area as Bush Fire Prone Land (see Figure 2).

Furthermore, changes are proposed to Bush Fire Prone Land Mapping within NSW that will see ‘Unmanaged Grasslands’, including a buffer of 50 m from this vegetation, mapped as Bush Fire Prone Land. This may have an impact on future BFPL mapping within the study site.

3.1.1.2 Section 117 (2) Direction 4.4 - Planning for Bush Fire Protection

S.117 Direction 4.4 - Planning for Bush Fire Protection (hereafter referred to as Direction 4.4, guides councils in the preparation of a draft LEP that affects, or is in proximity to, land that is mapped as bush fire prone land. The objectives of Direction 4.4 are:

- *To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas*
- *To encourage sound management of bushfire prone areas.*

Direction 4.4 instructs Councils on the bushfire matters which need to be addressed when drafting LEPs. This includes:

- Consultation with the Commissioner of the NSW Rural Fire Service under S.62 of the EPA Act, and take into account any comments so made;
- Draft LEPs shall have regard to ‘Planning for Bush Fire Protection 2006’;
- Compliance with numerous bushfire protection provisions where development is proposed; and

- Consultation with the Commissioner of the NSW Rural Fire Service. If a draft LEP affecting bush fire prone land does not comply with the provisions of this Direction, then Council must obtain written advice from the RFS that they do not object to the draft LEP proceeding.

3.1.2 Building construction standards (Building Code of Australia and AS 3959 – 2009)

The Building Code of Australia (BCA) is a performance based code which obtains its statutory power through the EP&A Act and *Environmental Planning and Assessment Regulation 2000*.

The EP&A Reg. (Section 145 (1) (b)) requires a certifying authority to be satisfied that the relevant requirements of the BCA will be met prior to the issuing a construction certificate (or a complying development certificate under clause 136A of the Regulation). Clause 98 (1) (a) of the Regulation also states that it is a 'prescribed condition' of development consent (S.80A (11) of the EP&A Act) that building work must comply with the BCA. The BCA contains both Performance Requirements and Deemed-to-Satisfy Provisions relating to the construction of buildings in bush fire prone areas.

These provisions apply to class 1, 2, and 3 buildings (as defined by the BCA) that are proposed for construction in 'designated bush fire prone areas'.

The construction requirements of AS 3959 – 2009 'Construction of buildings in bushfire-prone areas' is recognised by 'Planning for Bush Fire Protection 2006' as the 'deemed-to-satisfy' construction standard for buildings in designated bush fire prone areas.

3.1.3 NSW Rural Fires Act 1997 (RF Act)

On 1 August 2002, *NSW Rural Fires and Environmental Legislation Amendment Act 2002* (RF&EALA Act) came into effect which amended both the *EP&A Act* and the *Rural Fires Act 1997* (RF Act). The RF&EALA Act gives legal effect to the document 'Planning for Bush Fire Protection 2006' (RFS 2006a) (see below) and provides the current processes for development approval for bush fire prone land.

RF&EALA Act provides for a formal consultative role under S.79BA of the EP&A Act (Section 3.1.1) and powers of the Rural Fire Service Commissioner under the RF Act in relation to issuing a Bush Fire Safety Authority (BFSA) for certain 'high risk' developments which are considered 'integrated development' under the EPA Act (refer to Section 3.1.1 for more information). Under Section 100B of the RF Act, the Commissioner may issue a BFSA for the following development purposes:

- Subdivision of bush fire prone land that could lawfully be used for residential or rural residential purposes; and
- Development of bush fire prone lands for a 'Special Fire Protection Purpose' e.g. school, childcare centre, a hospital, tourist accommodation, retirement villages and for other developments as listed within s. 100B of the RF Act and the regulations.

