

BUSHFIRE RISK MANAGEMENT PLAN

FOR

RESIDENTIAL SUBDIVISION

LOTS 46 & 47 DP751395

52-54 MILES STREET,

YAMBA

PREPARED BY

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(AUST) PTY LTD

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EXECUTIVE SUMMARY

Bushfiresafe (Aust) P/L has been engaged by Rob Donges on behalf of his client to undertake a complete Bushfire Risk Assessment for the 310 lot residential subdivision of Lots 46 & 47, DP751395 – 52-54 Miles Street, Yamba. The assessment was conducted in accordance with section 4.46 of the Environmental Planning & Assessment Act (1979) and followed the guidelines recommended in the Planning for Bushfire Protection (RFS, 2019).

Property Description

The subject property is located on the corner of Carrs Drive and Miles Street on generally flat land that has been cleared of the majority of the over storey vegetation and consists of maintained native and introduced grasses. The subject property is zoned R1 - General Residential in the Clarence Valley Council Local Environment Plan (Clarence Valley Council, 2013); subdivision is permissible with consent. Miles Street adjoins the northern property boundary, Carrs Drive adjoins the western boundary and an area of forested Wetland adjoining the south-east boundary and a developed rural residential property adjoining the south-west boundary.

This development proposal seeks approval for a residential subdivision of Lots 46 and 47 Miles Street, Yamba. The development consists of 310 residential lots ranging in area from 420m² to 812m², 2 Detention Basins (proposed Lots 901 & 902) consisting of 4.511ha & 1,215ha respectively, a residue lot (proposed Lot 900) consisting of an area of 1.553ha, land to be dedicated to Council (proposed Lot 903) consisting of an area of 10.597ha and 17 internal access roads (including a perimeter road) which link to Miles Street in two locations and two detention basins. The eastern portion of lot 47 currently forms part of a Floodway and therefore will be dedicated to council as part of the development approval to be retained as a Floodway area, the south/western portion of Lot 46 will form a residue allotment which shall be part of a future development application.

Vegetation assessment

This Bushfire Risk Assessment was conducted through an on-site inspection undertaken on 4th May, 2021 using the methodology set out in Planning for Bushfire Protection manual (RFS, 2019). The on-site assessment included traversing the subject property and all lands within 140 metres from the proposed subdivision. The property inspection identified an area of forest vegetation to the south/east of the subject land as bushfire prone vegetation within 140m of the proposed development which occurs on 0-5° down slope terrain.

Based on the assessment of the vegetation communities and slopes present on and adjacent to the subject property, and in accordance with Appendix 1 Table A1.12.6, Planning for Bushfire Protection (RFS 2019), this Bushfire Risk Assessment recommends that a minimum 25 metre Asset Protection Zone (APZ) along the forest vegetation adjacent to the south-western margins of the subject property and a minimum 9 metre APZ from the remnant and riparian vegetation areas.

Bush Fire Attack Level

An assessment of the bushfire attack level applicable to the proposed development was carried out using the methodology detailed in Planning for Bushfire Protection (RFS, 2019) and Appendix B of AS 3959-2018. The bushfire assessment undertaken in relation to the proposed development concluded the bushfire attack level for the subdivision ranges from BAL-29 to BAL-LOW depending on the location of the individual allotments:

Access

The development has been designed with a 21 metre wide perimeter road along the bushfire hazard interface, the perimeter road links with Miles Street in 2 locations. The subdivision footprint also has been designed with approximately 16 internal road of various lengths, the internal road network intersects with other internal development. The proposed access roads allows for two-way bitumen trafficable area through existing developed residential area and away from the identified bushfire prone vegetation the proposed access is adequate for the development.

Services

Reticulated water supply is currently available to the development property. All delivery water lines shall be installed underground to a minimum depth of three hundred millimetres (300mm), with all points above ground using metal pipes or raisers with a minimum internal diameter of nineteen millimetres (19mm).

Where possible electrical transmission lines should be underground; where overhead electrical transmission lines are installed, lines should be installed with short pole spacing, unless crossing gullies, gorges or riparian areas. No part of a tree should be closer to a power line than the distance set by the appropriate authority. Regular inspection of lines is required to ensure they are not fouled by branches.

