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BUSHFIRE THREAT ASSESSMENT REPORT

FOR

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198 Wangat Trig Road

Bandon Grove

NSW 2420

Job #0894 V1.0 20 Jan 2023



Disclaimer

The report is prepared in accordance with current accepted practice as described in Australian Standard AS 3959 - 2018 and amendments thereto "Construction of Buildings in Bushfire Prone Areas" and N.S.W. Rural Fire Services guide "Planning for Bushfire Protection 2019" and amendments thereto and other relevant regulations.

I certify the proposed development can conform to the specifications and requirements of Planning for Bushfire Protection 2019 in accordance with Section 4.14(1)(b) of the Environmental Planning and Assessment Act 1979.

Due to the unpredictable nature of bushfires and of weather conditions at the time of a bushfire this report cannot be taken as a guarantee that the recommended bushfire mitigation measures will protect the property and life from damage in every possible bushfire condition or circumstance. Ultimately the responsibility is on the owner to accept the risks associated with development in or near a bushfire prone area.

This report is for the use only of Michael Charlton and Katie Charlton and Blencowe's Design & Drafting for whom it was prepared and their financial or business associates with whom they may share the report in its entirety and for no other purpose.

No responsibility is accepted for any third party who may use or rely on the whole or any part of the content of this report.

Neither the whole nor any part of this report nor any reference thereto maybe included in part or full in any way without my written approval for the form and context in which it may appear.



Barry Cleary AFSM 20/1/2023

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Post Grad Dip. Design for Bushfire Prone Areas. UWS

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LIST OF ABBREVIATIONS

DSC	DUNGOG SHIRE COUNCIL
APZ	ASSET PROTECTION ZONE
AS 3959-2018	CONSTRUCTION OF BUILDINGS IN BUSHFIRE PRONE AREAS
BAL	BUSHFIRE ATTACK LEVEL (MEASURED AS kW/m ²)
BCA	BUILDING CODE OF AUSTRALIA
BFRMP	BUSHFIRE RISK MANAGEMENT PLAN
BFSA	BUSHFIRE SAFETY AUTHORITY
DA	DEVELOPMENT APPLICATION
DCP	DEVELOPMENT CONTROL PLAN
GFDI	GRASSLAND FIRE DANGER INDEX
EP&A ACT	ENVIRONMENTAL PLANNING & ASSESSMENT ACT
ESD	ECOLOGICALLY SUSTAINABLE DEVELOPMENT
FFDI	FOREST FIRE DANGER INDEX (ALSO FDI)
FRL	FIRE RESISTANCE LEVEL
IPA	INNER PROTECTION AREA
kW/m ²	KILOWATTS PER SQR. METRE (being a measure of radiant heat)
LEP	LOCAL ENVIRONMENT PLAN
NASH	NATIONAL ASSOCIATION OF STEEL HOUSING
NCC	NATIONAL CONSTRUCTION CODE
OPA	OUTER PROTECTION AREA
PBP 2019	PLANNING FOR BUSHFIRE PROTECTION 2019
POM	PLAN OF MANAGEMENT
RFS	RURAL FIRE SERVICE
F+RNSW	FIRE & RESCUE NEW SOUTH WALES
RHF	RADIANT HEAT FLUX
ROS	RATE OF SPREAD
SEPP	STATE ENVIRONMENTAL PLANNING POLICY
SWS	STATIC WATER SUPPLY
=	EQUAL TO
<	LESS THAN
>	GREATER THAN
≤	LESS THAN OR EQUAL TO
≥	GREATER THAN OR EQUAL TO

EXECUTIVE SUMMARY

In New South Wales local councils are bound by the Environmental Planning and Assessment Act Sect 4.14 to ensure that all habitable developments in bushfire prone areas conform to 'Planning for Bushfire Protection' (NSW RFS, 2019). To determine the required levels of construction, this assessment adheres to the methodology and procedures outlined in Appendix 1 'Site Assessment Methodology' in Planning for Bushfire Protection (RFS, 2019) (now referred to in this report as PBP 2019).

Accordingly this report has been compiled by Mr. Barry Cleary AFSM, BPAD 19741. It will employ the empirical method of assessment for the development and its relationship with the bushland to the East and West using the methodology of PBP 2019 Appendix 1 and assess the development and its fabric in the context of the requirements of PBP 2019 and AS 3959-2018.

The assessment, carried out using the methodology, as outlined in Appendix 1 PBP 2019, concludes BAL-29 is the expected maximum attack level. The proposal is to construct a new Class 1A dwelling, at the address known as 198 Wangat Trig Road, Bandon Grove NSW 2420. The calculated attack level for the East and West exposures is BAL-29. The North and South elevations also have a line of sight exposure to the bushfire threat. Accordingly, the choice of materials and construction methods for all elevations will be compliant with AS 3959-2018 Section 7, BAL-29. This is in accordance with AS 3959-2018 clause 3.5 of the standard, 'Reduction in Construction Requirements Due To Shielding'.

Bushfire protection measures, used in combination, will minimise the risk of bushfire attack and provide protection for emergency services personnel, residents and others assisting with firefighting activities. Accordingly recommendations have been put forward to mitigate the threat posed by possible mechanisms of attack that can be expected in the event of a fire in this bushland with certain wind conditions.

Section 6 of this report contains a detailed list of these bushfire protection measures, as well as recommendations and the reasons for them.

“Although this Standard is designed to improve the performance of buildings when subjected to bushfire attack in designated bushfire-prone areas there can be no guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions”.

Extract from AS 3959 2018 Construction of buildings in bushfire-prone areas P.6

1.0 INTRODUCTION

Table 1.1 Site Cadastre

SITE CADASTRE	
Determined BAL	BAL-29
Water supply	Static Water Supply (SWS)
FFDI	100 @ 1:50 year event
Address	198 Wangat Trig Road, Bandon Grove NSW 2420
Lot Number	12
Deposited Plan	DP851360
Area of Parcel	55 ha Approx.
LGA	Dungog Shire Council (DSC)
Zoning	RU1 Primary Production
LEP & Mapping	NSW Planning Portal
10/50 Code Area	Yes
BPL Mapping	NSW Planning Portal
Vegetation type	Rainforest downgrade (PBP A1.11.1)
Canopy Height	10 - 15 Metres
Separation Distance	≥23 Metres
Effective Slope	10° - 15° downslope
Elevation	Approx. 235 m AHD
Sited Visited	9/11/2022

“In NSW all development on Bushfire Prone land must satisfy the aims and objectives of PBP 2019. The aim of PBP 2019 is to provide for the protection of human life and minimise the impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment.” (*PBP 2019 P.10*)

Being mindful of the above statement, the following report has been drafted to construct a new Class 1A dwelling at 198 Wangat Trig Road, Bandon Grove NSW 2420.

The proposed development is classed as ‘Infill’ and as such it is to be assessed under Sect. 4.14 of the EP&A Act. This requires compliance with Planning for Bushfire Protection 2019 (PBP 2019) and AS 3959 - 2018 Section 3 and Section 7 or the National Association of Steel Framed Housing (2014) Steel Framed Construction in Bush Fire Areas (NASH Standard)

2.0 DESCRIPTION



Fig. 2.1 Over-view of the site (see Appendix 1)

2.1 General Description

The yellow shaded area in the centre of the photo indicates the proposed siting on the subject block. The subject block is an area of approximately 55 ha. Situated on the South side of Wangat Trig Road, the subject block falls moderately from Wangat Trig Road to the South. The block is irregular in shape being approximately 900 m deep by 850 m wide with driveway access to Wangat Trig Road. All the surrounding blocks are developed and occupied.

2.2 Topographic Description (locality)

Rolling low hills to hills. Relief 40–120 m; elevation 100–400 m; slopes 5–25%, but range to <33%. Crests are commonly narrow (<100 m) and peaked, occasionally moderately broad (200–300 m). Steeper (>20%), concave upper slopes often lead to moderately broad, convex midslopes or spurs, below which are long, more gently inclined (5–15%) sideslopes and lower slopes. Sideslopes grade into narrow, incised drainage lines. Occasionally, up to 20% rock outcrop occurs on crests and upper slopes, rare rock outcrop occurs on lower slopes and toe slopes into drainage lines (*Henderson, L.E.*).

2.3 Vegetation Description (locality)

Mainly cleared tall open-forest. Common species in the Tillegra-Salisbury area are *Eucalyptus amplifolia* (cabbage gum), *Corymbia maculata* (spotted gum), *E. moluccana*

(grey box) and *Angophora floribunda* (rough-barked apple), with some *E. tereticornis* (forest red gum), *E. punctata* (grey gum), *E. paniculata* (grey ironbark), *E. siderophloia* (red ironbark), *E. microcorys* (tallowwood) and *E. umbra* ssp. *umbra* (bastard mahogany). *Syncarpia glomulifera* (turpentine), *Glochidion ferdinandi* (cheese tree), *Lophostemon confertus* (brush box) and *Acacia* spp. (wattles) occur in sheltered gullies. *E. saligna* (Sydney blue gum) occurs in the upper catchments on sheltered slopes and small alluvial flats. In the upper Williams catchment, *E. andrewsii* (New England ash), *E. saligna* (Sydney blue gum) and *E. quadrangulata* (coastal white box) also occur (Williams River Task Group 1993) (Henderson, L.E).

