



Bushfire Threat Assessment

For
Proposed Rezoning

At
Myall Downs

Prepared for
Great Lakes Council
PO Box 450
Forster NSW 2428

Job Reference 24737 - November 2008



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PROJECT: BUSHFIRE THREAT ASSESSMENT –MYALL RIVER DOWNS	
CLIENT:	GREAT LAKES COUNCIL
OUR REF	24737
DATE:	NOVEMBER 2008
APPROVED BY:	ALEX SADDINGTON
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EXECUTIVE SUMMARY

A Bushfire Threat Assessment Report has been prepared by RPS Harper Somers O'Sullivan (RPS HSO) at the request of Great Lakes Council for proposed rezoning at Tea Gardens being lot 4 DP 1099717, lot 54 DP 1039382, lot 404 DP 1093720 and Section 6-10 DP 13103.

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to the proposal. Recommendations are provided with regard to fuel management, access, provision of emergency services and building protection to facilitate an acceptable level of bush fire protection.

This report has been prepared to recognise the relevant requirements of the *Environmental Planning and Assessment Act 1979 (EP&A Act 1979)*, Environmental Planning and Assessment Regulation 2000, Rural Fires Act 1997 and the Rural Fires Regulation 2002. The development is classified as Integrated Development, and is assessed under Section 100B of the Rural Fires Act.

Due recognition of Planning for Bushfire Protection 2006 has been considered in the assessment method and consultation with the Rural Fire Service where required.

The following is recommended to enable the proposal to meet the relevant legislative requirements:

- APZ's of 60 metres will be required between future dwellings and vegetation external to the Tourist Lodgings.
- APZ's of 20 metres will be required between future dwellings and vegetation external to the proposed dwellings along the northern and southern boundary.
- Any future dwelling within the proposed development estates should have due regard to the specific considerations given in the BCA, which makes specific reference to the Australian Standard (AS3959 – 1999) construction of buildings in bushfire prone areas.
- Roads be constructed in accordance with section 4.1.3 (1), PBP 2006 as outlined in Section 7 of this report. Any lessening of these requirements will need a performance-based assessment to be undertaken.
- Any proposed development be linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005.

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1 INTRODUCTION

RPS Harper Somers O'Sullivan (RPS HSO) has been engaged by Great Lakes Council (GLC) to undertake a Bushfire Threat Assessment for proposed rezoning over numerous lots at Tea Gardens hereafter referred to as the 'site' (Figure 1-1).

This BTA is suitable for submission with a Rezoning Submission and provides information on measures that will enable the development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2006) (hereafter referred to as 'PBP').

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the *Environmental Planning and Assessment Amendment (Planning for Bush Fire Protection) Regulation 2007* and the *Rural Fires Amendment Regulation 2007 (RF Amendment Regulation, 2007)*. This assessment has been made based on the bushfire hazards in and around the site at the time of the site inspection (September 2008).

1.1 Site Particulars

Locality	Tea Gardens, NSW
LGA	Great Lakes
Area	460 Hectares
Zoning	1 (a) Rural, 7(a) Wetlands and Littoral Rainforest and 7(a1) Environmental Protection
Boundaries	The site is bounded to the north natural bushland, to the east by the township of Tea Gardens and Pindimar Bay to the south and west.
Topography	The site is predominately flat.
Climate / Fire History	The subject site lies within a geographical area with a Fire Danger Index (FDI) rating of 80.

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LEGEND

 Site Boundary



TITLE:
Figure 1-1 Site Location

SCALE: 1: 60000 at A4 Size DRAWN: A.Saddington APPROVED: S.Bishop

DATUM: MGA Zone 56 (GDA 94) DATE: 9/9/2008

LAYOUT REF.: J:\JOBS\24K\24737 Tea Gardens\Drafting\MapInfo
Ecology\Bushfire\24737 Figure 1-1 Site Location A4

CONTOUR INTERVAL: N/A

JOB REF:
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CLIENT: Great Lakes Council

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1.2 Description of Proposal

The proposal seeks to rezone the mentioned lots from the current 1 (a) Rural, 7(a) Wetlands and Littoral Rainforest and 7(a1) Environmental Protection to land zoned for future Industrial, rural and residential uses.