Subdivision for residential and rural residential purposes or for special fire protection purposes shall be considered in accordance with the principles of 'Planning for Bush Fire Protection 2006'. The BFSA will authorise development with regard to setbacks, access, asset protection zones, provision of water supply and other matters the Commissioner considers necessary. Clause 44 (*application of a bushfire safety authority*) of the *Rural Fires Regulation 2008* outlines the assessment process to obtain a BFSA.

3.1.4 'Planning for Bush Fire Protection 2006' (RFS 2006)

The document 'Planning for Bush Fire Protection 2006' (RFS 2006) clarifies the role and responsibilities of councils, developers and land owners.

PBP outlines the specific objectives that must be achieved for both residential development and Special Fire Protection Purpose (SFPP) development. Development is considered 'Special Fire Protection Purpose' where the development includes one of the following:

- *School;*
- *Child care centre;*
- *Hospital (including a hospital for the mentally ill or mentally disordered);*
- *Hotel, motel or other tourist accommodation;*
- *Building wholly or principally used as a home or other establishment for mentally incapacitated persons;*
- *Housing for older people or people with disabilities within the meaning of State Environmental Planning Policy No 5— housing for Older People or People with a Disability (now SEPP (Seniors Living));*
- *Group home within the meaning of State Environmental Planning Policy No 9—Group Homes;*
- *Retirement village; or*
- *Any other purpose prescribed by the regulations.*

The nature of SFPP developments is such that the occupants may be more vulnerable to bushfire attack for a variety of reasons including a reduced capacity to evaluate risk and to respond to the bush fire threat, and the fact that the logistical arrangements for the numbers of occupants may be complicated. Consequently, SFPPs need to meet a more stringent set of bushfire protection requirements than residential development.

'Planning for Bush Fire Protection 2006' outlines the most recent standards for bushfire protection for built assets applicable in NSW and provides standards for:

- Access to and from the property for evacuation and fire fighting;
- The provision of an adequate water supply for fire fighting;
- Building setbacks, including the provision of Asset Protection Zones;
- Design of the development; and
- Building construction standards.

'Planning for Bush Fire Protection 2006' is given legal effect through S.79BA 'Consultation and Development Consent – Certain Bushfire Prone Land' and S.91 'What is Integrated development' of the EPA Act.

3.2 RELEVANT ENVIRONMENTAL PLANNING INSTRUMENTS (EPI)

3.2.1 Kiama Local Environment Plan 2011 (KLEP)

Kiama LEP is the principal planning instrument for the Municipality of Kiama providing detailed controls on land use within the Municipality. The land is currently zoned as 'RU2 – Rural Landscape' the

objectives of which include maintaining the rural character of the land and the protection of agricultural land for long term agricultural production

The current RU2 – Rural Landscape zoning does not allow for urban development of the study area which is the reason behind the application to have the study area rezoned as 'R2 – Low Density Residential'.

The proposal will give rise to increased demand for emergency services during bushfire events, as every additional dwelling on bush fire prone land has this effect. Furthermore, even with the provision of bushfire protection measures identified within this report, some bushfire risk to life and property will remain (known as residual risk) and bushfires will periodically threaten property in the study area.

3.3 OTHER PLANNING CONSIDERATIONS

3.3.1 Illawarra Bush Fire Risk Management Plan, 2009 (IBFRMP)

The Illawarra BFRMP forms the basis for bushfire risk management in the Kiama area (Illawarra Bush Fire Management Committee 2009). The current BFRMP has identified the residential development south of the study area as '718 – Human Settlement' and has identified the bushfire risk to this area as 'Medium', but the Plan has not specified any bushfire hazard treatments for this southern area or the study area.

3.3.2 NSW Rural Fire Service policy documents

The RFS prepares various policy documents to clarify and add to that required by PBP; these include Development Control Practices Notes, Development Control Notes and Fast Facts. The most relevant of these for this study were issued prior to December 2006 and are therefore included within PBP 2006. Each of the policies may have some relevance to the specific approach taken for the development of future allotments e.g. use of swimming pools as water supply, building and fencing materials etc. However, as these do not constrain, or prevent, the development of the future allotments, they have not been commented upon here.

