



Travers

bushfire & ecology

bushfire protection assessment

Proposed redevelopment
of an existing aged care facility (infill)

Lot 103 DP 707503
290 Avoca Drive
Kincumber

Under Section 100B of the Rural Fires Act (1997)

March 2019
(Ref: 18LEND13)



Bushfire Protection Assessment

Proposed redevelopment of an existing aged care facility (infill)
Lot 103 DP 707503
290 Avoca Drive
Kincumber

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

A bushfire protection assessment has been undertaken for the proposed redevelopment of Brentwood Village and construction of a new 108 bed residential aged care facility at 290 Avoca Drive, Kincumber. The property forms part of a broader proposed subdivision which has been lodged to create six (6) allotments. The proposed redevelopment of the aged care facility will be confined to proposed Lot 1.

This type of development is categorised by the NSW Rural Fire Service (RFS) as being an infill 'special fire protection purpose' (SFPP). This classification requires the RFS to issue a bushfire safety authority (BSA) in accordance with *Planning for Bush Fire Protection 2006 (PBP)*.

PBP dictates that the subsequent extent of bushfire attack that can potentially impact a SFPP building must not exceed a radiant heat flux of 10kW/m². This rating assists in determining the size of the asset protection zone (APZ) to provide the necessary defensible space between hazardous vegetation and a building.

The assessment found that bushfire can potentially affect the proposed development from the forest vegetation located within the Avoca Drive road reserve to the north-east and the woodland vegetation located to the north-west and north resulting in possible ember and radiant heat attack.

The assessment has concluded that the proposed development will provide compliance with the performance criteria outlined in *PBP*.

GLOSSARY OF TERMS

APZ	Asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2009</i>
BAL	<i>Bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BSA	Bushfire safety authority
EEC	Endangered ecological community
<i>EP&A Act</i>	<i>Environmental Planning & Assessment Act 1979</i>
FDI	Fire danger index
ha	Hectare
IPA	Inner protection area
m	Metres
OPA	Outer protection area
<i>PBP</i>	<i>Planning for Bush Fire Protection 2006</i>
<i>RF Act</i>	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
SFPP	Special fire protection purpose
<i>TSC Act</i>	<i>Threatened Species Conservation Act 1995</i>

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SCHEDULE 1 – Bushfire Protection Measures

APPENDIX 1 – Management of Asset Protection Zones



Introduction

1

Travers bushfire & ecology has been requested to undertake a bushfire protection assessment for the proposed redevelopment of Brentwood Village at 290 Avoca Drive, Kincumber.

The proposed development is located on land mapped by Central Coast Council as being bushfire prone. This triggers a formal assessment by Council in respect of the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection 2006 (PBP)*.

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the landscape;
- undertake a bushfire attack assessment in accordance with *PBP*;
- provide advice on mitigation measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues and;
- review the potential to carry out hazard management over the landscape.

1.2 Project synopsis

The proposal involves the demolition of the existing onsite independent living units and construction of a three (3) storey one-hundred and eight (108) bed residential aged care development (refer Figure 1.1) within the newly created Lot 1. Public access will be provided from Scaysbrook Drive in the south.

Schedule 1 shows the proposed development and bushfire protection measures, including APZs.