1.3 Objectives of Assessment

This assessment has been undertaken in accordance with clause 46 of the RF Regulation 2007. This BTA also addresses the six key Bush Fire Protection Measures (BFPMs) in a development assessment context being:

1. The provision of clear separation of buildings and bush fire hazards, in the form of fuel-reduced Asset Protection Zones (and their components being Inner Protection Areas and Outer Protection Areas);
2. Construction standards and design;
3. Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
4. Adequate water supply and pressure;
5. Emergency management arrangements for fire protection and / or evacuation;
and
6. Suitable landscaping, to limit fire spreading to a building.

2 METHODOLOGY

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation (API) to map the community(s) extent; and
- Confirmation of the community type(s) present (dominant species) via the undertaking of flora surveys and identification.

2.2 Slope Assessment

Slope Assessment has been undertaken as follows:

- Aerial Photographic Interpretation (API) in conjunction with analysis of electronic contour maps with a contour interval of 10m; and
- On site confirmation of slope measurements using a hand-held inclinometer.

3 VEGETATION ASSESSMENT

In accordance with PBP (RFS, 2006), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the site.

The vegetation communities were delineated using the following regional vegetation community mapping package:

- Review of Great Lakes Council Vegetation Strategy (Eastern Portion) Volume 2 Vegetation Community Descriptions, 2003.

Refer to Table 3-1 and Figure 3-1 for vegetation description and location.

Ground-truthing found eleven vegetation communities within the site and within 140m of the site as follows;

Table 3-1: Vegetation Classification

Vegetation Community	Classification of Vegetation Formations
Open Woodland <i>Eucalyptus signata</i>	Woodland
Open Forest <i>Corymbia maculata</i> & <i>Eucalyptus siderophloia</i>	Open Forest
Open Forest <i>Corymbia gummifera</i>	Woodland
Woodland <i>Angophora costata</i>	Open Forest
Open Forest <i>Eucalyptus robusta</i>	Woodland
Open Forest <i>Melaleuca quinquinervia</i>	Woodland
Open Forest <i>Melaleuca quinquinervia/Eucalyptus robusta</i>	Woodland
Woodland <i>Pinus elliotii/Eucalyptus signata</i>	Woodland
Open Forest <i>Pinus elliotii</i>	Woodland
Swamp Mahogany / Paperbark	Forested Wetland
Disturbed/Cleared Land	Reduced Vegetation

WARNING

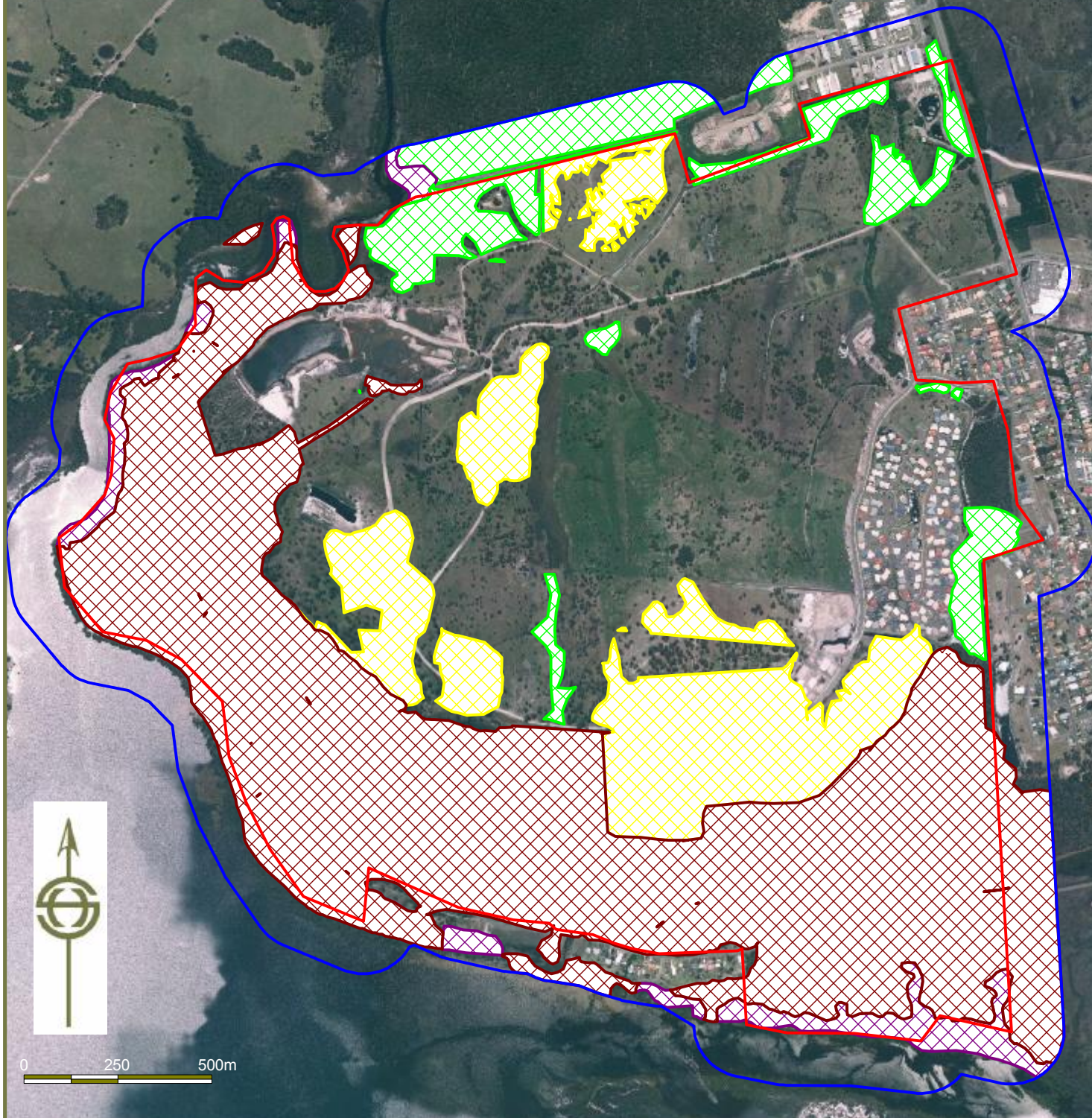
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Note that this Vegetation Community Map depicts clearly defined boundaries between vegetation communities that are the product of individual interpretation and are not distinguished by clearly defined boundaries 'on the ground'. Therefore, this map should only be treated as an indication of approximate peripheries between delineated vegetation communities.