2.4 Land Use (locality)

Mainly improved and semi-improved pasture for beef cattle grazing and some dairy cattle grazing adjacent to floodplains. Some native pasture, including *Themeda australis* (kangaroo grass) and *Cymbopogon refractus* (barb wire grass). *Axonopus affinis* (carpet grass) occurs in imperfectly drained areas. *Imperata cylindrica* (blady grass) and *Pteridium esculentum* (bracken) occur where fire has been used as a grassland management tool. (Henderson, L.E).

3.0 BUSHFIRE PRONE LAND MAP

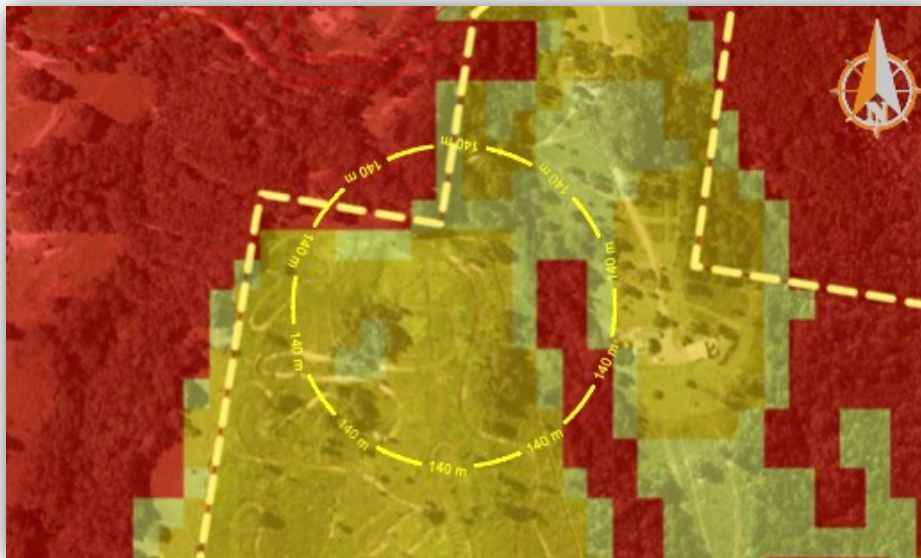
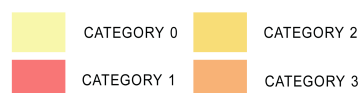


Fig. 3.1 Extract of DSC's Bushfire Prone Land Map
Note: the highlighted area denotes the approximate block location.



3.1 Category 0

Category 0 vegetation appears as the yellow layer on the map and the buffer zone which extends out away from the vegetation. Buffer distances vary in width according to the vegetation category.

3.2 Category 1

Category 1 vegetation appears as red on the map and represents forests, woodlands, heathlands, pine plantations and wetlands. Land within 100 metres of this category (indicated by the yellow layer on the map) is also captured by the Bushfire Prone Land Map due to the likelihood of bushfire attack.

3.3 Category 2

Category 2 vegetation appears as light orange on the map and represents rainforests and lower risk parcels of bushfire prone vegetation. Land within 30 metres of this category (indicated by the yellow layer on the map) is also captured by the Bushfire Prone Land Map due to the likelihood of bushfire attack.

3.4 Category 3

Category 3 vegetation appears as orange on the map and represents medium risk vegetation such as grasslands, freshwater wetlands and arid shrublands. Land within 30 metres of this category (indicated by the yellow layer on the map) is also captured by the Bushfire Prone Land Map due to the likelihood of bushfire attack.

3.5 Context of the map

The map is in general accordance with the structure of the vegetation communities found at this location.

4.0 PHOTOGRAPHIC REVIEW OF THE LOCALITY



Fig. 4.1 View to the North



Fig. 4.2 View to the South



Fig. 4.3 View to the East



Fig. 4.4 View to the West

5.0 METHODOLOGY

Determination of Bushfire Attack Level (BAL) shall follow the Site Assessment Methodology found in PBP 2019 Appendix 1 which sets out the following:

1. Determine all vegetation formations within 140m of the development
2. Determine the effective slope from the building to a distance of 100 m
3. Determine the FFDI for the local council area
4. Determine the separation distance from the building to the vegetation
5. Match the relevant FFDI, vegetation group, separation distance and the effective slope using the relevant tables found in PBP 2019 Appendix 1..

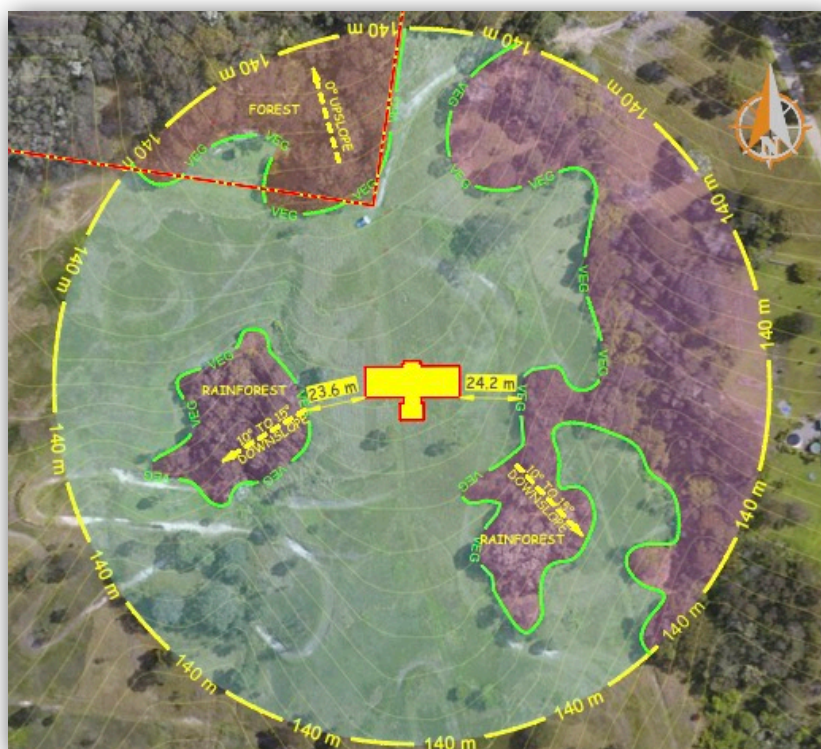


Fig 5.1 Vegetation formations within 140 m (See Appendix 1)

5.1 Vegetation assessment

The predominant bushfire threat is the remnant bushland communities located East and West of the proposal. Both these vegetation communities are downgraded to Rainforest in accordance with PBP 2019 A1.11.1. The remainder is grassland which is currently used for grazing.

5.2 Threat Assessment East and West

Table 5.1 Summary of Threat Assessment East and West

Summary Threat Assessment Data East and West		
1	Determine all vegetation formations within 140m of the development	Remnant Assessed as Rainforest Remnant vegetation is a parcel of vegetation with a size of less than 1 Ha or a shape that provides a potential fire run directly toward buildings not exceeding 50m. These remnants are considered a low hazard and APZ setbacks and building construction standards for these will be the same as for rainforests. (PBP 2019 A1.11.1)
2	Determine the effective slope from the building to a distance of 100 m	Typically 10° - 15° downslope
3	Determine the FFDI for the local council area	FFDI = 100 (PBP 2019)
4	Determine the separation distance from the building to the vegetation	≥23 metres
5	Match the relevant FDI, vegetation group, separation distance and the effective slope using the relevant tables found in PBP 2019 A1	BAL-29

Table 5.2 Extract from PBP 2019 Table A1.12.5

Determination of Bushfire attack level (BAL) -FDI 100 (1090K)					
PBP 2019 Table A1.12.5					
Vegetation Formation (Keith)	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
	Distance (m) of asset to the predominant vegetation class				
	10° <15° Downslope				
Rainforest	<17	17 -<23	23 -<34	34 -<46	46 -<100
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine plantations and Sub-Alpine Woodland	<36	36 -<45	45 -<60	60 -<77	77 -<100
Grassy and Semi-Arid Woodland including Mallee	<19	19 -<25	25 -<36	36 -<49	49 -<100
Forested Wetland (excluding Coastal Swamp Forest)	<15	15 -<20	20 -<29	29 -<41	41 -<100
Tall Heath	<17	17 -<22	22 -<32	32 -<44	44 -<100
Short Heath	<10	10 -<13	13 -<20	20 -<29	29 -<100
Arid-Shrublands (Acacia and chenopod)	<7	7 -<9	9 -<14	14 -<20	20 -<100
Freshwater wetlands	<5	5 -<7	7 -<11	11 -<16	16 -<100
Grassland	<11	11 -<15	15 -<23	23 -<32	32 -<50