Construction Standards

The bushfire risk management assessment undertaken in relation to the proposed subdivision concluded that the construction standard in accordance with AS 3959 (2018) Construction of Buildings in Bushfire Prone Areas (Standards Australia, 2018) will be assessed and nominated when development applications are submitted for the construction of dwellings on the approved allotments.

GLOSSARY

APZ	Asset Protection Zone
BFRMP	Bushfire Risk Management Plan
CVCBPL	Clarence Valley Council Bushfire Prone Lands map
EEC	Endangered Ecological Community
EP&A	Environmental Planning and Assessment Act
IPA	Inner Protection Area
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection manual
RFS	Rural Fire Service of New South Wales
SEPP	State Environmental Planning Policy
TOBAN	Total Fire Ban
TSC Act	Threatened Species Conservation Act (1995)
TSCA Act	Threatened Species Conservation Amendment Act (2002)

BUSH FIRE RISK MANAGEMENT PLAN

1.0 SCOPE OF THE PLAN

The Bushfire Risk Management Plan (BFRMP) is a strategic document which identifies: the level of bush fire risk for human habitation; strategies which will be implemented to manage the bush fire risk identified; and those persons responsible for implementing and maintaining this Bushfire Risk Management Plan.

1.1 Area

This Plan covers a proposed residential subdivision of Lots 46 & 47 DP751395, 52-54 Miles Street, Yamba, within Clarence Valley Council Local Government Area; the subdivision will consist of 310 residential lots, 2 detention basins, 1 residue lot and internal road network.

1.2 Period of Operation

Once approved by the Local Authority and the NSW Rural Fire Service, this Plan will have a period of operation of the life of the development.

1.3 Aim and objectives of the Plan

The aim of this Plan is to provide for the mitigation of bush fires for the protection of life and property for the habitants, visitors and emergency personnel in bush fire situations Secondly, the Plan aims to reduce the treat to ecological and environmental assets. To achieve this aim, the Bushfire Risk Management Plan must address a number of specific objectives.

- i. Identify the area most at risk from bush fire attack;
- ii. Reduce the risk of bush fire damage to life and property;
- iii. Ensure that the developer/owner/occupier understands their bush fire management responsibilities;
- iv. Reduce the impact of bush fire on the development;
- v. Develop sustainable Asset Protection Zones (APZ) surrounding the proposed building

1.4 Bushfire Risk Management Strategies

This Plan contains a number of strategies, which are directed at addressing the risk to the residential development from bushfire emergencies. This is achieved through addressing and managing fuel loads, separation distances from the assessed dominant bushfire vegetation, and recommending appropriate bushfire building standards.

1.5 Implementation

Implementation of the strategies in this Plan is the responsibility of the developer and shall

be undertaken as part of the development infrastructure. The ongoing maintenance of the strategies in this Plan shall be the responsibility of the owner/occupiers of each individual residential allotment to the limit of their property boundaries. Finally, the local authority or their delegated authority, for the life of the development shall monitor this Plan.

2.0 LEGISLATIVE BUSHFIRE HAZARD MANAGEMENT RESPONSIBILITIES

2.1 Clarence Valley Council

The Clarence Valley Council has responsibility, under Section 66 of the Rural Fires Act, to issue a notice in writing requiring an owner / occupier of any land within the LGA to carry out bushfire hazard reduction works on that land. Section 100E of the Rural Fires Act requires the council to issue bushfire hazard reduction certificates for hazard reduction to be undertaken on private lands.

2.2 New South Wales Rural Fire Service

The NSW Rural Fire Service (RFS) has the responsibility for undertaking fire suppression activities, hazard management activities and other functions relative to emergency management, within its areas of operation. Section 73 of the Rural Fires Act (1997) enables the Commissioner to carry out bush fire hazard reduction works on any land as required by a bush fire risk management plan if the work has not been carried out satisfactorily. Incurred costs can be recovered as a debt owed to the Crown.

2.3 NSW Fire Brigade

The NSW Fire Brigade has the responsibility for undertaking fire suppression activities, and other functions relative to emergency management, within its area of operation. Through mutual aid agreements, the NSW Fire Brigade can provide assistance to the NSW Rural Fire Service, particularly for structural fire operations within the NSW Rural Fire Brigade Districts. Furthermore, Hazmat operations within New South Wales are the responsibility of the NSW Fire Brigade.