Caution should therefore be exercised when using this data for purposes requiring high levels of accuracy. Furthermore, no account for intergrading areas between delineated vegetation communities has been made.

LEGEND

- Region
- 140m Buffer
- Open Forest
- Woodland
- Saline Wetland
- Forested Wetlands



TITLE:
Figure 3-1 Vegetation Classification

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SCALE: 1: 15000 at A4 Size **DRAWN:** A.Saddington **APPROVED:** S.Bishop

DATUM: MGA Zone 56 (GDA 94) **DATE:** 8/9/2008

LAYOUT REF: J:\OCES\24K\24737 Tea Gardens\Drafting\MapInfo Ecology\Bushfire\24737 Figure 3-1 Vegetation Class A A4

CONTOUR INTERVAL: N/A

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4 EFFECTIVE SLOPE ASSESSMENT

In general, the site is predominantly flat. The highest point on the site is at approximately 18m AHD due to an isolated hill along the north-western boundary. In accordance with PBP (2006), an assessment of the slope over a distance of 140m in all directions from the site boundary was undertaken.

The slopes leading away from the site have been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behavior of the site.

The slope of vegetation surrounding each site is documented in Table 4-1 below.

Table 4-1: Slope Assessment

Direction that Vegetation (hazard) occurs from the lot	Vegetation Type	Slope
North	Open Forest	Flat
South	Forested Wetlands	Flat
South East	Established APZ for Hermitage Retirement Village	Flat
South-west	Forested Wetlands	Flat
West	Forested Wetlands	Flat

5 DETERMINING APPROPRIATE SETBACKS

5.1 APZ's

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA). The respective IPA and OPA widths for the required APZ's are as detailed in Table 5-1. An APZ can include the following:

- Lawns;
- discontinuous gardens;
- swimming pools;
- driveways;
- unattached non-combustible garages with suitable separation from the dwelling;
- open space / parkland; and
- car parking.

5.2 IPA (Inner Protection Area)

The IPA extends from the edge of the OPA to the development. The IPA aims to ensure that the presence of fuels which could contribute to a fire event / intensity, are minimized close to the development. The performance of the IPA must be such that:

- there is minimal fine fuel at ground level which could be set alight by a bushfire; and
- any vegetation in the IPA does not provide a path for the transfer of fire to the development – that is, the fuels are discontinuous.