3.3.3 Threatened Species Conservation Act 1995 (TSC Act)

A constraints/opportunities investigation is currently being undertaken in relation to any potential impacts on flora and fauna within and adjacent the study site. Endangered Ecological Communities or threatened species/populations within/adjacent the study site may have an impact on the bushfire protection requirements for future residential development within the study area particularly if these necessitate revegetation within/adjacent the site.

This may require more detailed investigation once this flora/fauna information becomes available.

3.4 SUMMARY

The rezoning of the study site requires support from the RFS (s.117 EPA Act Direction 4.4), and any residential development within the study site must comply with the requirements of 'Planning for Bush Fire Protection 2006'. Section 5 of this study provides a detailed response to these compliance requirements.

4 Bushfire threat and risk assessment

4.1 VEGETATION

Much of the bush fire prone vegetation within the study locality has been subject to varying levels of past disturbance, including clearing for agricultural activities, vehicle access and surrounding residential development.

The two predominant vegetation communities within the study area include grazed pasture on the top of the plateau and heavily weed infested remnant rainforest down both the western and eastern slopes off the edge of the plateau. The vegetation communities have been assessed as part of the ecological assessment to inform the proposed rezoning, and are shown below in Figure 3.

PBP requires the 'predominant vegetation' occurring up to 140 m from each potential development site to be determined in all directions. It also states that:

where a mix of vegetation types exist the type providing the greater hazard is said to predominate

and this vegetation type is to be used in determining the bushfire protection measures required.

The main bush fire prone vegetation type present within and adjacent the study area as defined by PBP and AS 3959-2009 is 'Rainforest' (see Figure 3). There is a narrow band of rainforest along the western slope of the plateau and a wider band along the eastern slope of the plateau which extends east and south-east down into remnant riparian corridors amongst adjoining low density housing (as shown in Figure 3). The vegetation on the south-western boundary and north-eastern corner of the subject land has been assessed in the accompanying ecological assessment as a heavily weed infested regrowth, not rainforest remnant, and this vegetation will be removed as shown in Figure 3.

Within the central portion of the study area, there is a large tract of grazed pasture and there are similar grazed pastoral areas to the west and north-east of the study area. To the north, east, south-east and south of the study area, there are areas of existing residential development.

4.2 EFFECTIVE SLOPE

The area proposed for rezoning is located on the top of a plateau. PBP (p. 50) defines the effective slope as 'that slope within the hazard which most significantly affects fire behaviour of the site having regard to the vegetation class found'. The effective slopes are classified within five slope classes, one being upslope and four being downslope.

The majority of the vegetation within and adjacent to the study area is on steep slopes heading down from the edge of the plateau with effective slopes falling into the PBP slope categories of 'downslope >10-15 degrees', 'downslope >15-18 degrees' and slopes in excess of 18 degrees which are beyond the scope of PBP.

Figure 3: Vegetation and Slopes



- Contours
- Subject Land
- Vegetation to be removed

- Pasture/grassland
- Weeds and Acacia regrowth
- Rainforest - native and weeds, heavily disturbed
- Subtropical rainforest EEC

Data Sources: Bing Aerials
0 20 40 80
Meters
Datum/Projection: GDA 1994 MGA Zone 56

5 Bushfire protection measures

5.1 ASSET PROTECTION ZONES (APZ)

Asset Protection Zone setbacks (*i.e.* the separation of buildings from unmanaged bushfire prone vegetation) are required at the interface between all bush fire prone vegetation and built assets vulnerable to bushfire damage. The primary purpose of an APZ is to ensure that a progressive reduction of bushfire fuels occurs between the bushfire hazard and any buildings.

The gradient of the slope and whether it is upslope or downslope from the asset, and the type of vegetation on that slope are used within PBP to determine the size of the APZ.

The required APZs are determined by PBP and are shown in Table 1 and Figure 4.