2.4 Clarence Valley Council Bush Fire Management Committee

The Clarence Valley Council Bushfire Management Committee has the responsibility for planning for co-ordinated fire fighting activities / hazard management activities on a local government level. It is not an operational organisation, a fire fighting organisation or a funding source for fire management activities. The Bush Fire Management Committee is supported by the following provisions of the Rural Fires Act (1997).

Section 50 of the Act requires the Bush Fire Co-ordinating Committee to constitute a Bush Fire Management Committee for the whole of the area of any local Council area for which a rural fire district is constituted.

Section 51(1A) requires a Bush Fire Management Committee to report to the Bush Fire Coordinating Committee on the implementation of the requirements of the Bushfire Risk Management Plan.

Section 52 requires each Bush Fire Management Committee to prepare a draft bush fire management plan for their local areas which includes a plan of operations and a bush fire risk management plan.

Section 54 of the Act specifies that a draft bush fire risk management plan is to 'set out schemes for the reduction of bush fire hazards in the rural fire district or other part of the State'. A draft bush fire risk management plan may also restrict or prohibit the use of fire or other fire hazard reduction activities in all or specified circumstances or places to which the plan applies.

2.5 Private Land Owners / Occupiers

The Rural Fires Act, 1997 provides several legislative opportunities to require land owners and occupiers to manage hazardous fuels. These are listed below:

Section 63(2) states that 'it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of fires on, and to minimise the danger of the spread of fires on or from that land'. In this section; 'notified steps' means any steps that:

(a) a bushfire risk management plan (or the Co-ordinating Committee) advises a person to take;

(b) are included in a bush fire risk management plan that applies to that land.

Section 87 allows the removal of hazards in the bush fire danger period by the provision of a permit system. The permits are valid for 21 days, excluding total fire ban (TOBAN) days. Section 10 permits are not required to adhere to Part V provisions of the Environmental Planning & Assessment Act (1979) (EP&A Act) in any assessment of impact, except for public authorities. An owner/occupier of private land must obtain from the NSW Rural Fire Service, a bushfire hazard reduction certificate before undertaking hazard reduction works on that land (see Section 100E of the Rural Fires Act (1997)).

3.0 INTRODUCTION

Development applications on bush fire prone land must be accompanied by a bush fire assessment report that demonstrates compliance with the aim and objectives of the Planning for Bushfire Protection (PBP) guidelines. In particular, the following matters must be addressed:

- a) A statement that the site is bush fire prone land, where applicable;
- b) The location, extent and vegetation formation of any bushland on or within 100m of the site;
- c) The slope and aspect of the site and of any bush fire prone land within 100m of the site, which may determine the likely path of any bush fire;
- d) Any features on or adjoining the site that may mitigate the impact of a high intensity bush fire on the proposed development;
- e) A statement of the likely environmental impact of any proposed bush fire protection measures; and

- f) Whether any building complies with AS 3959/1999 in relation to the construction level for bush fire protection.

3.1 Background

Bushfiresafe (Aust) P/L has been engaged by Rob Donges on behalf of his client to undertake a complete Bushfire Risk Assessment for the residential subdivision of Lots 46 & 47 DP751395 – 52-54 Miles Street, Yamba. The assessment was conducted in accordance with section 4.46 of the Environmental Planning & Assessment Act (1979) and followed the guidelines recommended in the Planning for Bushfire Protection (RFS, 2019).

The assessment has involved the following activities:

- i. Verifying of terrain attributes in relation to the assessed bushfire vegetation.
- ii. Identification of the appropriate bushfire protection for any identified environmental assets.
- iii. Determination of the location of adequate water supplies for fire fighting purposes.
- iv. Identifying the capacity of public roads to handle increased volumes of traffic in a bushfire situation.
- v. Identification of adequacies for implementation of fire trails which link to Public roads in the vicinity.
- vi. Identification of adequacy of arrangements for access and egress from the development for the purposes of an emergency response.
- vii. Identification of construction standards to be used for building elements in the development.
- viii. Identification of adequacy of bushfire maintenance plans and fire emergency procedures for the development.
- ix. Identification of additional bushfire protection measures.