The presence of a few shrubs or trees in the IPA is acceptable provided that they:

- do not touch or overhang any buildings;
- are well spread out and do not form a continuous canopy;
- are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc. are not permitted in the IPA.

5.3 OPA (Outer Protection Area)

The OPA is located adjacent to the hazard. Within the OPA any trees and shrubs should be maintained in a manner such that the vegetation is not continuous. Fine fuel loadings should be kept to a level where the fire intensity expected will not impact on adjacent developments.

5.4 Determining the Appropriate Setbacks for Proposed Residential Areas

The subject site lies within the Great Lakes Local Government Area and therefore is assessed under an FDI (Fire Danger Index) rating of 80. Given the information regarding slope and vegetation and in accordance with Table A2.4 (pg 58 PBP, 2006) the following APZ's would be required between any proposed development within the site and the above-mentioned vegetation.

Refer to Figure 5-1 and Table 5-1 which illustrates the position of the required APZs within the development site.

Table 5-1: APZ Widths

Direction from Development Estate	Vegetation Type	Slope	APZ
North	Open Forest	Flat	20m

5.5 Determining Appropriate Setbacks for Tourist Lodgings Western Boundary

The portion of the development is classified as Special Fire Protection Purpose (SFPP) as the concept plans identifies it as proposed Tourist lodgings. SFPP are also assessed under Section 100B of the Rural Fires Act such developments are also integrated development under Section 91 of the EP & A Act.

As tourists may not be familiar with local surroundings and best evacuation routes APZ determinations are assessed under a higher risk than residential developments.

The following Figure 5-2 and Table 5.1 illustrates the position of required APZ's within the 'Tourist Lodgings' development estate on the western boundary.

Table 5-2: APZ Widths Tourist Lodging

Direction from Development Estate	Vegetation Type	Slope	APZ
West	Forested Wetlands	Flat	50m
South west	Forested Wetlands	Flat	50m

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LEGEND

- Site Boundary
- Conservation Area
- 20m APZ
- 15m APZ
- 50m APZ



TITLE:
Figure 5-1 Required APZ's

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SCALE: 1: 16344.68 at A4 Size DRAWN: A. Saddington APPROVED: S. Bishop

DATUM: MGA Zone 56 (GDA 94) DATE: 9/9/2008

LAYOUT REF: J:\JOBS\24K\24737 Tea Gardens\Drafting\MapInfo
Ecology\Bushfire\24737 Figure 5-1 Required APZ's A4

CONTOUR INTERVAL: N/A

JOB REF: 24737

6 DWELLING DESIGN AND CONSTRUCTION

The design of any future dwelling within the lots should have due regard to the specific considerations given within the Building Code of Australia (BCA), which makes specific reference to Australian Standard 3959 (AS 3959-1999) 'Construction of Buildings in Bushfire-Prone Areas'. This standard aims to provide ways to improve the design and construction of a building by minimising the likelihood of the consequences of bushfire attack.

The design of any future dwelling and the materials used for construction should be chosen based on the information contained within this standard, and accordingly the relevant architect should be made aware of this recommendation. It may be necessary to have dwelling plans checked by the architect involved to ensure that the proposed dwelling meets the relevant construction level criteria. If it becomes apparent that appropriate criteria is not being met, then either the design will have to be amended or the APZ setback distances may have to increase accordingly.

The determinations of the appropriate levels of construction are based upon categories of bushfire attack. This follows the site assessment methodology outlined in Appendix 3 of PBP (RFS, 2006) based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the construction level is derived by assessing the:

- predominant vegetation type contained within the hazard;
- predominant slope class within the identified vegetation type; and
- distance of the extensions from the hazard.

This assessment is based on a proposed rezoning and therefore specific construction standards are not relevant.

Future development on this land should however comply with the Australian Standard 3959 (AS 3959-1999) 'Construction of Buildings in Bushfire-Prone Areas'.

7 ACCESS

In the event of a serious bushfire threat in the future to possible development, it will be essential to ensure that adequate evacuation routes are provided and that access to all areas of retained adjacent vegetation (both on-site and adjacent) is feasible. Therefore it is recommended that multiple access / egress routes be provided for any proposed development upon this site, and that all internal roads be designed to the specifications outlined below during the subsequent design stages.