In accordance with PBP where an APZ extends onto neighbouring property, this must be formalised under a *Conveyancing Act* Section 88b agreement. This assessment is based upon all APZ's being within the subject land and no such agreement being required.

5.1.1 APZ dimensions

Dimensions of Asset Protection Zones for residential development within the study area have been determined using methodology identified in Appendix 2 of PBP for residential development. It is important to note that should Special Fire Protection Purpose (SFPP) development be proposed within the study area, it will be required to achieve larger APZs than those specified for residential development.

Figure 4 shows the APZs for the study area and these are summarised as shown in Table 1 below. Section 5.1.2 shows the fuel management specifications for the APZs.

Table 1: APZs for study area based on an FDI of 100

Vegetation	Effective slope	Total APZ
Rainforest	>10°-15° downslope	20 m
	>15°-18° downslope	25 m
	> 18°	25 m

As shown in Table 1 above, the minimum APZ for rainforest on downslopes greater than 18 degrees has been accepted by the NSW Rural Fire Service as the same as the minimum APZ for the 'downslope >15-18 degree' slope category.

Figure 4 shows that the minimum required APZs will have a significant impact on the viability of Lots 21-23 in the north-eastern corner of the site and on Lots 84-91 along the western boundary of the site and these areas may required some redesign. There will also be a lesser impact on Lots 20, 92-93, 46 and 48 but future dwellings may still be possible within these allotments.

5.1.2 Fuel / vegetation management within the APZ

Figure 4 shows the locations of the APZ within the study area. The fuel management required in within these APZ are described overleaf:

- Existing larger trees (at least 150 mm in diameter measured at chest height) can remain within the APZ provided that;
 - no part of their crown occurs within 2 m of any building;
 - canopies are discontinuous;
 - if trees are removed preference should be given to removal of rough bark barked species as these typically produce a higher hazard; and
 - low branches holding fine fuel (*i.e.* leaves and twigs of <6mm in diameter) are pruned to 2 m from the ground.
- Smaller trees (*i.e.* less than 150 mm in diameter), shrubs, fallen trees and tree-limbs and stumps should be removed and continually suppressed;
- Any landscaping or plantings should preferably be local endemic low flammability species. The presence of a few shrubs, vegetable gardens or fruit trees is also acceptable provided that all plantings and residual vegetation are well spread out, do not form a contiguous pathway to the dwelling and do not constitute more than 5% of the total APZ area; and
- A minimal ground fuel should be maintained to include mown grass, paving, concrete, bare ground, or less than 4 tonnes per hectare of fine fuel (*i.e.* material of <6 mm in diameter).

5.2 BUILDING CONSTRUCTION STANDARDS (AS3959-2009)

Based upon the minimum APZs shown in Figure 4 and Table 1, the Bushfire Attack Level (BAL) under AS 3959-2009 'Construction of buildings in bushfire-prone areas' for future Class 1, 2 and 3 buildings in the study area will vary with slope and distance from the rainforest vegetation within and adjacent the study area as shown in Table 2.

The study area is of sufficient size and the bush fire prone vegetation within and adjacent the study area is located such that it is likely there will be a number of future buildings that have no requirement for a specific BAL particularly in the northern portion of the site.

Table 2: Construction standards for future Class 1, 2 and 3 buildings

Vegetation	Slope	BAL-40	BAL-29	BAL-19	BAL-12.5	BAL-LOW
Rainforest	>10°-15° downslope	20 - < 23 m	23 - < 33 m	33 - < 45 m	45 – 100 m	>100 m
	>15°-18° downslope	25 - < 29 m	29 - < 42 m	42 - < 56 m	56 – 100 m	>100 m
	>18° downslope	25 - < 29 m	29 - < 42 m	42 - < 56 m	56 – 100 m	>100 m