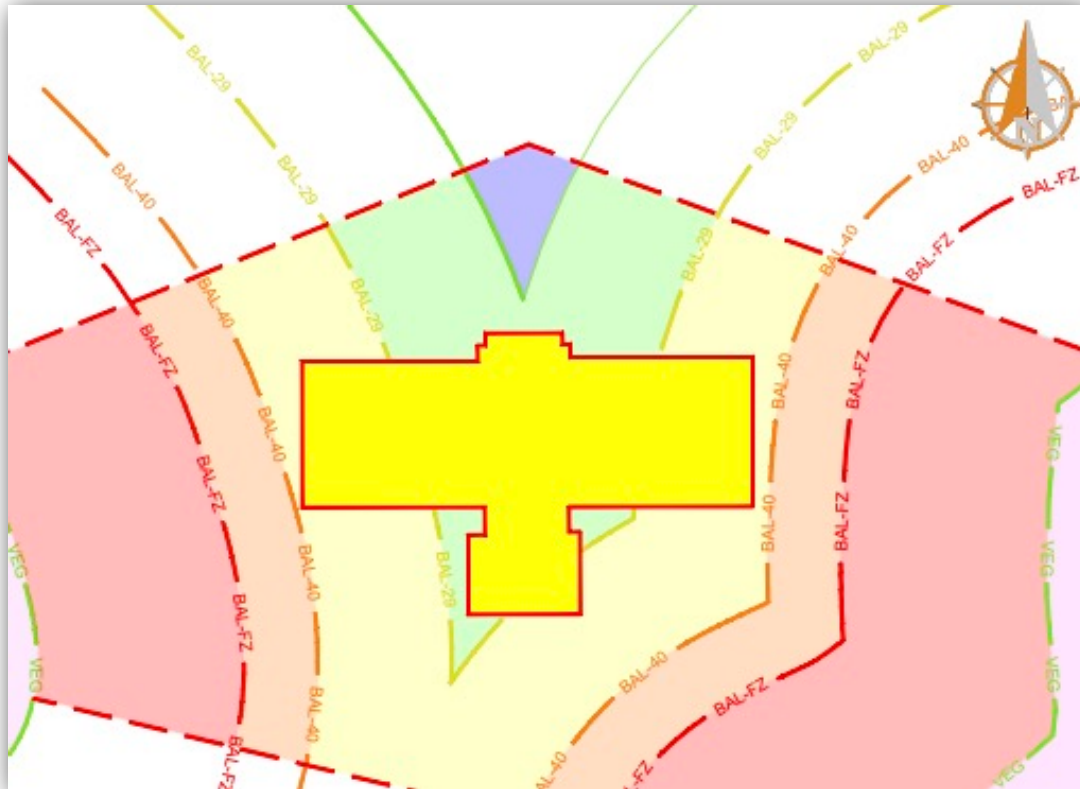


Fig 5.3 Threat assessment output demonstrated as a BAL-Map (see Appendix 1).

Fig. 5.3 above shows the output of the threat assessment. It clearly shows the proposed structure (red border/yellow fill) is in the BAL-29 zone. This diagram also illustrates the importance of maintaining the current separation distances. Since all exposed elevations are to be constructed to BAL-29 it is critical that the APZ be maintained. If the APZ is allowed to diminish due to poor maintenance, the BAL graduations will effectively move toward the dwelling with the East and West elevation possibly being subjected to a radiant heat flux beyond its design capacity.






5.3 Fire History

An inspection of the adjacent bushland revealed no indication of wild fire in this bushland in the past 25 years. Small low intensity fires may have occurred in the area occasionally. This will have had an indirect effect of hazard reduction in the existing bushland.

6.0 BUSHFIRE PROTECTION MEASURES & RECOMMENDATIONS

The overall intention of bushfire protection measures is to improve property protection and community resilience to bushfire attack (*PBP 2019 P.10*).

For all residential developments there are five bushfire protection measures that can be used to reduce the attack mechanisms of a bushfire. They are:

-  Asset Protection Zones.
-  Access.
-  Water and utility services.
-  Construction standards and design.
-  Landscaping.

Each of these mechanisms work in combination to achieve a resilient development. The following section describes how the proposal will address each of these measures.

6.1 Asset Protection Zones (APZ)

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION
The intent may be achieved where:	APZ is provided in accordance with PBP 2019 Appendix 1
<i>In relation to APZ's</i>	APZs are managed in accordance PBP 2019 Appendix 4
A defensible space is provided on site.	APZ is wholly contained within the site
An APZ is provided and maintained for the life of the development	
Performance Criteria met?	Yes

“An APZ is a buffer zone between a bushfire hazard and buildings. The APZ is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development” (*PBP 2019 P26*).

The proposal is effectively ≥ 23 metres from the predominant bushfire threat. It shall have separation from the threat via a mowed and managed grassed area in accordance with Fig 6.1 below.

The entire APZ shall be maintained as an Inner Protection Area (IPA) for the life of the development.

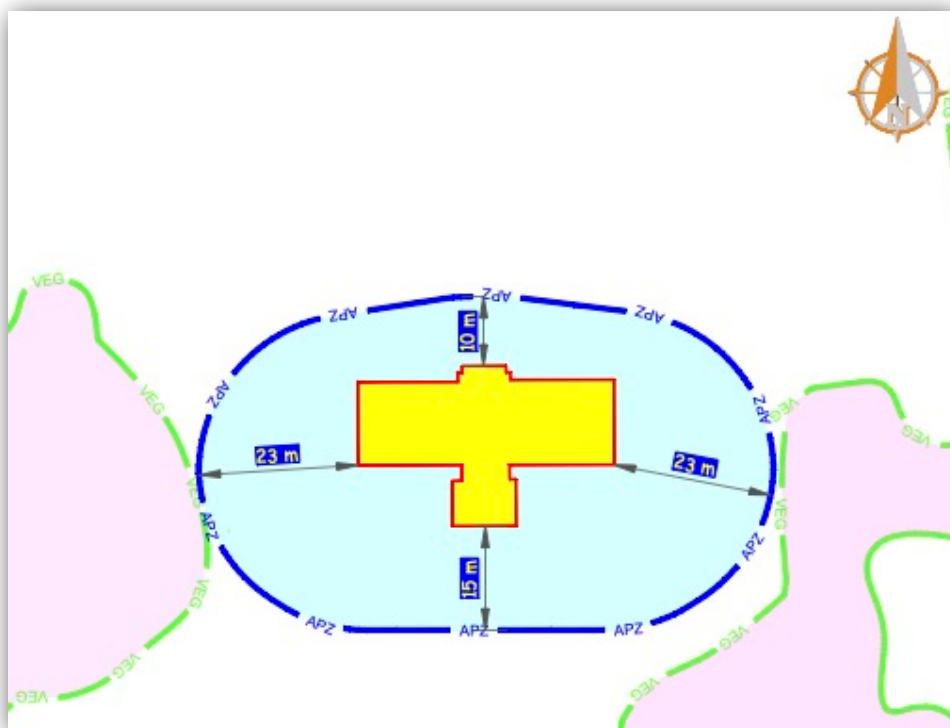


Fig 6.1 The proposed APZ to be managed as an IPA (see Appendix 1).

6.2 Access Requirements

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION
The intent may be achieved where:	Compliance with PBP 2019 Table 7.4a Access
<i>In relation to Access Provisions</i>	
Fire appliances are provided with safe operational all weather access to the structure and hazard vegetation	
There is appropriate access to a water supply	
Performance Criteria met?	Yes

It is the aim of this requirement to provide safe operational access for emergency services personnel in suppressing a bushfire, while residents are accessing or egressing an area.

Vehicular access to the property will be available to both light and heavy vehicles. There will be good access around the periphery of the dwelling for emergency personnel to lay out hoses and other firefighting equipment. The property will offer safe refuge for firefighters and occupants in and around the dwelling depending on the direction of the attack.

The proposal is greater than 200 metres from Wangat Trig Road however it can meet the performance criteria for Access Provisions.

The access road is completely contained within the boundaries of the subject property. The access road does not pass through any heavily wooded areas, it shall be ≥ 4 metres wide with ample passing opportunities. The road shall have a turning solution in accordance with PBP 2018 A3.3, adjacent to the proposal. It will offer safe access and egress for emergency response and evacuating occupants. There shall be adequate access to within 4 metres of the static water supply.

The proposed primary access route shall be an all weather road which:

- 🔥 has no water crossings
- 🔥 has a minimum carriageway of ≥ 4 metres
- 🔥 has numerous passing opportunities
- 🔥 does not pass through any heavily wooded or forested areas
- 🔥 has no vertical clearance issues
- 🔥 all curves have an inner radius > 6 metres and outer radius > 12 metres
- 🔥 has grades $\leq 5^\circ$

Wangat Trig Road is a minor road with connection to Chichester Dam Road from its Southern end. Chichester Dam Road is part of a peri-urban road system providing access to Dungog.

This address is in Munni RFS operational area. This station is an RFS Fire Station. It is 12.5 km from the subject block. It is 12-15 min drive time and about 20-30 min response time. This is a Volunteer Station i.e. they have a combined staff of approx. 20 Firefighters who only attend the station for calls and drills. At other times the station is unmanned.

This next nearest station is Dungog RFS. It is 20 km from the subject block. It is 20-25 min drive time and about 30-40 min response time depending on staff availability. This is a Volunteer Station i.e. they have a combined staff of approx. 20 Firefighters who only attend the station for calls and drills. At other times the station is unmanned. It has a Cat 1 and a Cat 7 appliance.

6.3 Water and Utilities





PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION
The intent may be achieved where: <i>In relation to Water and utilities</i> Adequate water supplies and electricity services are provided for firefighting operations Gas & electricity services are located so as to not contribute to the risk of fire to a building	Compliance with PBP 2019 Table 7.4a Water Supplies Electricity Services Gas Services
Performance Criteria met?	Yes

It is the aim of this measure to provide adequate water services for the protection of buildings during and after the passage of a bushfire, to locate gas and electricity so as not to contribute to the risk of fire to buildings.