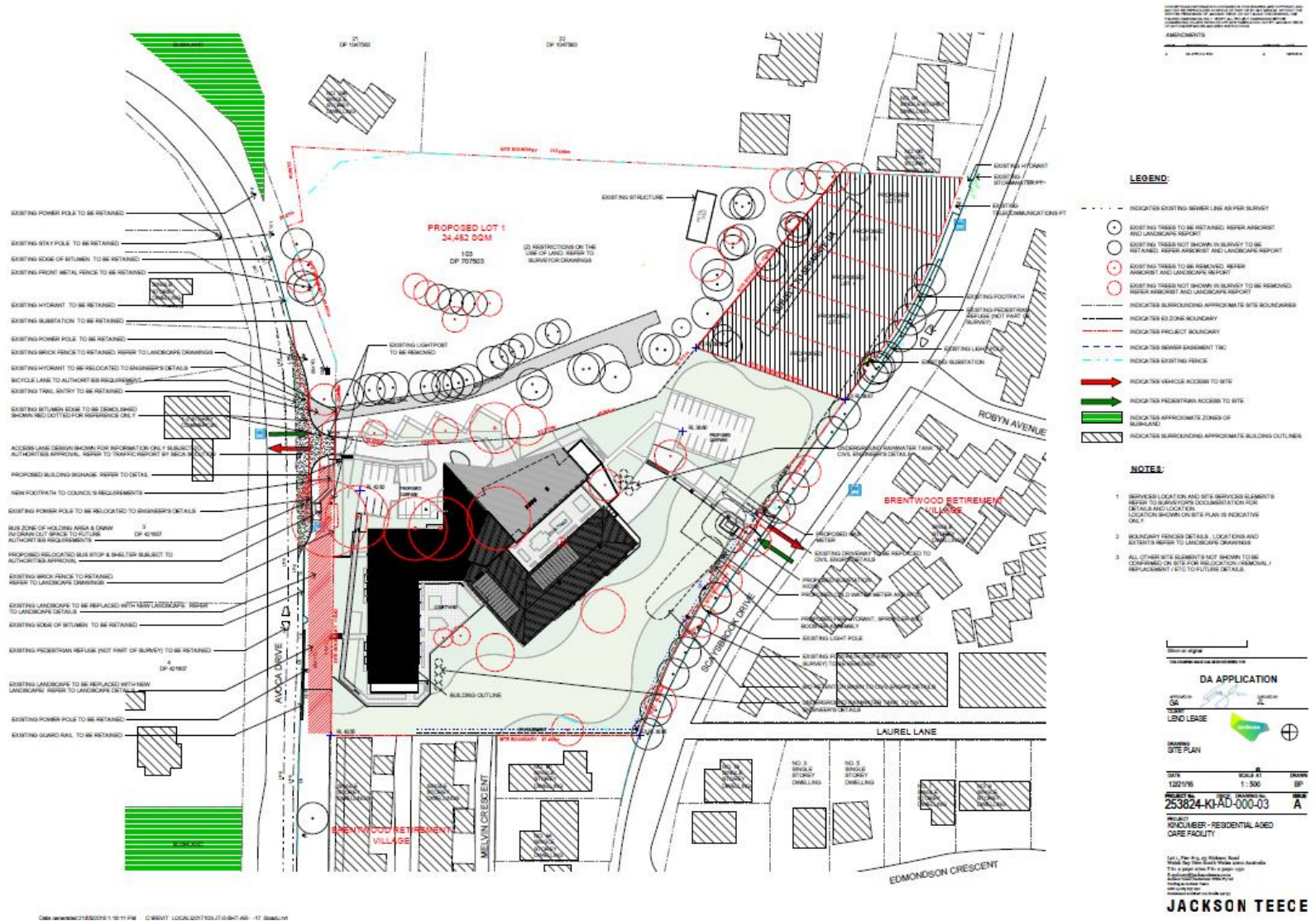


Figure 1.1 – Site plan

1.3 Information collation

To achieve the aims of this report, a review of the information relevant to the property was undertaken prior to the initiation of field surveys. Information sources reviewed include the following:

- Site plans prepared by *Jackson Teece* dated 12/21/16
- *Nearmap* aerial photography
- Topographical maps DLPI of NSW 1:25,000
- Australian Standard 3959 *Construction of buildings in bushfire-prone areas (AS3959)*
- *Planning for Bush Fire Protection 2006 (PBP) (RFS)*.

An inspection of the proposed development site and surrounds was undertaken by Nicole van Dorst on 20 October 2016 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

The property is located to the north of Scaysbrook Drive approximately 200m to the east of its intersection with Melville Street within the local government area (LGA) of the Central Coast.

The site forms part of Brentwood Village (aged care facility) and currently supports a number of independent living units. The site is adjoined by managed rural residential land to the east and north. Remnant bushland is situated within Avoca Drive road reserve to the north-east and remnant woodland trees (with a managed understorey) are located in the rural residential land to the north-west and north (refer Figure 1.2).



Figure 1.2 – Location plan

1.5 Legislation and planning instruments

1.5.1 *Environmental Planning and Assessment Act (EP&A Act)*

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *BCA*. The identification of bushfire prone land is required under Section 10.3 of the *EP&A Act*.

1.5.2 *Bushfire prone land*

Bushfire prone land maps provide a trigger for the development assessment provisions. The proposed development is located on land that is mapped by Central Coast Council (formerly Gosford) as being bushfire prone (refer Figure 1.3).

Although the land to the north is mapped as Category 1 & 2 vegetation the majority of this land consists of woodland trees with a managed understorey in a rural landscape.

The development is an integrated development under Section 4.46 of the *EP&A Act*. Consequently, to proceed, the proposed development will require a bushfire safety authority (BSA) from the RFS. The Commissioner must be satisfied that the proposal complies with *PBP* before granting a BSA.