Figure 4: APZ requirements



- | | |
|-----------------------------|--|
| Subject Land | Pasture/grassland |
| Cadastre | Weeds and Acacia regrowth |
| Asset Protection Zone - 25m | Rainforest - native and weeds, heavily disturbed |
| Vegetation to be removed | Subtropical rainforest EEC |

Data Sources: 0 20 40 80
Don Fox Planning

Meters

Datum/Projection:
GDA 1994 MGA Zone 56

5.3 ACCESS REQUIREMENTS

5.3.1 Public road construction requirements

Future development within the study site will require public road construction standards as outlined within 'Planning for Bush Fire Protection 2006' and contained in Table 3 of this report. With careful design, future public roads would be able to comply with all of the design requirements of PBP.

Public perimeter roads can be provided between all future lots and the bushfire hazard, except in the north-eastern corner of the subject land where no perimeter road is proposed between the subject land and the lot immediately to the east (all vegetation in the north-eastern corner of the subject land is weedy regrowth and is proposed to be removed). This lot will have dual road frontage, to the south and north, providing access to the vegetation for firefighting purposes.

The future road configuration may provide only a single access point to the subdivision from Lilly Pilly Way. This road configuration will be finalised at subdivision stage, however the provision of a single access road meets the performance criteria of PBP as the access road does not pass through Bush Fire prone land, the development will have perimeter roads in accordance with PBP (except as detailed above), the bushfire hazard is comprised of small, disconnected patches and only impacts some areas of the development interface and the development will be serviced by reticulated water supply. The access configuration will be fully assessed at subdivision stage.

5.3.2 Property access road requirements

Private property access road requirements for the study area will need to comply with the requirements of PBP as outlined in Table 4 of this report.

However, in future urban areas within the study area, PBP has no specific requirements for property access roads if the following conditions apply:

- The speed limit is not greater than 70 kph;
- The nearest public road supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply); and
- There is a 70 m unobstructed path from the most distant external part of future buildings and the nearest public access road (RFS 2006a).

Table 3: Performance criteria for future public roads*¹

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	public roads are two-wheel drive, all weather roads
public road widths and design that allows safe access for firefighters while residents are evacuating an area	- urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) - the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas - traffic management devices are constructed to facilitate access by emergency services vehicles - public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard - curves of roads (other than perimeter roads) are a minimum inner radius of six metres - maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient - there is a minimum vertical clearance to a height of four metres above the road at all times
the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles	the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	- public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression - public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression
there is clear access to reticulated water supply	- public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression - one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression
parking does not obstruct the minimum paved width	- parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays - public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

*¹ PBP page 21

Table 4: Performance criteria for proposed property access roads^{*1}

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
access to properties is provided in recognition of the risk to fire fighters and / or evacuating occupants	at least one alternative property access road is provided for individual dwelling (or groups of dwellings) that are located more than 200 metres from a public through road
- the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles - all weather access is provided	- bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes - roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge)
road widths and design enable safe access for vehicles	- a minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint) <i>Note: No specific access requirements apply in a urban area where a 70 metres unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply.</i> - in forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay - a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches - internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius - curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress - the minimum distance between inner and outer curves is six metres - the crossfall is not more than 10 degrees - maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads <i>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above</i> - access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way

^{*1} PBP page 23

5.4 SERVICE SUPPLIES

During major bushfire events, the protection and preparedness of dwellings and their occupants may be jeopardised with the loss of basic services (RFS 2006a). 'Planning for Bush Fire Protection 2006' specifies certain criteria for the provision of electricity, gas and water supplies on bush fire prone land. The supply of services to the study area must take these criteria into account.

5.4.1 Electricity

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies, and
- No part of a tree should be closer to a powerline than the distance specified in 'Vegetation Safety Clearances' issued by Ausgrid (NS179, December 2010).

These bushfire protection measures are achievable for the subject site.

5.4.2 Gas

Any gas cylinders and tanks are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008). The relief valves of any gas cylinder located near the dwelling will be directed away from buildings and away from combustible materials.