Because this is an isolated rural development, reticulated water supplies are not available. For this reason it is mandatory that a static supply with a 20,000 litre capacity be available at all times for firefighting purposes. This requirement is as per PBP 2019 Table 5.3d This supply can be part of the domestic system for the purposes of water quality but the above stated capacity must be available for firefighting purposes.

Electricity supply shall be aerial and should not hinder bushfire fighting operations.

Any proposed gas service, either natural gas or bottled LPG, shall be provided in accordance with the following recommendations:

-  Reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities. Metal piping is to be used.
-  All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.
-  If gas cylinders need to be kept close to the building, the release valves are directed away from the building and away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are to be metal.
-  Polymer sheathed flexible gas supply lines to gas meters, adjacent to buildings, are not to be used.

6.4 Construction Standards

6.4 Construction Standards

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION
The intent may be achieved where:	Compliance with PBP 2019 Table 7.4a Construction Standards
<i>In relation to Construction Standards</i>	
It is demonstrated that the proposed building can withstand bushfire attack in the form of embers, radiant heat and flame contact.	
Proposed fences and gates are designed to minimise the spread of bushfire	
Proposed Class 10a buildings are designed to minimise the spread of bushfire	
Performance Criteria met?	Yes

Since the proposal is to construct a new Class 1A dwelling, it must conform to the performance criteria of PBP 2019 Appendix 1. Accordingly, the proposed new works shall comply with AS 3959-2018 Section 7, BAL-29 for all elevations of the structure. This provision is in accordance with AS 3959-2018 Section 3.5 'Reduction in Construction Requirements Due to Shielding'.

The owner/builder should consult the actual standard before commencing construction. As stated previously in this report, construction of exposed facades to AS 3959-2018 Section 7, BAL-29 will increase the structure's survivability in the event of a bushfire attack.

The structure shall be constructed from a selection of materials which comply with the prescribed requirements of AS 3959 2018. Appendix 3 of this report is an abridged version of AS 3959-2018 BAL-29 requirements. It is a guide only and a full reading of the standard should be undertaken by the builder before commencement of construction.







Table 6.1 Construction standard for each elevation

Elevation / Exposure	Minimum Construction Standard
North	BAL-29
South	BAL-29
East	BAL-29
West	BAL-29

6.5 Landscaping

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION
The intent may be achieved where:	
<i>In relation to landscaping</i>	Compliance with PBP 2019 Table 7.4a Landscaping
It is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind driven embers to cause ignitions.	
Performance Criteria met?	Yes

The principles of landscaping for bush fire protection aim to:




-  Prevent flame impingement on the dwelling.
-  Provide a defensible space for property protection.
-  Reduce fire spread.
-  Deflect and filter embers.
-  Provide shelter from radiant heat.
-  Reduce wind speed.

The NSW RFS 'Asset Protection Zone Standards' is attached to this report as Appendix 2. This provides detailed maintenance and planting strategies for bushfire prone areas.

A clear area of low cut lawn or pavement is maintained adjacent to the house

Fencing and retaining walls are constructed in accordance with PBP 2019 s7.8

Trees and shrubs are planted such that:

-  Branches will not overhang the roof.
-  The tree canopy is not continuous.
-  If proposed a windbreak is located on the elevation from which fires are likely to approach.

6.6 Requirements and Recommendations

Table 6.2 Requirements and Recommendations

List of requirements	
North elevation	Compliance with requirements of AS 3959 2018 Section 7 BAL-29
South elevation	Compliance with requirements of AS 3959 2018 Section 7 BAL-29
East elevation	Compliance with requirements of AS 3959 2018 Section 7 BAL-29
West elevation	Compliance with requirements of AS 3959 2018 Section 7 BAL-29
Provide water tanks (non-combustible) with at least 20,000 litres capacity for firefighting. This tank shall be located near the property access road to enable a water tanker clear and safe access. Provide a 65 mm Stortz adapter and stop cock to the 20Kl water tank.	
Any underground tank to be used for Firefighting water supply shall have an access hole of 200 mm ² to allow a water tanker to draught from the tank. A hardened ground surface truck access shall be provided within 4 metres of the access hole.	
An SWS marker shall be obtained from the local RFS station and placed in a position for ease of identification by responding brigades. In this regard markers shall be fixed in a location which is highly visible from the roadway in both directions and adjacent to the most appropriate access to the water supply.	
All above ground water and gas pipes shall be metal.	
Gas cylinders, piping and fittings shall comply with AS 1596:2008. Relief vents shall be faced away from the structure.	
List of recommendations	
Provide a 3kW (5hp) (minimum) petrol/diesel portable fire pump set fitted with Stortz adaptors 2 (Minimum) x 20mm x 20m Stortz hose kits. 2 x Firefighting hose nozzles to suit hose. Occupants are to conduct regular drills with the pump set to ensure operational readiness.	
Provide a 4.5Kg Dry Chemical Powder (DCP) extinguisher. Provide a fire blanket in the vicinity of cooking appliances.	
Proposed gardens to be maintained and kept free of litter.	
Provide functioning garden hoses long enough to cross over each other, to diagonal corners of the structure i.e. 2 hoses with nozzles.	
Develop an appropriate emergency bushfire action plan. Additional information can also be found on either http://www.fire.nsw.gov.au/page.php?id=883 or http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=4074	

7.0 Conclusion

The proposed development is classed as 'Infill' and as such it is to be assessed under Sect. 4.14 of the EP&A Act. Because of the subject property's location in relationship to the bushfire threat and its position on the DSC's "Bushfire Prone Land Map", the proposal must conform to PBP 2019 and AS 3959 2018.

The analysis of the development indicates BAL-29 for all elevations. This is as per AS 3959-2018 Clause 3.5. 'Reduction in Construction Requirements Due to Shielding'.

Because this is an isolated rural development, reticulated water supplies are not available. For this reason it is mandatory that a static supply with a 20,000 litre capacity be available at all times for firefighting purposes.

The implementation of Bushfire Protection Measures, as set-out in PBP 2019 and detailed within this report, must improve the outcome for the occupants, firefighters and the structure itself.

The requirements and recommendations in Section 6.7 of this report should enhance the chances of occupant and building survival as well as outcomes for adjacent neighbours. It does not increase the fire management and maintenance responsibility of its neighbours.

It is the aim of this report to provide for the protection of human life (including firefighters) and to minimise impacts on the proposal from the threat of bushfire, while having due regard to development potential, on-site amenity and protection of the environment. (*PBP 2019 P.1*)

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<https://six.nsw.gov.au/wps/portal/>

All measurements and slopes determined on site using Nikon Forestry Pro Range finding Hypsometer.

APPENDIX 1



SITE OVERVIEW 140m

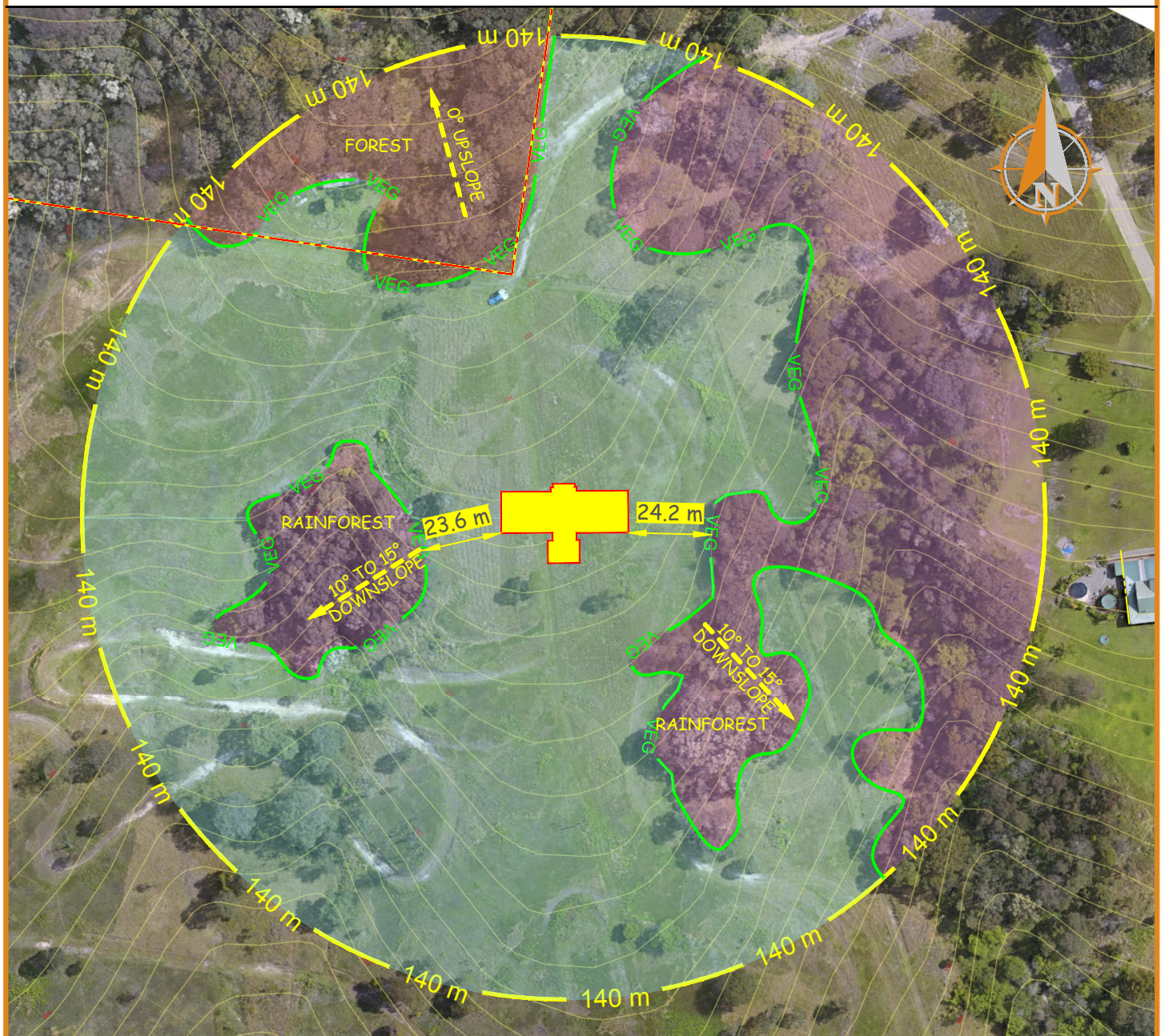
SOURCE:- SIX MAPS AND ON SITE PHOTOGRAMMETRY COLLECTED 2/2/2022