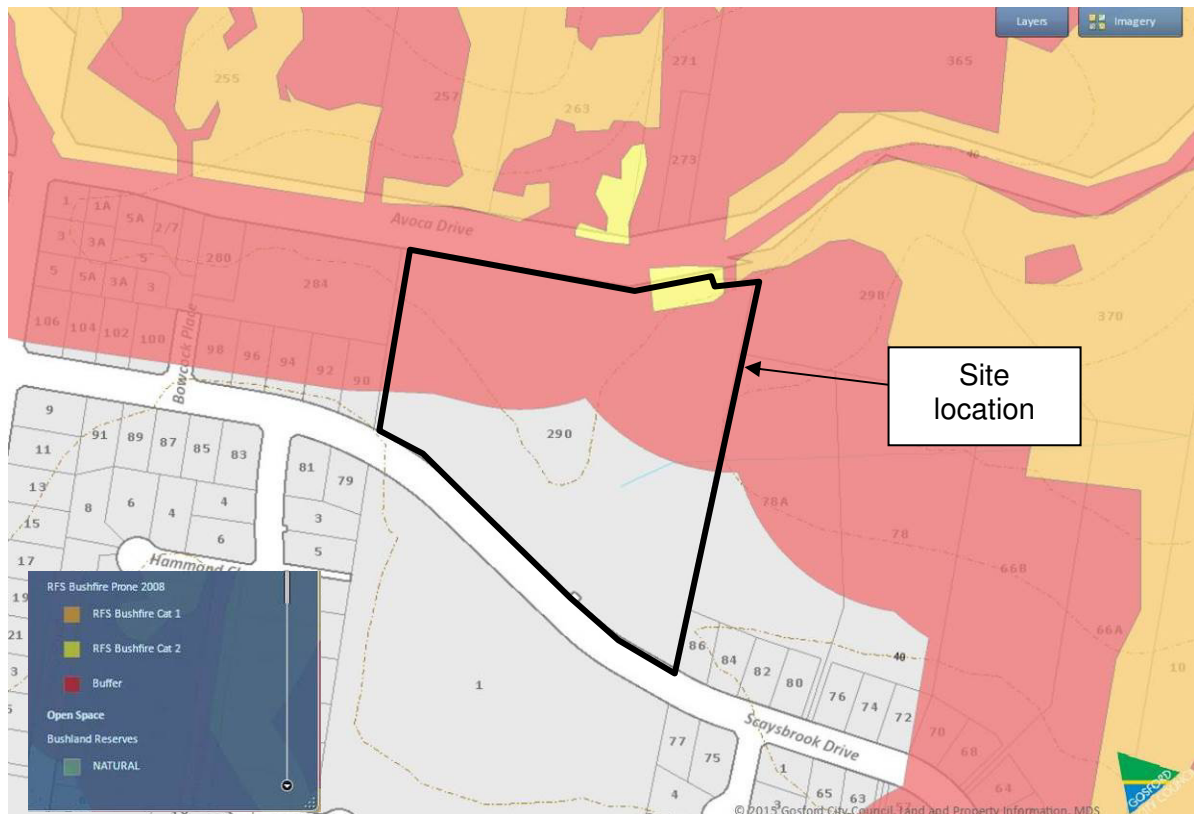


Figure 1.3 – Bushfire prone land map

1.5.3 Rural Fires Act (RF Act)

This legislation is concerned with the prevention and control of bushfire, hazard reduction and administration. Section 100B of the *RF Act* states that the Commissioner may issue a BSA for a subdivision development on bushfire prone land.

1.5.4 Local environmental plan (LEP)

A LEP provides for a range of zonings which list development that is permissible, or not permissible, as well as the objectives for development within a zone.



Figure 1.4 – Zoning map
(source: Gosford LEP (2004))

The site is zoned as *R2 – Low Density Residential* and *E3 – Environmental management*. The proposed aged care buildings are confined to the R2 zoned land.

1.5.5 Planning for Bush Fire Protection 2006 (PBP)

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP*. *PBP* provides planning controls for building in bushfire prone areas as well as guidance on effective bushfire protection measures.

The policy aims to provide for the protection of human life (including fire fighters) and to minimise impacts on property and the environment from the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment. More specifically, the aims and objectives for all development located on bushfire prone land should:

1. Afford occupants of any building adequate protection from exposure to a bushfire.
2. Provide for a defensible space to be located around buildings.
3. Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition.
4. Ensure that safe operational access and egress for emergency service personnel and residents is available.
5. Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the APZ.
6. Ensure that utility services are adequate to meet the needs of fire fighters (and others who may assist in bushfire fighting).

As the Brentwood Village is a type of development regarded by the RFS as a special fire protection purpose (SFPP) development, *PBP* requires additional objectives to be considered. These include the need to:

7. Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and fire fighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.
8. Provide for safe emergency evacuation procedures. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to fire fighters and other emergency services personnel can be high through prolonged exposure, where door to door warnings are being given and exposure to the bushfire is imminent.

The nature of SFPPs means that occupants may be more vulnerable to bushfire attack for one or more of the following reasons:

- they may have reduced capacity to evaluate risk and to respond adequately to the bushfire threat
- they may present organisational difficulties for evacuation and / or management
- they may be more vulnerable through stress, anxiety and smoke impacts arising from bushfire threat
- there may be significant communication barriers
- supervision during a bushfire may be difficult
- logistical arrangements for the numbers of residents may be complicated in terms of alternate accommodation, transport, healthcare and food supplies

In addition, *PBP* outlines the bushfire protection measures required to be assessed for new development in bushfire prone areas. The proposal has been assessed in compliance with the following measures:

- asset protection zones
- building construction and design
- access arrangements
- water supply and utilities
- landscaping, and
- emergency management arrangements.