3.2 Description of property

The subject property is located on the southern side Miles Street on generally flat land that has been cleared of the majority of the over storey vegetation and consists of maintained native and introduced grasses. The subject property is zoned R1 - General Residential in the Clarence Valley Council Local Environment Plan (Clarence Valley Council, 2013); subdivision is permissible with consent. Miles Street adjoins the northern property boundary, Carrs Drive adjoins the western boundary with developed rural residential property adjoining the south-west boundary.

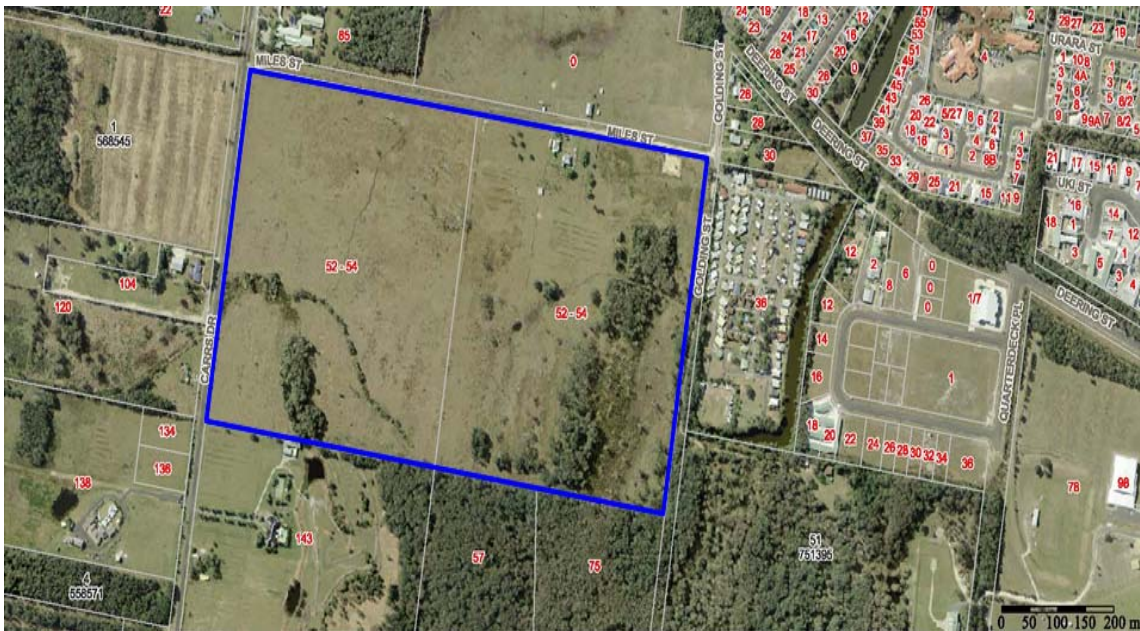


Figure 1: Aerial photograph showing subject property in relation to the identified bushfire prone vegetation.

3.3 Proposal

This development proposal seeks approval for a residential subdivision of Lots 46 and 47 Miles Street, Yamba. The development consists of 310 residential lots ranging in area from 420m² to 812m², 2 Detention Basins (proposed Lots 901 & 902) consisting of 4.511ha & 1,215ha respectively, a residue lot (proposed Lot 900) consisting of an area of 1.553ha, land to be dedicated to Council (proposed Lot 903) consisting of an area of 10.597ha and 17 internal access roads (including a perimeter road) which link to Miles Street in two locations and two detention basins. The eastern portion of lot 47 currently forms part of a Floodway and therefore will be dedicated to council as part of the development approval to be retained as a Floodway area, the south/western portion of Lot 46 will form a residue allotment which shall be part of a future development application.

3.4 NSW Rural Fire District BFRMP

The Clarence Valley Council's Bushfire Management Options are to:

- (a) **Reduce the hazard** - encourages the development of asset protection zones along the settlement area - bushland interface.
- (b) **Reduce vulnerability** - maintain development and building controls and standards appropriate to the level of hazard.