According to PBP (2006), the design specifications for **Public Roads** require that roads:

- Public roads are two-wheel drive, all weather roads;
- Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway eight metres minimum kerb to kerb);
- The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas;
- Public roads have a cross-fall not exceeding 3°;
- All roads are through roads. Where dead end roads are unavoidable, dead ends are both more than 200 metres in length and incorporates minimum 12 metres outer radius turning circle and are clearly signposted as a dead end;
- Curves of roads (other than perimeter roads) are a minimum inner radius of six metres;
- Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10°;
- 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 (15 tonnes for areas with reticulated water, 28 tonnes for all other areas);
- Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves;
- Public roads between 6.5m and 8 metres wide are No Parking on one side with the hydrants located on this side;
- Parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement; and
- Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.

According to PBP (2006), the design specifications for **Urban Property Access** require that roads:

- At least one alternative property access road is provided for individual dwellings that are located more than 200 metres from a public road;
- 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;
- A minimum carriageway 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;
- A minimum vertical clearance of four metres to any overhanging obstructions including tree branches;
- Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress;
- Minimum distance between inner and outer curves is six metres;
- The crossfall is not more than 10°;
- Maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads; and
- Access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.

According to PBP (2006), the design specifications for **Rural Property Access** require that roads:

- At least one alternative property access road is provided for individual dwellings that are located more than 200 metres from a public road;
- 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;
- A minimum carriageway 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;
- 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;
- 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 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;
- Minimum distance between inner and outer curves is six metres;
- The crossfall is not more than 10°;
- Maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads; and
- Access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.

7.1 SFPP

According to PBP (2006), the design specifications for **Internal Roads** for SFPP developments require that roads:

- Internal roads are two-wheel drive, all weather roads;
- Internal perimeter roads are two-way, that is, at least two traffic lane widths (carriageway eight metres minimum kerb to kerb);
- Crossfall of the pavement is not more than 10°;
- All roads are through roads. Where dead end roads are unavoidable, dead ends are both more than 100 metres in length and incorporates minimum 12 metres outer radius turning circle and are clearly signposted as a dead end;
- Curves of roads (other than perimeter roads) are a minimum inner radius of six metres;
- Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10°;
- 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 (15 tonnes for areas with reticulated water, 28 tonnes for all other areas);
- Traffic management devices are constructed to facilitate access by emergency service vehicles;
- Roads do not traverse through a wetland or other land potentially subject to periodic inundation; and
- Roads are clearly signposted and bridges clearly indicate load ratings.

8 WATER

Associated with any kind of development upon the land, it is expected that water mains will be extended into the development estate. Provision of access to this supply should be provided for fire-crews in the form of readily accessible and easily located fire hydrants. Fire hydrant spacing, sizing and pressure should 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 to be 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. Other future sources such as swimming pools and rainwater tanks for a supplementary source of water in the event of any fire emergency within the area are encouraged.

9 FIRE FIGHTING CAPABILITY

Any fire within the site would be attended in the first instance by Tea Gardens branch of the NSW Fire Brigade. Response time would be expected to be five minutes or less. To facilitate quick and efficient action by the Fire Brigade / Rural Fire Service upon arrival, it is recommended that all necessary connections / pumps etc be clearly marked and visible, and in good working order.

10 CONCLUSION & RECOMMENDATIONS

It is clear from this investigation and assessment the site, in part constitutes BFPL. Therefore, the proposed rezoning and consequent developments will have to be carried out in accordance with the specifications contained within PBP (RFS, 2006) as assessed and presented within this report.

If the recommendations contained within this report are duly considered and incorporated, it is considered that the fire hazard present is containable to a level necessary to provide an adequate level of protection to life and property on the site.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements:

- APZ's of 60 metres will be required between future dwellings and vegetation external to the Tourist Lodgings.
- APZ's of 20 metres will be required between future dwellings and vegetation external to the proposed dwellings along the southern boundary.
- Any future dwelling within the proposed development estates should have due regard to the specific considerations given in the BCA, which makes specific reference to the Australian Standard (AS3959 – 1999) construction of buildings in bushfire prone areas.
- Roads be constructed in accordance with section 4.1.3 (1), PBP 2006 as outlined in Section 7 of this report. Any lessening of these requirements will need a performance-based assessment to be undertaken.
- Any proposed development be linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005.