1.5.6 *Building Code of Australia (BCA) and the Australian Standard AS3959 Construction of buildings in bushfire-prone areas 2009 (AS3959)*

The *BCA* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls. The *BCA* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions. In NSW, construction in bushfire prone areas applies to Classes 2, 3, 4 and 9b buildings or a Class 10a associated with Classes 2, 3, 4 and 9b buildings. The construction manual for the deemed to satisfy requirements is the *AS3959*.



Bushfire Threat Assessment

2

To assess the bushfire threat and to determine the required width of an APZ for a development, a review of the elements that comprise the overall threat needs to be completed.

PBP provides a methodology to determine the size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) to determine APZ distances for SFPP developments. The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The vegetation within 140m of site has been identified as:

- Forest vegetation located within the Avoca Drive road reserve to the north-east (refer Photo 1 with location depicted in Schedule 1 attached)
- Woodland vegetation beyond Avoca Drive to the north-west and commercial development to the north. This vegetation consists of managed mown understorey with canopy trees (<30% coverage). A worst case 'woodland' threat has been used based on canopy cover (refer Photo 2 & 3 with location depicted in Schedule 1 attached)



Photo 1 – Forest vegetation within the Avoca Drive road reserve in the north-east



Photo 2 & 3 – Woodland vegetation within rural residential land north-west
(Note managed understorey)

The remaining land within 140m of the site is considered managed as depicted in the following photographs (refer Schedule 1 for photo location).



Photo 4 – Managed land to the east



Photo 5-7 – Managed lands to the north

2.2 Effective slope

The effective slope is assessed for a distance of up to 100m. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous areas is described as follows:

- 0-5° downslope within the forest vegetation to the north-east.
- 10-15° downslope within the woodland vegetation beyond the managed residential land to the north; and
- 0-5° downslope within the woodland vegetation to the north-west.

2.3 Bushfire attack assessment

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site based on its location within the Greater Sydney region.

Table 2.1 provides a summary of the bushfire attack assessment. Column 4 identifies the minimum required APZs to ensure appropriate setbacks in accordance with those required for a SFPP. Column 5 provides the APZ distances measured from the proposed building footprint, as shown within Schedule 1, based on current and proposed future management regimes.

Table 2.1 – Bushfire attack assessment

Aspect	Vegetation within 140m of development	Effective slope of land	APZ Required (10kW/m ² (metres)	APZ provided (metres)
North	Woodland	10-15 ^{0D}	70	72
North-east	Forest	0-5 ^{0D}	70	89
South, east and west	Managed land	N/A	N/A	>100
North-west	Woodland	0-5 ^{0D}	50	53

Notes: * Slope is either 'U' meaning up slope or 'C' meaning cross slope or 'D' meaning down slope