4.0 VEGETATION CLASSIFICATION

The vegetation of the subject property and adjacent properties up to 140m (where practicable) from the proposed subdivision was assessed during a site visit on 4th of October,

2018. The vegetation communities present were identified and classified into formations as described in Keith (2004).

Planning for Bushfire Protection (PBP) manual (RFS, 2019) outlines the methodology for determining the predominant bushfire prone vegetation to the distance of at least 140 metres in all directions from the future development on the site. Vegetation is classified using Table A1,2 of *Planning for Bushfire Protection* 2019, which classifies vegetation types into the following groups:

- | | |
|--|----------------------------|
| (a) Forests [wet & dry sclerophyll forests]; | (g) Freshwater Wetlands; |
| (b) Woodlands; | (h) Saline Wetlands |
| (c) Plantations – being pine plantations but not native plantations; | (i) Alpine Complex; |
| (d) Forested Wetlands; | (j) Semi – arid Woodlands; |
| (e) Tall Heath lands; | (k) Arid Woodlands; and |
| (f) Short Heath lands; | (l) Rainforests |

4.1 Vegetation communities present on the Property

The majority of the subject property currently consists of managed grassland (grazing paddocks) with several small clumps of retained shade trees (Figure 2). The eastern portion of the property (Floodway) consists of grassland vegetation with 2 small clumps of remnant swamp oak trees and a small creek occurs within the south/west corner of the property which will be revegetated as a riparian area approximately 20 metres wide either side.



Figure 2: view of the development area with the subject property showing managed grassland vegetation with scattered singular trees (Photograph, W. Hadaway).

4.2 Vegetation within 140m from the subject land boundary

West: Carrs Drive adjoins the western boundary of the subject property which is followed by a developed residential property to the south west, a forested property to the west and an approved residential subdivision (currently under construction) to the north west (Figure 3 & 4).



Figure 3: view of the developed residential property adjacent to south-west corner of the property adjacent to Carrs Drive (Photographs, W. Hadaway).



Figure 4: view of forest vegetation within an undeveloped property to the west of the subject property adjacent to Carrs Drive (Photographs, W. Hadaway).

South: Developed residential property adjoins the south-western boundary and a property to the south-east consisting of Coastal Swamp Forest vegetation (Figure 5 & 6).



Figure 5: view of the Coastal Swamp Forest vegetation within the adjoining property which adjoins the south east corner of the development property (Photographs, W. Hadaway).



Figure 6: view of the developed large lot residential property which adjoins the south-west corner of the development property (this property has been approved for a Large Lot residential subdivision (Photographs, W. Hadaway).

East: A large grassland property adjoins the eastern property boundary, this property consists grassland vegetation with 2 small clumps of remnant vegetation which is followed by Goldings Street and developed residential properties (Figure 7).



Figure 7: view of the east from the development footprint looking within the managed grassland property (Photographs, W. Hadaway).

North: Miles Street adjoins the northern boundary of the subject property followed by either a large grassland property or a remnant forested property (Figure 8 & 9).



Figure 8: view to the north-west of the subject property showing an area of remnant forest vegetation which is less than a hectare in size and therefore is not considered bushfire prone vegetation (Photographs, W. Hadaway).



Figure 9: view to the north-east of the subject property showing managed grassland vegetation (grazing paddocks) adjacent to Miles Street which extends for a distance greater than 140 metres from the development property (Photographs, W. Hadaway).

4.3 Assessed Bushfire Vegetation in Relation to the Proposed Subdivision

The forest vegetation to the south-east within the adjoining property is classified as Category 1 bushfire prone vegetation, according to the Clarence Valley Council Bushfire Prone Lands (CHCCBPL) map (Clarence Valley Council, 2014). The 100m buffer to Category 1 bushfire prone vegetation extends over the south-western portion of the subject property. A bushfire risk assessment is required for any development of this property.

It was assessed that the forest vegetation south-east of the proposed subdivision and the two areas of remnant vegetation within the land to the east which will be dedicated to Council and the proposed riparian revegetation area within the south/west of the development property will have the most influence on bushfire behaviour for this development.