These bushfire protection measures are achievable for the subject site.

5.4.3 Water supply

If the study area is to be serviced by reticulated water, the system would need to be designed such that the furthest point from any future dwellings to a hydrant will be less than 90 m in accordance with AS 2419.1-2005. The reticulated water supply would need to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The [PBP] provisions of parking on public roads are met.

Where land size will prevent future dwellings from achieving the required distance to hydrants on the public road system (AS 2419.1-2005) a static water supply will be required based on the size of the allotment.

Future dwellings on allotments less than 1 ha in size within the study area would require a 10,000 L static water supply for firefighting purposes. Future buildings on allotments larger than 1 ha would require a 20,000 L static water supply for firefighting purposes, although such supplies do not need to be dedicated solely for firefighting purposes.

The water supplies must be visible and readily accessible to fire fighting vehicles and a suitable connection for Rural Fire Service purposes must be made available (65 mm Storz fitting). The supply must be accessible to within 3 m by fire fighting appliances and outlets are not to be located within 10 m of the future buildings unless protected by a radiant heat barrier (i.e. a non-flammable wall).

The following is a list of additional requirements to adequately protect future properties:

- Hose lengths should be available to reach the extremities of the dwellings and structures. Canvas or rubber hoses are preferred over plastic;
- Taps and pipes should be 19 mm diameter for adequate water flow;
- Pipes must be buried in the ground to 300 mm minimum;
- Taps should be located away from buildings to avoid heat if the building catches fire; and
- A minimum 3 kW (5 Hp) petrol or diesel driven firefighting pump system is required that may be connected to the dedicated static water supply indicated above. An electric pump of similar capacity is permitted instead of a fuel firefighting pump provided that a dedicated petrol or diesel generator is available to drive the electric pump during a bushfire.

5.5 DEMAND OF EXISTING FIRE SERVICES

The study area is under the jurisdiction of the Illawarra Rural Fire Zone. Kiama village is under the jurisdiction of Fire and Rescue NSW and there is a memorandum of understanding between the two fire services that enables them to work cooperatively within the study area.

Consequently, Fire and Rescue NSW will respond within the study area for the following types of incidents:

- Automated Fire Alarms (AFAs);
- Structure fires; and
- Hazardous Materials (HAZMAT) incidents.

If the study area is rezoned for urban development, it is expected there will be an increase in the demand for firefighting services in the area. Future development of the study area may lead to it being placed under the jurisdiction of Fire and Rescue NSW.

5.6 SUMMARY OF PROTECTION MEASURES AND COMPLIANCE WITH PBP 2006

Both s.79BA of the EPA Act and s.117 Direction 4.4 require an assessment of the extent to which the study area conforms with or deviates from the requirements within 'Planning for Bush Fire Protection 2006'. As outlined above, with careful planning and design, future urban development of the study area can comply with the requirements of PBP.

6 Conclusion

Under Ministerial Direction 4.4, rezoning applications are to have regard to 'Planning for Bush Fire Protection 2006' and to comments received from the Commissioner of the NSW Rural Fire Service (RFS).

Any further subdivision within the study area or development applications for class 1, 2 and 3 buildings may be subject to separate application under s91 or 79BA of the *Environmental Planning and Assessment Act 1979*, Planning for Bush Fire Protection 2006 (PBP) and the *Rural Fires Act 1997*.

Any retention of vegetation or revegetation within and adjacent the site will retain or increase the bushfire risk to the site and the appropriate bush fire protection measures for residential development will be required commensurate with the hazard.

With this in mind, it is expected that the appropriate bushfire protection measures, along with any recent changes in bushfire associated legislation, will be detailed in any future subdivision and/or building development applications.

The bushfire protection measures outlined in Section 5 of this report demonstrate that the future rezoning of the study site for low density residential development has the capacity to comply with 'Planning for Bush Fire Protection 2006'.

7 References

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