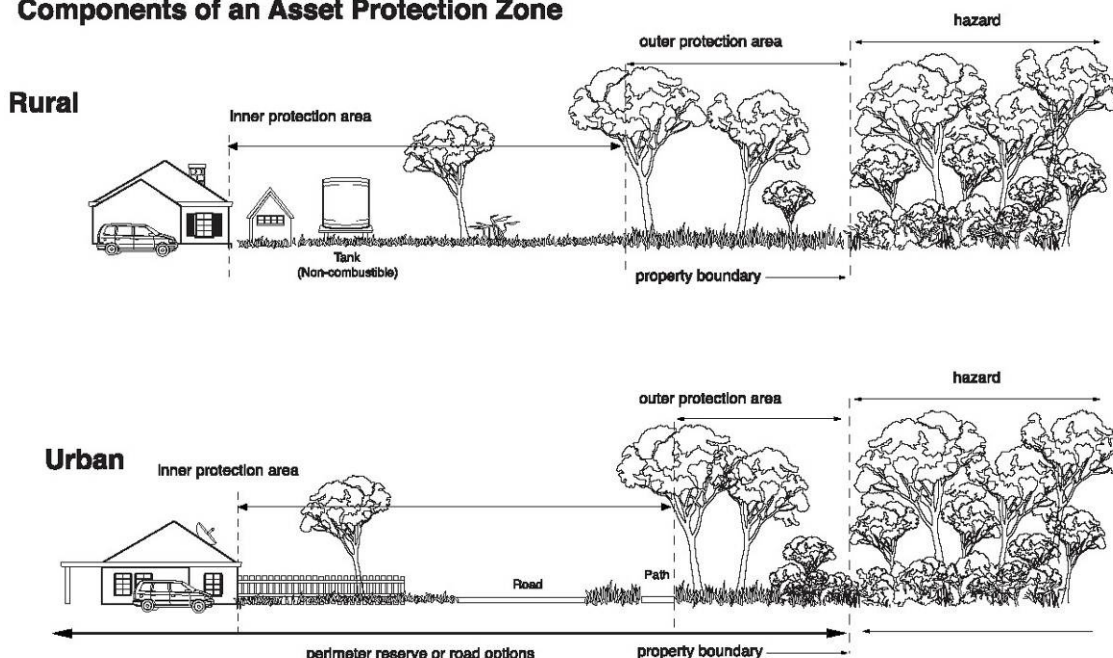
Specific Protection Issues

3

3.1 Asset protection zones

APZs are areas of defensible space separating hazardous vegetation from buildings. The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The IPA cannot be used for habitable dwellings but can be used for all external non-habitable structures such as pools, sheds, non-attached garages, cabanas, etc. A typical APZ, and therefore defensible space, is graphically represented below:

Components of an Asset Protection Zone



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

PBP dictates that the subsequent extent of bushfire attack that can potentially emanate from a bushfire must not exceed a radiant heat flux of $10\text{kW}/\text{m}^2$ for SFPP developments. This rating assists in determining the size of the APZ in compliance with Appendix 2 of *PBP* to provide the necessary defensible space between hazardous vegetation and a building. Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3.1 – Performance criteria for asset protection zones (*PBP* guidelines pg. 19)

Performance criteria	Acceptable solutions	Complies
Radiant heat levels of greater than 10kW/m ² will not be experienced by occupants or emergency services workers entering or exiting a building.	An APZ is provided in accordance with the relevant tables and figures in Appendix 2 of <i>PBP</i> . Exits are located away from the hazard side of the building. The APZ is wholly within the boundaries of the development.	Complies.
Applicant demonstrates that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fire is negated.	Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. The APZ is not located on land with a slope exceeding 18°.	Complies – The entire site is to be managed in accordance with the requirements for an APZ. The APZ is not located on slopes exceeding 0-5°.
APZs are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of <i>Standards for Asset Protection Zones (RFS 2005)</i> .	Complies - to be made a condition of consent.

3.2 Building protection

The construction classification system is based on five (5) bushfire attack levels (BALs). These are BAL – Flame Zone (FZ), BAL 40, BAL 29, BAL 19 and BAL 12.5 AS3959.

The proposed exposed elements of the building (within 100m of the hazard) is to be constructed to comply with BAL 12.5 as outlined in AS3959 (2009). The remaining elevations (as depicted in Schedule 1 attached) are shielded from the direct threat and are exposed to a very low risk. As a result no construction standards will apply to the southern building elevations.

3.3 Hazard management

The owner / ground maintenance team is required to manage the APZ (i.e. the entire property including the E3 portion of the site) in accordance with RFS guidelines *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 5 of *PBP*.

In terms of implementing and / or maintaining APZs, there is no physical reason that would constrain hazard management from being successfully carried out by normal means (e.g. mowing / slashing / grazing). No trees will require removal for APZ purposes.

A summary of the guidelines for managing APZs is attached as Appendix 1 to this report.

3.4 Access for fire fighting operations

Access to the development will be provided from Scaysbrook Drive in the south. This access will allow unobstructed access for fire fighting vehicles to the services area where a three point turn can be undertaken (refer Figure 3.1).

Fire-fighting access to the site can be provided via the proposed internal access road and via the existing Avoca Drive and Scaysbrook Drive in the north and south allowing an unobstructed 70m path between the most distant external part of the building and the nearest part of the proposed and existing access roads.

Table 3.2 below outlines the proposed fire trails compliance with the performance criteria.



Figure 3.1 – Access
(source: Jackson Teece)

Table 3.2 – Performance criteria for internal roads (*PBP* guidelines pg. 35)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	Internal roads are two-wheel drive, sealed, all weather roads.	☒	☐	
	Internal perimeter roads are provided with at least two traffic lane widths (carriageway 8m minimum curb to curb) and shoulders on each side, allowing traffic to pass in opposite directions.	☒	☐	Avoca Drive to the north is an existing perimeter road. This road has a carriageway width of 9m. The proposed internal road has a width of 5.5m to support firefighting access / egress.
	Roads are through roads. Dead end roads are not more than 100m in length from a through road, incorporate a minimum 12m outer radius turning circle, and are clearly sign posted as a dead end.	☐	☒	The internal road does not provide through access. As depicted in Figure 3.1 a turning head is achievable within the site and can support the dimensions for a turning T head as depicted in Figure 3.2.
	Traffic management devices are constructed to facilitate access by emergency services vehicles.	☒	☐	Can be made a condition of consent
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	☒	☐	Can be made a condition of consent
	Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress.	☒	☐	Can be made a condition of consent
	The minimum distance between inner and outer curves is 6m.	☒	☐	Can be made a condition of consent
	Maximum grades do not exceed 15° and average grades are not more than 10°.	☒	☐	Grades are less than 10 degrees
	Cross fall of the pavement is not more than 10°.	☒	☐	Cross fall is less than 10 degrees