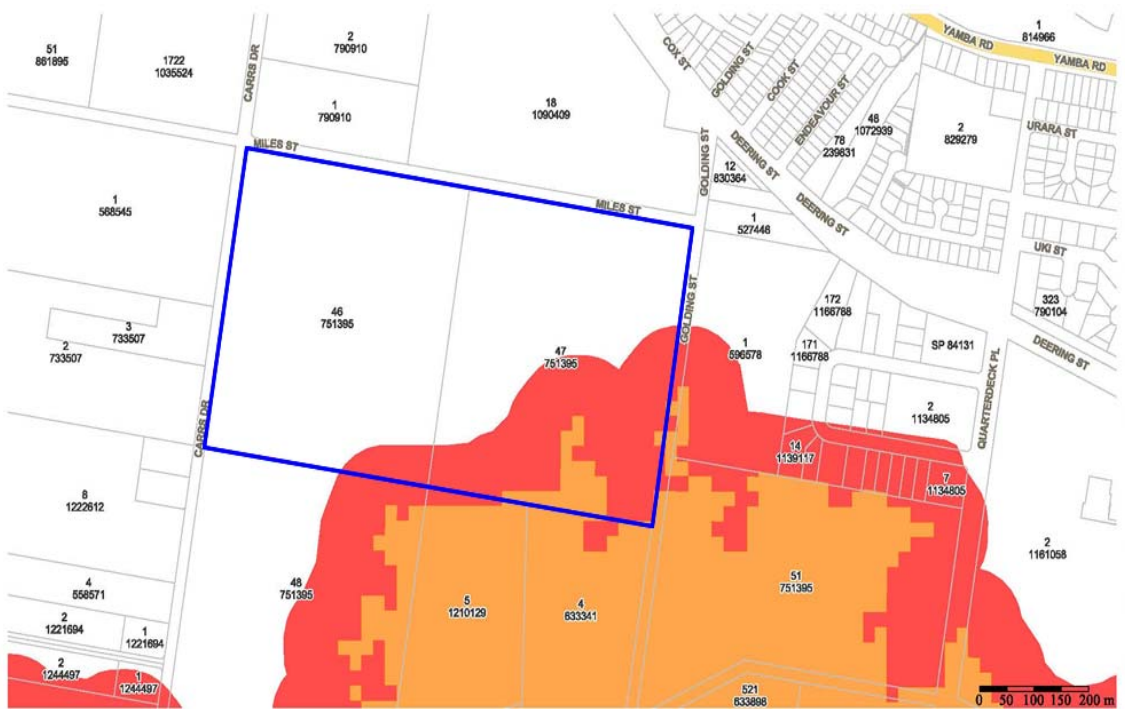


Figure 10: Clarence Valley Council bushfire prone land map showing subject property in relation to the identified bushfire prone vegetation to the south-west

5.0 LANDFORM ASSESSMENT

Inspection of published topographic maps and an on-site assessment using a clinometer verified the following land forms were present over the subject land. There is a slight fall from Miles Street to the southern property boundary.

5.1 Assessed Dominant Slope in relation to identified bushfire prone vegetation

Appendix 1 of Planning for Bushfire Protection (RFS, 2019) recommends that slopes should be assessed, over a distance of at least 100m from a development site and that the dominant gradient of the land should be determined on the basis of which will most significantly influence the fire behaviour at the site.

The terrain beneath the forest vegetation occurring to the south-east was assessed as a 0-5° down slope.

6.0 BUSHFIRE ASSESSMENT FOR PROPOSED DEVELOPMENT

6.1 Asset Protection Zones

Based on the assessment of the vegetation communities and slopes present on and adjacent to the subject property, and in accordance with Appendix 1 Table A1.12.6, Planning for Bushfire Protection (RFS 2019).

Lots 241 to 245 and Lots 261 to 265 and Lot 249 located within the south/east corner of the development footprint shall be impacted by the Coastal Swamp Forest within the adjoining property and therefore it is a recommendation of this report that a 25 metre Asset Protection Zone (APZ) shall be implemented and maintained from the identified coastal swamp forest vegetation, the APZ for proposed Lots 241 to 245 and Lots 261 to 265 and Lot 249 shall be achieved through utilizing the 21 metre road reserve of the perimeter road and 4 metres within the allotments.