NOT TO SCALE

 <div>BushFire CONSULTANT</div> <div>BUSHFIRE THREAT ASSESSMENT REPORTS PRE-PURCHASE INSPECTION REPORTS BUSHFIRE ATTACK LEVEL MAPPING T: 02 4952 7376 M: 0402 027 376 E: baz@bushfireconsultant.com.au</div>	198 Wangat Trig Rd Bandon Grove NSW 2420		 <div>BPAD Bushfire Planning & Design Accredited Practitioner Level 2 BPAD 19741</div>
	Site Overview to 140 m		
	Date; 20-01-2023	Version V-1.0	
Drawn by BJC	Checked by JC	File name X:\BFC\Clients\#0894_Charlton\DWG\198WangatTrigRoadBandonGrove2420.dwg	

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APPENDIX 1




VEGETATION & SLOPE ANALYSIS TO 140m

NOT TO SCALE CONTOURS = 2 METRES
 VEGETATION ASSESSED USING AS 3959-2019
 VEGETATION ASSESSED WITHIN 140M OF THE SITE.
 ALL SLOPES RELATIONAL TO THE SUBJECT SITE.
 PREDOMINANT VEGETATION ASSESSED AS
 RAINFOREST
 CANOPY = 15 - 20m HIGH
 SOME INDIVIDUALS \geq 25 m

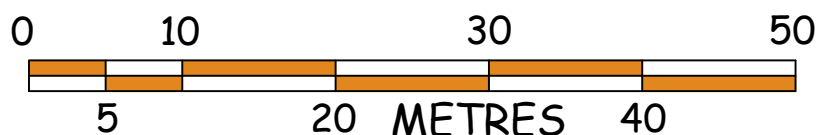
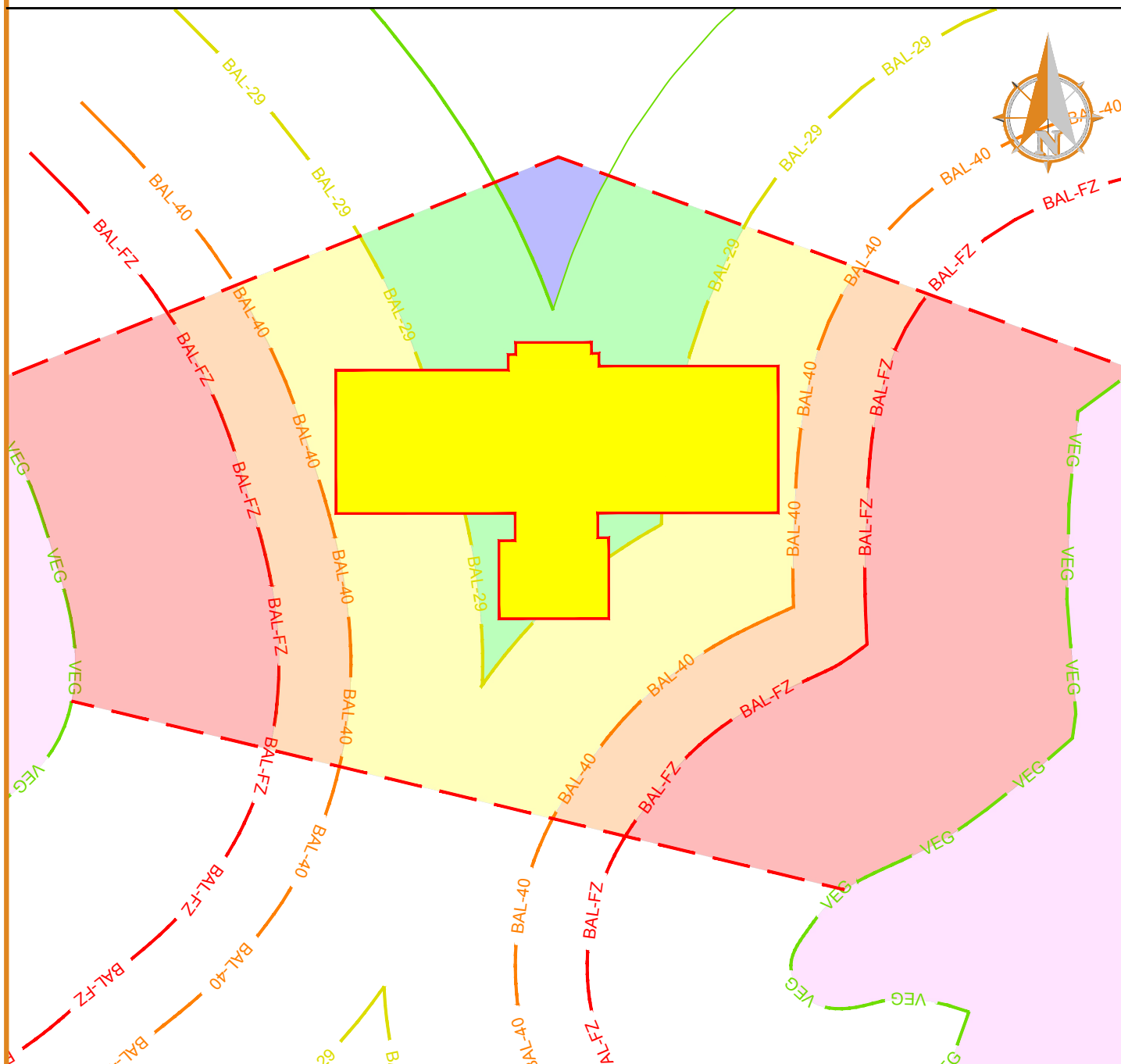
DOMINANT SPECIES = EUCALYPTS
 UNDERSTOREY = ACACIA AND OTHER SPECIES
 GROUND COVER = MIXTURE OF NATIVE SPECIES AND GRASSES

	RAINFOREST DOWNGRADE (PBP A1.11.1)
	FOREST
	MANAGED LAND

 <div>BushFire CONSULTANT</div> <div>BUSHFIRE THREAT ASSESSMENT REPORTS PRE-PURCHASE INSPECTION REPORTS BUSHFIRE ATTACK LEVEL MAPPING T: 02 4952 7376 M: 0402 027 376 E: baz@bushfireconsultant.com.au</div>	198 Wangat Trig Rd Bandon Grove NSW 2420		 <div>BPAD Bushfire Planning & Design Accredited Practitioner Level 2 BPAD 19741</div>	
	Vegetation & Topographical Analysis			
	Drawn by	Checked by	Date:	Version
BJC	JC	20-01-2023	V-1.0	2
X:\BFC\Clients\#0894_Charlton\DWG\198WangatTrigRoadBandonGrove2420.dwg				

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APPENDIX 1



BAL ANALYSIS

NOT TO SCALE

PREDOMINANT VEGETATION CLASSIFICATION -
RAINFOREST, 10° TO 15° DOWNSLOPE
DEPICTION OF THE BUSHFIRE ATTACK LEVELS
THAT MAY BE EXPERIENCED BY THE SUBJECT
BLOCK IN THE EVENT OF A BUSHFIRE

NOTE: THE EFFECTIVE WIDTH OF BAL'S IS A FUNCTION OF VEGETATION
CLASSIFICATION AND THE SLOPE UNDER THE VEGETATION IN RELATION
TO THE PROPOSAL. FOR THIS REASON THE WIDTH OF BAL'S MAY VARY
AROUND A PROPOSAL DUE TO CHANGES IN THE TOPOGRAPHY OF THE SITE
AND ITS SURROUNDS. MEASUREMENTS DISPLAYED ON THIS DIAGRAM
ARE FOR THE PREDOMINANT VEGETATION GROUP(S).