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
	Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than storm surge).	☒	☐	Roads do not traverse a wetland
	Roads are clearly sign-posted and bridges clearly indicate load ratings.	☒	☐	Complies - to be a condition of consent
	The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).	☒	☐	Can be made a condition of consent

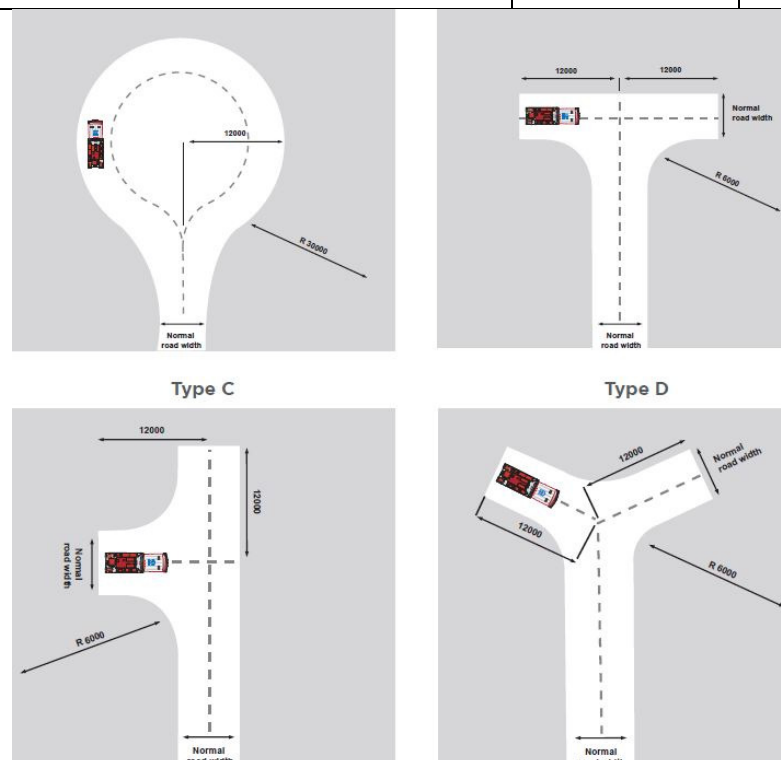


Figure 3.1 – Turning head dimensions
(source: *Pre-release PBP 2018*)

3.5 Water supplies

Town reticulated water supply is available to the proposed development in the form of an underground reticulated water system.

Two existing hydrants are located adjacent to the development on Scaysbrook Drive, with a proposed fire hydrant, sprinkler and booster assembly to be provided at the entrance road from Scaysbrook Drive. A fire hydrant also exists on Avoca Drive at the fire trail entry.

Table 3.3 outlines the proposals compliance with the performance criteria for reticulated water supply.

Table 3.3 – Performance criteria for reticulated water supplies (*PBP* guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
Water supplies are easily accessible and located at regular intervals.	Access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads. Fire hydrant spacing, sizing and pressures comply with <i>AS2419.1</i>. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. The provisions of public roads in Section 4.1.3 of <i>PBP</i> in relation to parking are met.	Complies - can be made a condition of consent. A ring main system will not be installed with the existing hydrants capable of complying with the BCA requirements.

3.6 Gas

Table 3.4 outlines the required performance criteria for the proposals gas supply.

Table 3.4 – Performance criteria for gas supplies (*PBP* guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
Location of gas services will not lead to the ignition of surrounding bushland land or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with <i>AS1596</i> and the requirements of relevant authorities. Metal piping is to be used. All fixed gas cylinders are to be kept clear of flammable materials and located on the non hazard side of the development. If gas cylinders are to be kept close to the building the release valves must be directed away from the building and away from any combustible material, so that they do not act as a catalyst to combustion. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.	Complies - can be made a condition of consent.

3.7 Emergency and evacuation planning

Table 3.5 outlines the required performance criteria for the proposal's emergency procedures.

Table 3.5 – Performance criteria for emergency and evacuation planning (*PBP* guidelines pg.39)

Performance criteria	Acceptable solutions	Complies
An emergency and evacuation management plan is approved by the relevant fire authority for the area.	An emergency / evacuation plan is prepared consistent with the <i>RFS</i> Guidelines for the Preparation of Emergency / Evacuation Plan. <i>Note: The applicant should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of any accommodation of a SFPP.</i>	Complies - can be made a condition of consent.
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	An emergency planning committee is established to consult with staff in developing and implementing and emergency procedures manual. Detailed plans of all emergency assembly areas including onsite and offsite arrangements as stated within <i>AS3745</i> are clearly displayed, and an annual trial emergency evacuation is conducted.	Complies - can be made a condition of consent.