Lots 280 to 291 located along the north/east boundary of the development footprint shall be impacted by the 2 small areas of remnant vegetation and the grassland vegetation within the land to be dedicated to Council for use of a Floodway, the 2 small areas of remnant vegetation are less than 50 metres wide and less than 1ha in size, therefore was assessed as Rainforest equivalent vegetation as per Section A.1.11.1 *Simplified Approach* within the Planning for Bushfire Protection (PBP) manual (RFS, 2019), which states “remnant vegetation is a parcel of vegetation with a size less than 1ha or shape that provides a potential fire run that could threaten buildings not exceeding 50m. These remnants are considered a low hazard and APZ setbacks and building construction standards for these may be the same as for rainforests”. It is a recommendation of this report that a 9 metre Asset Protection Zone (APZ) shall be implemented and maintained from the identified remnant forest and grassland vegetation, the APZ for proposed Lots 280 to 291 shall be contained wholly within the eastern portions of the allotments.

It is envisioned that the detention basins located approximately within the central area of the subdivision footprint shall be vegetated with low groundcover plants such as Lomandra (etc), proposed road 5 to the north and proposed road 12 to the south of the proposed detention basins have a minimum road reserve of 15 metres which is adequate to provide an asset protection zones for the lots adjacent to the detention basins.

The proposed revegetated riparian areas within the south/west corner of the subdivision footprint are less than 50 metres wide and less than 1ha in size, therefore was assessed as Rainforest equivalent vegetation as per Section A.1.11.1 *Simplified Approach* within the Planning for Bushfire Protection (PBP) manual (RFS, 2019), which states “remnant vegetation is a parcel of vegetation with a size less than 1ha or shape that provides a potential fire run that could threaten buildings not exceeding 50m. These remnants are considered a low hazard and APZ setbacks and building construction standards for these may be the same as for rainforests”. The proposed allotments (excluding proposed Lot 28) adjoining the proposed riparian vegetation are separated by road reserves with a minimum reserve of 15 metres which shall provide adequate asset protection zones for the allotments

adjacent to the riparian areas. It is a recommendation of this report that a 9 metre Asset Protection Zone (APZ) for proposed Lot 28 shall be implemented and maintained from the identified riparian vegetation, the APZ for proposed Lot 28 shall be contained wholly within the southern portion of the allotment.

Note: As the subdivision will be constructed through 11 stages, it is a recommendation of this report that a 20 metre asset protection zone be implemented and maintained on the proposed residual lot at the construction of each stage. This restriction can be extinguished upon commencement of any future stage for the proposed residential development on the residual lot, but only if the hazard is removed as part of the proposal.

The APZ shall be implemented and maintained as outlined within section 5.3.1 and Appendix 4 of 'Planning for Bush Fire Protection 2019' and the NSW Rural Fire Service's document 'Standards for asset protection zones'.

The Asset Protection Zones for all aspects of the development shall be measured from the foliage drip line and shall be implemented and maintained to the specifications as outlined below.

Inner Protection Area (IPA) shall be maintained in such a manner that;

- minimal fire fuel that could be set alight by bushfire (*e.g.* long grass, tree branches *etc.*) is present at ground level;
- vegetation does not provide a path for the transfer of fire to the development;
- trees are a minimum of 5 metres away from any building, measured from the edge of the foliage to the roof line or any open balconies;
- bark chips and the like are not present within 5 metres of any building;
- any trees present have a minimum canopy separation of 2 metres; and
- any trees present are not species that retain dead material or deposit excessive amounts of ground fuel in a short time.

6.2 Assessed Bushfire Attack Level

An assessment of the bushfire attack level applicable to the proposed development was carried out using the methodology detailed in Planning for Bushfire Protection (RFS, 2019) and Appendix B of AS 3959-2018. The bushfire assessment undertaken in relation to the proposed development concluded:

All lots within the development that are located adjacent to bushfire prone vegetation have had adequate asset protection zones applied to maintain a minimum BAL-29 bushfire attack level.