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BUSHFIRE ATTACK LEVEL (BAL)

RAINFOREST	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
10° to 15° DOWNSLOPE	<17 m	17- <23 m	23-<34 m	34-<46 m	46-<100 m

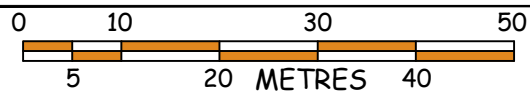
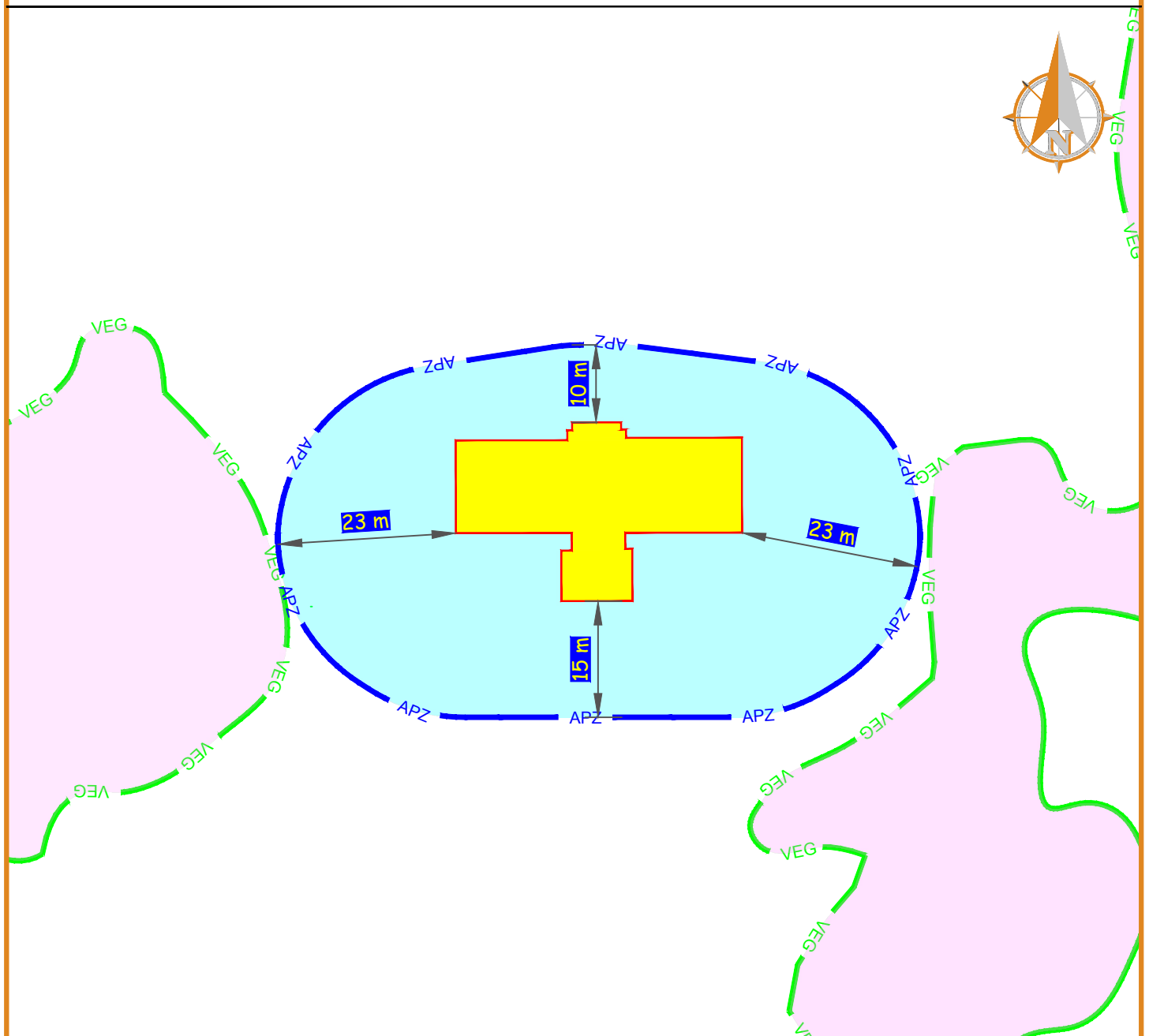
SOURCE: PBP 2019 TABLE A1.12.5 FDI 100

 <p>BushFire CONSULTANT</p> <p>BUSHFIRE THREAT ASSESSMENT REPORTS PRE-PURCHASE INSPECTION REPORTS BUSHFIRE ATTACK LEVEL MAPPING T: 02 4952 7376 M: 0402 027 376 E: boz@bushfireconsultant.com.au</p>	198 Wangat Trig Rd Bandon Grove NSW 2420		 <p>BPAD Bushfire Planning & Design Accredited Practitioner Level 2 BPAD 1974</p>
	Bushfire Attack Level (BAL) Analysis		
	Date; 20-01-2023	Version V-1.0	Sheet 3

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APPENDIX 1



ASSET PROTECTION ZONE (APZ)

NOT TO SCALE

SOURCE: STANDARDS FOR ASSET PROTECTION ZONES
NSW RFS

An APZ is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings. An APZ can be comprised of an Inner Protection Area (IPA) and an Outer Protection Area (OPA)

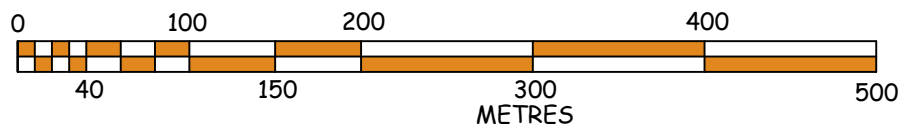
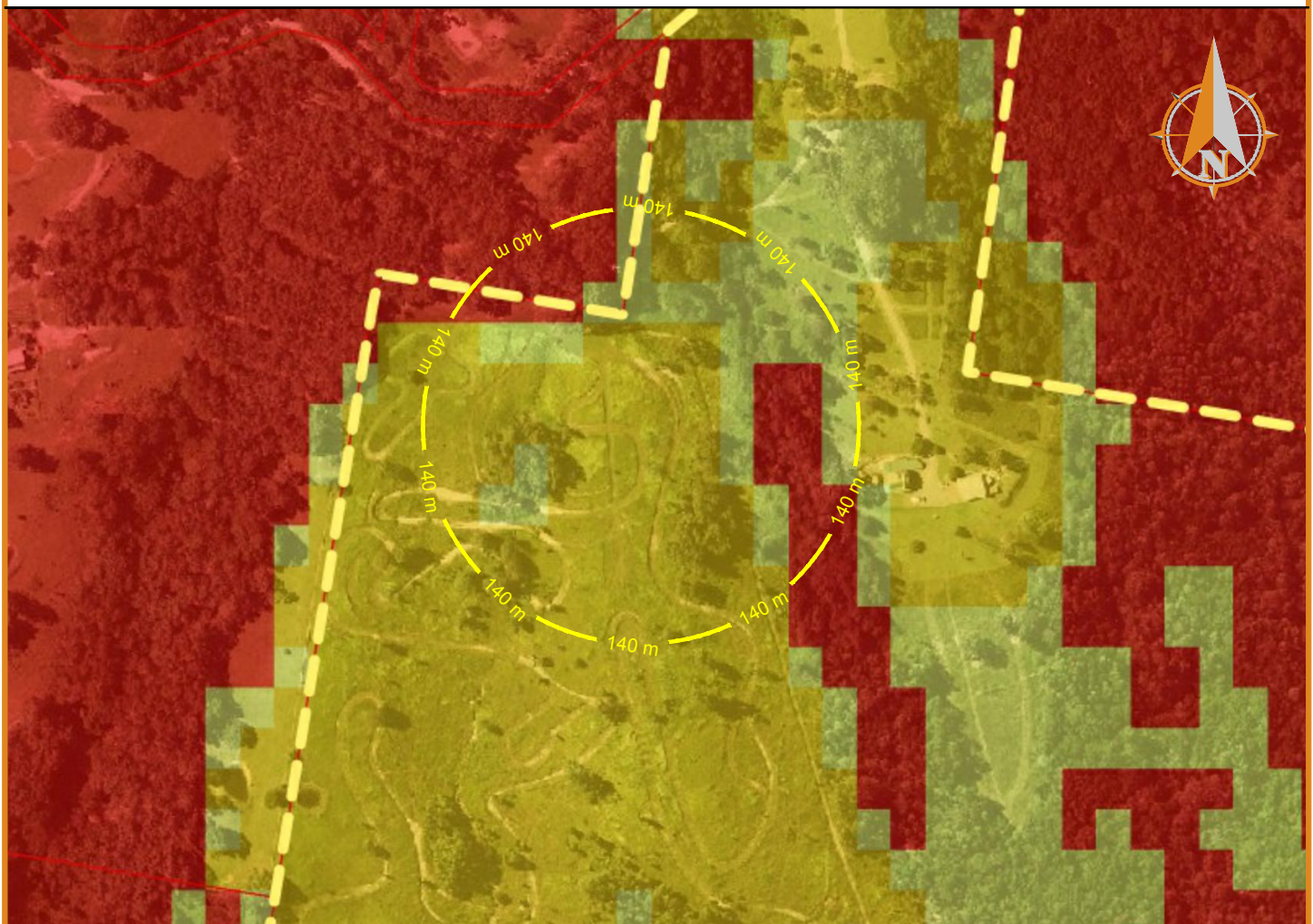
An APZ provides:

- * a buffer zone between a bushfire hazard and an asset
- * an area of reduced bushfire fuel which allows suppression of fire
- * an area from which backburning may be conducted: and
- * an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property

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	Asset Protection Zone Layout		
	Date: 20-01-2023	Version V-1.0	Sheet 5
Drawn by BJC	Checked by JC	File name X:\BFC\Clients\#0894_Charlton\DWG\198WangatTrigRoadBandonGrove2420.dwg	

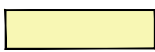



APPENDIX 1



BUSH FIRE PRONE LAND MAPPING

NOT TO SCALE

Source: ePlanning Spatial Viewer; <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

-  **Category 0** vegetation appears as the yellow layer on the map and the buffer zone which extends out away from the vegetation. Buffer distances vary in width according to the vegetation category
-  **Category 1** vegetation appears as red on the map and represents forests, woodlands, heathlands, pine plantations and wetlands. Land within 100 metres of this category (indicated by the yellow layer on the map) is also captured by the Bushfire Prone Land Map due to the likelihood of bushfire attack.
-  **Category 2** vegetation appears as light orange on the map and represents rainforests and lower risk parcels of bushfire prone vegetation. Land within 30 metres of this category (indicated by the yellow layer on the map) is also captured by the Bushfire Prone Land Map due to the likelihood of bushfire attack.
-  **Category 3** vegetation appears as orange on the map and represents medium risk vegetation such as grasslands, freshwater wetlands and arid shrublands. Land within 30 metres of this category (indicated by the yellow layer on the map) is also captured by the Bushfire Prone Land Map due to the likelihood of bushfire attack.