Finally, it is believed that the implementation of the measures and recommendations forwarded within this report would contribute to the amelioration of the potential impact of any bushfire upon the development estate, but they do not and cannot guarantee that the area will not be affected by bushfire at some time

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APPENDIX A Building Requirements

Appendix 4

BUILDING REQUIREMENTS FOR BUSH FIRE PROTECTION

(Incorporating key components of AS3959 Construction of Buildings in Bushfire-prone Areas)

LEVEL 1 CONSTRUCTION			LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE Note: Reference to additional site requirement will be necessary for this category. For example; water supply, access, shielded egress
Flooring systems	- Concrete slab on ground - Enclosed suspended floors - no requirements - Open subfloors; Bearer greater than 600mm above ground – no requirements Bearer less than 600mm above ground require either the floor frame to be protected by non-combustible sheets or timber floor frame to be fire retardant	As for level 1	As for level 2 except that for open subfloors timber floor framing is required to be fire retardant	All floors are to be fully enclosed with a non-combustible material	
Supporting posts, columns, stumps, piers and poles	- Non-combustible - Fire retardant treated timber treated up to 400mm above finished ground level - Timber mounted on galvanised metal shoes that provide a clearance of 75mm above finished ground or paving	As for level 1	As for level 2 except that timber in unenclosed floor spaces shall be fire retardant-treated to full height	All floors are to be fully enclosed with non-combustible material All other posts on attached or adjacent structures shall be non-combustible	
External Walls	Must have an external leaf with either one or a combination of; - Masonry, concrete, pise, rammed earth or stabilised earth - A frame wall that incorporates either a sarking or insulation material immediately behind the cladding - A wall of timber logs gauge planed and the space between the logs sealed to prevent burning debris and to allow for building movement Combustible leaf or cladding must be greater than 400mm above finished ground	As for level 1 except that; - PVC cladding is not permitted - External timber wall cladding shall be of fire retardant-treated timber	As for level 2	- External walls shall not include any combustible material - Additional radiant heat protection such as non-combustible fencing or shielding and or a drenching water system	

Windows <i>Note: A vertical dormer window or clerestory is regarded as a normal window, not a rooflight</i>	Openable windows shall be screened with mesh max. aperture 1.8mm that remains in place while the window is open; • Aluminium • Bronze • Corrosion resistant steel	As for level 1 except that aluminium shall not be used In addition, timber shall be fire retardant-treated timber except where protected by non-combustible shutters. Leadlight windows are to be protected by shutters	As for level 2 except that where windows are not protected by non-combustible shutters they shall be glazed with toughened glass	As for level 3 except that non-combustible shutters or windows constructed to withstand 40kw/m ² radiant heat exposure for 3 minutes shall be provided on the elevation exposed directly to the hazardous vegetation
External Doors	External doors shall be fitted with; • Draught excluders, and • Tight fitting door screens fitted with; - Aluminium - Bronze - Corrosion resistant steel	As for level 1 except that aluminium shall not be used If leadlight glazing panels are incorporated in the doors, they shall be protected by shutters constructed of a non-combustible material or of toughened glass	As for level 2 except that; • Timber doors shall be fire retardant treated timber or covered in a non-combustible covering OR protected with non-combustible shutters OR shall be solid core having a thickness of not less than 35mm • Sliding glass doors may be treated as for windows • If glazing panels are incorporated they shall be of toughened glass	As for level 3 except that non-combustible shutters or glazing constructed to withstand 40kw/m ² radiant heat exposure for 3 minutes shall be provided on the elevation exposed directly to the hazardous vegetation

LEVEL 1 CONSTRUCTION			LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE <i>Note: Reference to additional site requirement will be necessary for this category. For example; water supply, access, shielded egress</i>
Vents and Weepholes	Vents and weepholes shall be protected with spark guards made from 1.8mm mesh that is either; - Aluminium - Bronze - Corrosion resistant steel		As for level 1 except that aluminium shall not be used	As for level 1 except that aluminium shall not be used	As for level 3
Roofs	Sheeted roofs –Only metal or fibre-cement sheet shall be used. Gaps to be sealed or protected by; - Fully sarking the roof with sarking with a flammability index of not more than 5 or - Providing corrosion resistant steel or bronze mesh, profiled metal sheet, neoprene seal, compressed mineral wool or similar material - Rib caps and ridge caps shall be sealed using methods outlined in the AS3959 - Tiled roofs shall be provided with sarking - Shingles and shakes shall not be used - All roofing shall be non-combustible		As for level 1 construction except that all roof sheeting shall be non-combustible and sarked	As for level 2 construction except that fibre-reinforced cement or aluminium shall not be used.	As for level 3
Roof lights <i>Note: A vertical dormer window or clerestory window is regarded as a normal window, not a rooflight</i>	All penetrations of the roof space for the installation of roof lights and associated shafts shall be sealed with a non-combustible sleeve or lining Thermoplastic sheet in a metal frame may be used for a roof light, but in a diffuser installed at ceiling level shall be wired or toughened glass in a metal frame. Vented rooflights shall be provided with corrosion resistant steel or bronze mesh.		As for level 1 except that rooflight glazing shall be of wired glass Thermoplastic or toughened glazing shall not be used	As for level 2	As for level 2 except that glazing shall be required to withstand 40kw/m ² radiant heat exposure for 3 minutes