Conclusion & Recommendations

4

4.1 Conclusion

A bushfire protection assessment has been undertaken for the proposed redevelopment of Brentwood Village which involves the demolition of the existing independent living units and construction of a new residential aged care facility at 290 Avoca Drive, Kincumber.

The assessment found that bushfire can potentially affect the proposed development from the forest vegetation located within the Avoca Drive road reserve to the north-east and the woodland vegetation located to the north and north-west resulting in possible ember and radiant heat attack.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP*.

4.2 Recommendations

Recommendation 1 - The development is as generally indicated on the attached Schedule 1 – Plan of Bushfire Protection Measures.

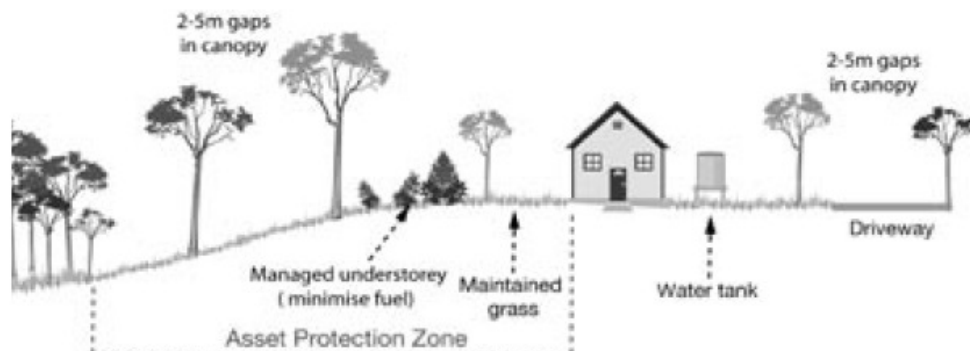
Recommendation 2 – The entire property is to be managed as an APZ. A summary of the guidelines for managing APZs are attached as Appendix 1 to this report and summarise below:

- *Mowing of grass*: Grass needs to be kept short (approximately 5cm in height) and green where adequate water supplies are available.
- *Raking or manual removal of fine fuels*: Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and bark should be removed on a regular basis. Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.
- *Removal or pruning of trees, shrubs and understorey*: The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation. Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by 2-5m. A canopy is not to overhang a dwelling unless specifically approved by the RFS. Native trees and shrubs should be retained as clumps in landscape beds and should not exceed a covering of more than 20% of the IPA.
- Trees or tall shrubs may require pruning upon building completion in line with *PBP*. Notwithstanding this, the presence of shrubs and trees close to a building in a bushfire prone landscape requires specific attention to day to day management and owners and / or occupiers should be made aware that whilst landscaping can contribute to a way of life and environmental amenity, the accumulated fuels must be regularly removed.

- Trees may remain within close proximity of a building where it can be demonstrated that the tree is not able to produce a build-up of fuel on the roof of a dwelling due to:
 1. A roof pitch which self sheds leaf litter
 2. Ongoing roof maintenance by staff or contractors
 3. Adequate ember protection has been installed
- Trees that are likely to be structurally unstable such that they could cause a limb to fall would require removal for the RFS to agree to a dwelling in proximity to the trees.

In addition, the following general APZ planning advice is to be followed:

- Ensure that vegetation does not provide a continuous ignition path to the building.
- Plant or clear vegetation into clumps rather than continuous rows.
- Prune low branches 2m from the ground to prevent a ground fire from spreading into trees.
- Locate vegetation far enough away from the proposed building so that plants will not ignite the dwelling by direct flame contact or radiant heat emission.
- Ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non-flammable ground cover such as pebbles and crushed tiles.
- The following RFS diagram depicts one version of an ideal situation. Divergence from this ideal should not be undertaken without expert advice.



Recommendation 3 - Building construction standards for the proposed northern building elevations are to be applied in accordance BAL 12.5 as outlined with *AS3959 Construction of buildings in bushfire prone areas (2009)* with additional construction requirements as listed within Section A3.7 of Addendum Appendix 3 *PBP*. The remaining elevations (as depicted in Schedule 1 attached) are shielded from the direct threat and are exposed to a very low risk. As a result no construction standards will apply to the southern building elevations.

Recommendation 4 – Access, water, electricity and gas supply is to comply with the performance criteria outlined in Section 4.2.7 of *PBP*.

Recommendation 5 – An emergency / evacuation plan is to be prepared / upgraded consistent with the RFS *Guidelines for the Preparation of Emergency / Evacuation Plans*.