EP&A ACT 1979 SECTIONS 4.14 & 10.3

EP&A Act Sect. 10.3: Councils prepare maps which record the bushfire prone vegetation within their LGA. These maps are certified by the RFS Commissioner.



EP&A Act Sect. 4.14: (Implicit) If a proposed structure, its access roads, APZ's or water supplies are captured by this mapping, then it must provide evidence that the proposal conforms to the specifications and requirements of Planning for Bush Fire Protection 2019.



 BushFire CONSULTANT BUSHFIRE THREAT ASSESSMENT REPORTS PRE-PURCHASE INSPECTION REPORTS BUSHFIRE ATTACK LEVEL MAPPING T: 02 4952 7376 M: 0402 027 376 E: baz@bushfireconsultant.com.au	198 Wangat Trig Rd Bandon Grove NSW 2420		 BPAD Bushfire Planning & Design Accredited Practitioner Level 2 BPAD 19741
	Bushfire Prone Land Mapping		
	Date; 20-01-2023	Version V-1.0	Sheet 5
Drawn by BJC	Checked by JC	File name X:\BFC\Clients\#0894_Charlton\DWG\198WangatTrigRoadBandonGrove2420.dwg	

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for asset protection zones

protection

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STANDARDS FOR ASSET PROTECTION ZONES

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INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows suppression of fire;
- an area from which backburning may be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

WHAT WILL THE APZ DO?

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset;
- damage to the built asset from intense radiant heat; and
- ember attack on the asset.

WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

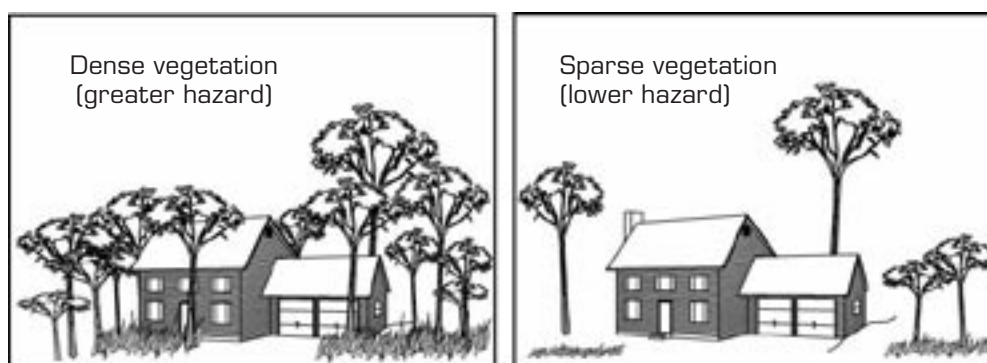
STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

Subdivided land or construction of a new dwelling

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

Existing asset

If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

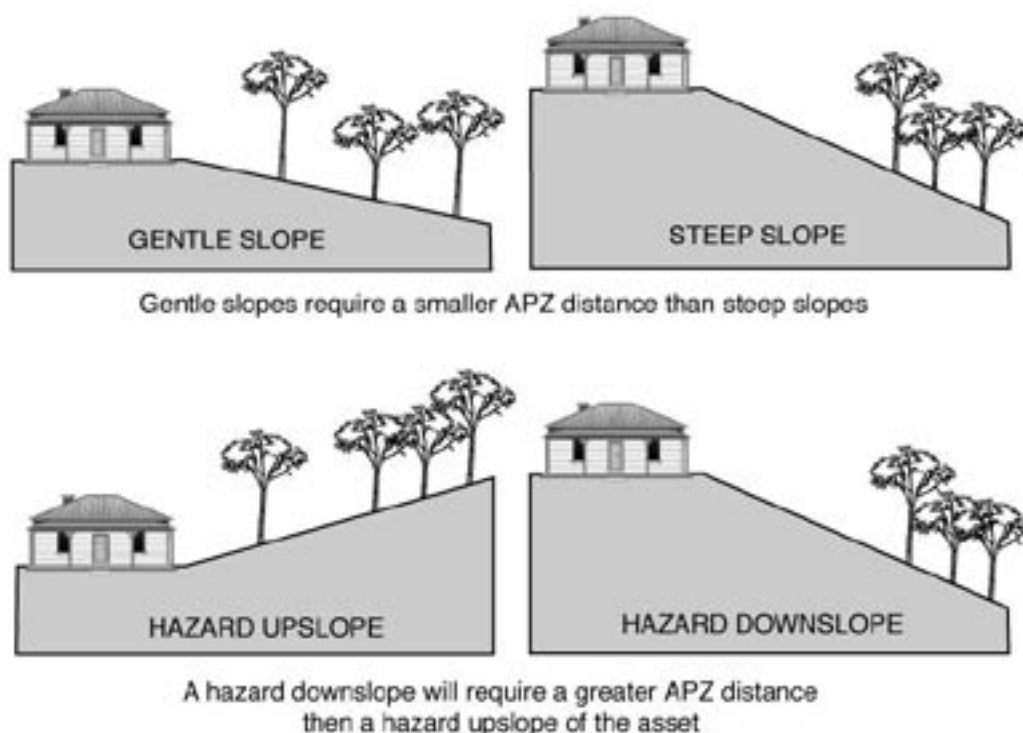
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

STEP 3. DETERMINE THE APZ WIDTH

The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.



Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

Subdivided land or construction of a new dwelling

If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

Existing asset

If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

Fuels can be controlled by:

1. raking or manual removal of fine fuels

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

2. mowing or grazing of grass

Grass needs to be kept short and, where possible, green.

3. 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 two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

APPENDIX 2

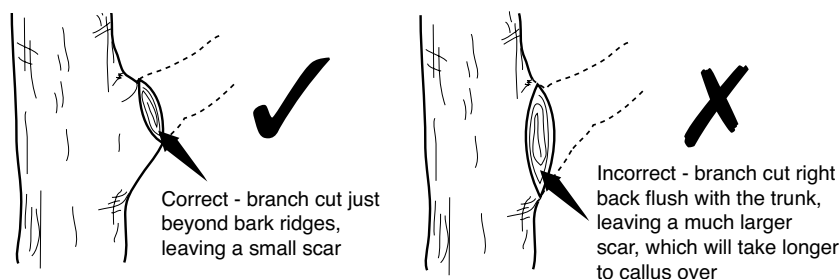
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at www.agric.nsw.gov.au/noxweed/;
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3. Remove or thin understory plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in accordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

1. Crown lifting (skirting)

Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning

Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

3. Selective pruning

Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees)* for more information on tree pruning.

4. Slashing and trittering

Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

5. Ploughing and grading

Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

6. Burning (hazard reduction burning)

Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning*, or contact your local RFS for advice.