Ventilators	All components must be non-combustible and shall be protected against the entry of sparks and embers with corrosion resistant steel or bronze mesh.	As for level 1	As for level 2	As for level 3 except that roof ventilators shall not be permitted on the plane of the roof nearest to the unmanaged vegetation
Roof mounted evaporative cooling units	Roof mounted evaporative cooling units shall only be used if openings to the cooling unit are encased in corrosion resistant steel or bronze mesh	As for level 1 except that the case of the evaporative cooler shall be of non-combustible material	As for level 2	As for level 3 except that roof mounted evaporative cooling units shall not be permitted on the plane of the roof nearest to hazardous vegetation
Eaves	Eaves shall be enclosed and the fascias or the gaps between the rafters shall be sealed	As for level 1 except that all timber eaves lining and joining strips shall be of fire-retardant treated timber	As for level 2 except that aluminium shall not be used	As for level 3 except that all materials shall be non-combustible
Fascias	No requirements	Fascias are to be either non-combustible or fire-retardant treated timber	As for level 2 except that no fibre-reinforced cement or aluminium sheet shall be used.	As for level 3 except that all materials shall be non-combustible
Gutters and Downpipes	Any materials or devices used to stop leaves collecting in the gutters shall have a flammability index of not greater than 5 when tested in accordance with AS1530.2	As for level 1	As for level 2	As for level 3
Service Pipes (Water and Gas)	All exposed piping, for water and gas supplies, shall be of metal. Pipes of other materials shall be buried to a depth of at least 300mm below finished ground level	As for level 1	As for level 2	As for level 3

LEVEL 1 CONSTRUCTION		LEVEL 2 CONSTRUCTION	LEVEL 3 CONSTRUCTION	FLAME ZONE <i>Note: Reference to additional site requirement will be necessary for this category. For example; water supply, access, shielded egress</i>
Verandas and Decks	No timbers shall be allowed to directly connect with the remainder of the dwelling Slab SUSPENDED SLAB; supported by posts, columns, stumps, piers and poles that are protected by- • Non-combustible material • Fire retardant treated timber treated up to 400mm above finished ground level • Timber mounted on galvanised metal shoes that provide a clearance of 75mm above finished ground or paving • OR Enclosed against the entry of embers. The enclosure shall be non-combustible within 400mm of the finished ground level SHEET OR TONGUE AND GROOVE FLOOR; is acceptable where bearer is greater than 600mm above ground (see protection for supports above) A sheet or tongue and groove floor that is less than 600mm above finished ground at any point shall be enclosed. This enclosure shall be non-combustible where it is within 400mm of the finished ground level. SPACED DECKING; shall have a clearance of at least 5mm between adjacent timbers. The external perimeter of the decking shall not be enclosed nor shall access to the space beneath the decking be impeded. (see protection for supports above)	As for level 1, except that if spaced decking is used, it shall be non-combustible or fire-retardant-treated timber As for level 1, except that if spaced decking is used it shall be non-combustible or fire-retardant-treated timber.	As for level 2 except that all materials shall be non-combustible or where timber is used, it shall be fire-retardant-treated including any balustrades As for level 2 except that all materials shall be non-combustible or where timber is used, it shall be fire-retardant-treated including any balustrades	As for level 3 except all materials shall be non-combustible including, treads risers, balustrade and any other attachments on the side of the dwelling exposed to the unmanaged vegetation As for level 3 except all materials shall be non-combustible including, treads risers, balustrade and any other attachments on the side of the dwelling exposed to the unmanaged vegetation

source: Infill Development in Bush Fire Prone Areas, Blue Mountains City Council