Recommendation 6 - Landowners living in bushfire prone areas should familiarise themselves with publications published by the RFS. These are located on the RFS web site www.rfs.nsw.gov.au under 'Publications'.

REFERENCES

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- Rural Fire Service (2006) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service
- Rural Fire Service (2006) - Bushfire Attack Software on RFS web site
- Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack*. RFS Development Control Service



Plan of Bushfire Protection Measures

S1



Legend

- Subdivision boundary
- Contours -1m (source: LiDAR)
- Asset Protection Zone (APZ)

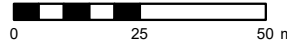
Bushfire Construction Standards

AS3959 (2009)*

BAL 12.5

* Please refer to additional construction requirements for BAL levels which are contained in Addendum Appendix 3 of 'Planning for Bushfire Protection' (2006).

Aerial source: Nearmap



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE 290 Avoca Drive, Kincumber 18LEND13_BF001	DATE & ISSUE NUMBER 28/03/2019 Issue 1	SCALE & COORDINATE SYSTEM 1:1,500 @A3 GDA 1994 MGA Zone 56
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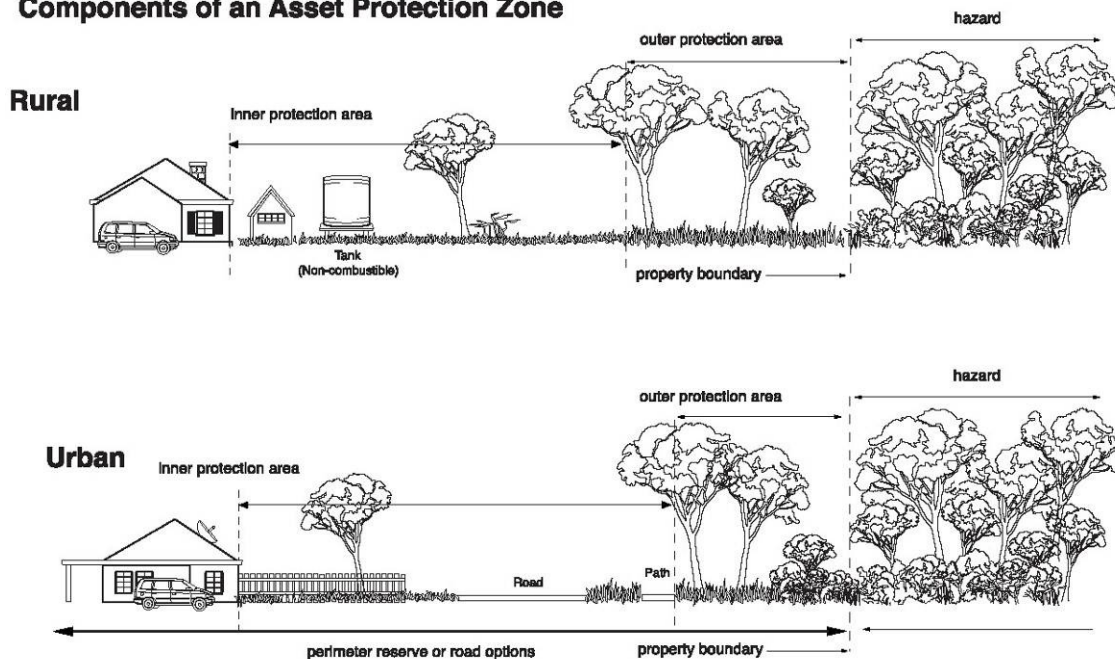
Management of Asset Protection Zones

A1

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 5 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. A typical APZ is graphically represented below:

Components of an Asset Protection Zone



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following provides maintenance advice for vegetation within the IPA.

Inner Protection Area (IPA)

Fuel loads within the IPA are to be maintained so it does not exceed 4t/ha.

Trees are to be maintained to ensure;

- Canopy cover does not exceed 15%
- Trees (at maturity) do not touch or overhang the building
- Tree canopies (at maturity) should be well spread out and not form a continuous canopy

- There should be no unmanaged vegetation within 10m of windows, doorways, eaves and gutters
- Lower limbs should be removed up to a height of 2m above ground

Shrubs are to be maintained to ensure;

- Large discontinuities or gaps in vegetation
- Shrubs should not be located under trees
- Shrubs should be in clumps no greater than 5m²
- Shrubs should be no closer than 10 metres from an exposed window or door.

Grass is to be maintained to ensure:

- A height of 10cm or less
- Leaves and debris is removed.

Landscaping to the site is to comply with the principles of Appendix 5 of PBP. In this regard the following landscaping principles are to be incorporated into the development:

- Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;
- Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come in contact with the building;
- When considering landscape species consideration needs to be given to estimated size of the plant at maturity;
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e. leaf litter);
- Avoid climbing species to walls and pergolas;
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building;
- Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and
- Use of low flammability vegetation species.