7. Burning (pile burning)

In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning*.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

APPENDIX 2

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

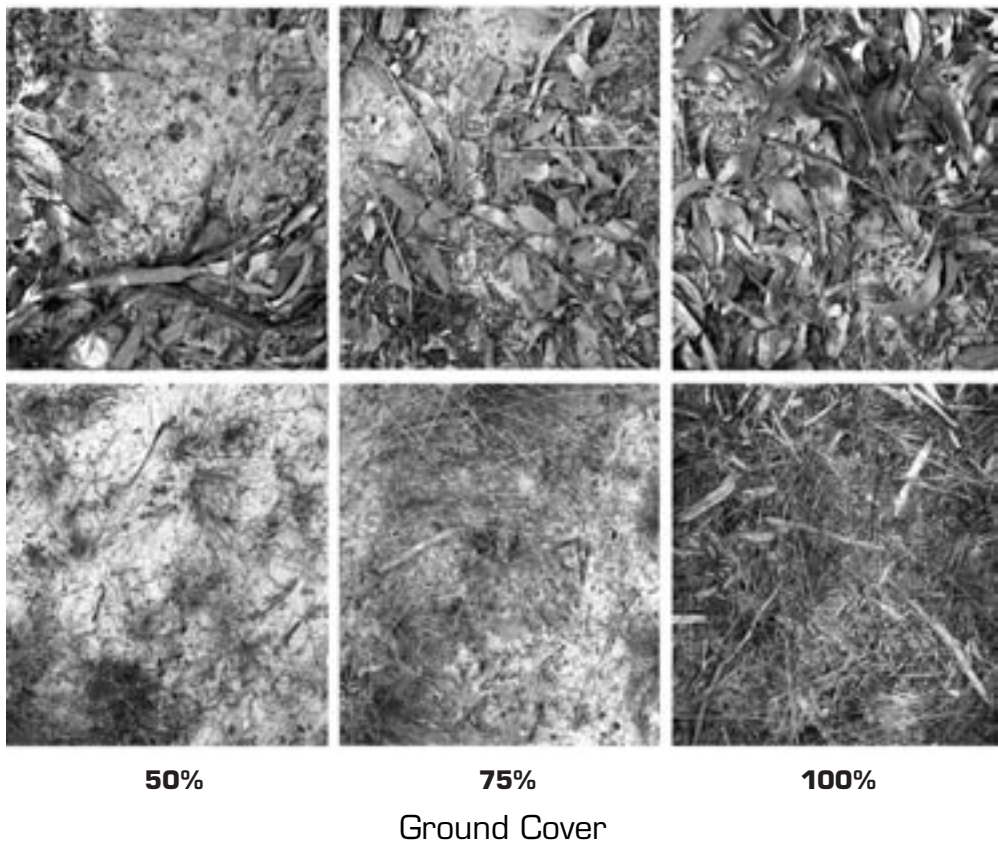
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

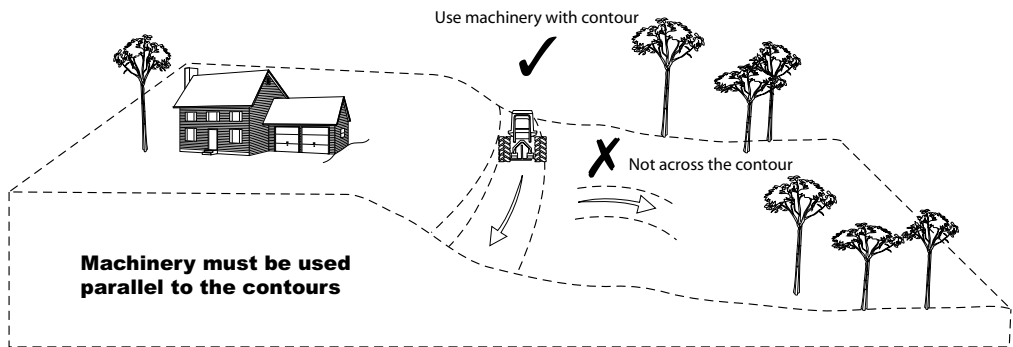
- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.



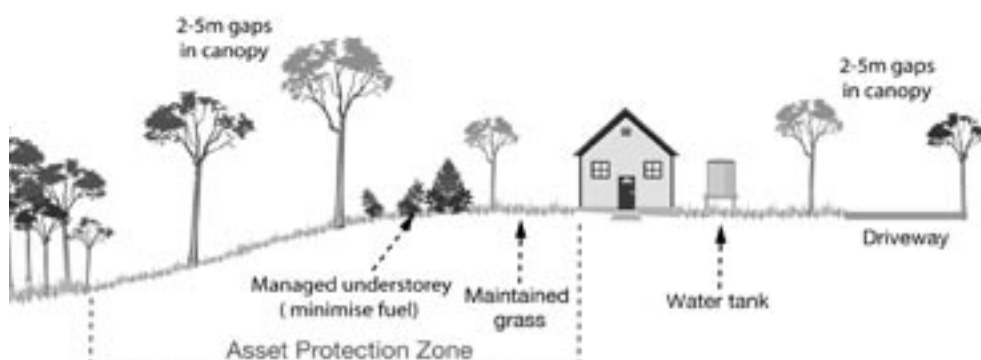
STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

Layout of gardens in an APZ

When creating and maintaining a garden that is part of an APZ you should:

- ensure that vegetation does not provide a continuous path to the house;
- remove all noxious and environmental weeds;
- plant or clear vegetation into clumps rather than continuous rows;
- prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
- locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
- 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 crush tile; and
- avoid erecting brush type fencing and planting “pencil pine” type trees next to buildings, as these are highly flammable.



Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.

APPENDIX 2

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

Plants that are less flammable, have the following features:

- high moisture content
- high levels of salt
- low volatile oil content of leaves
- smooth barks without “ribbons” hanging from branches or trunks; and
- dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees*.

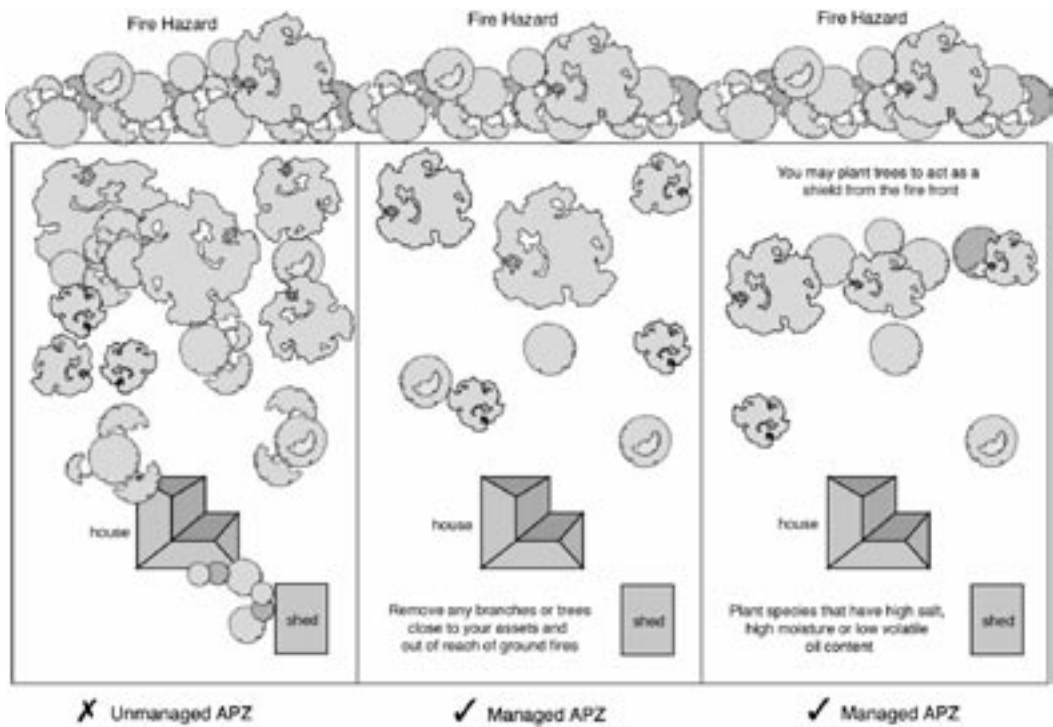
WIND BREAKS

Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.



HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at **www.rfs.nsw.gov.au**.

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre.
Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737
(Monday to Friday, 9am to 5pm), or
- the NSW RFS website at **www.rfs.nsw.gov.au**.






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www.rfs.nsw.gov.au

BAL-29

AS 3959-2018 Section 7 BAL-19

AS 3959-2018 specifies the requirements for the construction of buildings in bushfire prone areas in order to improve their resistance and resilience to the mechanisms of bushfire attack. These mechanisms are;

-  Burning embers
-  Radiant heat
-  Flame contact
-  Wind
-  Any combination of the above forms of attack

BAL-29 is primarily concerned with protection from ember attack and radiant heat greater than 19kW/m² up to and including 29kW/m².

The following is a summarised version of AS 3959-2018 Section 7, BAL-29. It is to be used as a guide only to the likely requirements of the standard. Bushfire Consultant Pty Ltd assumes no responsibility for any reliance upon the material contained in this document. A full reading of the standard should be carried out, in conjunction with PBP 2019. This reading should be undertaken before design and construction is commenced.

Key Criteria for BAL-29

Gaps ≥2 mm	Screened with 2 mm corrosion resistant metal screen
Glass windows	Corrosion resistant steel, bronze or aluminium 5mm thick toughened (<400 mm above a level surface shall be screened - 7.5.3 (b)(v))
Glass doors	6mm thick toughened glass
Walls <400mm from a surface	Non combustible/bushfire resistant timber
Un-enclosed floor spaces	Non combustible/bushfire resistant timber
Windows and doors construction	Non combustible/bushfire resistant timber
Windows and doors openable portions	Screened
Screens	2 mm corrosion resistant steel, bronze or aluminium
Roofs	Non combustible materials Fully sarked
Awning roofs not sharing main roof space	Under side shall be enclosed (7.6.4 (b)(iii)) All gaps and penos screened
Decking (trafficable areas)	Non combustible/bushfire resistant timber or equal
Deck framing (bearers, joists etc)	Non combustible/bushfire resistant timber or equal

Note: Treated Pine is NOT PERMISSIBLE externally unenclosed

AGL* = Above Ground Level

Appendix 4

A3.3 Vehicle turning head requirements

Dead ends that are longer than 200m must be provided with a turning head area that avoids multipoint turns. “No parking” signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following options:

Figure A3.3

Multipoint turning options.