Determination of Bushfire Attack Level (BAL) – FDI 80 (1090K)

Forest	0-5° Down Slope	Bal-29	BAL-19	BAL-12.5
		25 - <35m	35 - <47m	47 - <100m
Rainforest	Flat	Bal-29	BAL-19	BAL-12.5
		9 - <14m	14 - <20m	20 - <100m
Grassland	Flat	Bal-29	BAL-19	BAL-12.5
		10 - <14m	14 - <20m	20 - <50m

6.3 Adequacy of Water Supply

Reticulated water is available to the development and will be supplied to each allotment through the town mains system in accordance with local water authority, council development control plans (DCPs) or any other policies and procedures.

- a) External fire hydrants will be installed and located in accordance with Australian Standard 2419-1, the hydrants shall be installed so as a clear unobstructed path to each designated building envelope, and
- b) The fire hydrants shall be installed at a maximum distance of 80m from the furthest extremity of the building/s, and
- c) The location of fire hydrants shall be delineated by blue pavement markers in the centre of the road, and
- d) All delivery water lines shall be installed underground to a minimum depth of three hundred millimetres (300mm), with all points above ground using metal pipes or raisers with a minimum internal diameter of nineteen millimetres (19mm).

6.4 Adequacy of Access and Egress in Bushfire Situations

The development has been designed with a 21 metre wide perimeter road along the bushfire hazard interface, the perimeter road links with Miles Street in two locations. The subdivision footprint also has been designed with approximately 16 internal road of various lengths, the internal road network intersects with other internal development roads. The proposed access roads allows for two-way bitumen trafficable area through existing developed residential area and away from the identified bushfire prone vegetation the proposed access is adequate for the development.

The property access roads shall be constructed to the following standard as required by the document 'Planning for Bushfire Protection 2019' section 5.3.2 Access.

- Bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes;
- Roads do not traverse a wetland or any other land potentially subject to periodic inundated (other than flood or storm surge);
- A minimum reserve width of 15 metres consisting of a 8 metre all weather bitumen trafficable area.
- A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches;
- Curves have a minimum inner radius of 6 metres and are minimal in number to allow for rapid access and egress;
- The maximum distance between inner and outer curves is 6 metres;
- The crossfall is not more than 10 degrees
- Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.

7.0 BUSHFIRE CONSTRUCTION STANDARDS

The bushfire risk management assessment undertaken in relation to the proposed subdivision concluded that the construction standard in accordance with AS 3959 (2018) Construction of Buildings in Bushfire Prone Areas (Standards Australia, 2018) will be assessed and nominated when development applications are submitted for the construction of dwellings on the approved allotments.

8.0 LANDSCAPING AND PROPERTY MAINTENANCE – BUSHFIRE PROVISIONS

According to the PBP manual, the principles of landscaping for bush fire protection are to: prevent flame impingement on the dwelling; provide a defendable space for property protection; reduce fire spread; deflect and filter embers; provide shelter from radiant heat; and reduce wind speed. Careful consideration of the species selection, their location relative to their flammability, and on-going maintenance to readily remove flammable fuels (leaf litter, twigs and debris) is critical to providing for bushfire protection (RFS, 2019).

9.0 EXTENT OF COMPLIANCE AND/OR DEVIATION FROM SPECIFICATIONS

The following Tables set out the standards by which the proposal is to be assessed. These Tables are those that are provided at section 5 of *PBP-2019* and are relevant to urban subdivision developments.

9.1 Bushfire Protection Measures for Residential Developments

9.2 Asset Protection Zones

Table 4

ASSET PROTECTION ZONES		
Intent of measures: to provide		

sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building.		COMPLIES / DOES NOT COMPLY
Performance Criteria	Acceptable solutions	
The intent may be achieved where		
Radiant heat levels at any point on a proposed building will not exceed 29 kW/m ² .	1) An APZ is provided in accordance with the relevant tables/ figures in Appendix 1 of PBP-2019. 2) The APZ is wholly within the boundaries of the development site.	Complies Complies
APZs are managed and maintained to prevent the spread of a fire towards the building.	3) In accordance with the requirements of Standards for Asset Protection Zones (RFS, 2005)	Complies
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	4) The APZ is located on lands with a slope less than 18°.	Complies

In relation to *Acceptable Solution 1*, the minimum separation / APZ required by *PBP-2019* for residential developments are provided in Attachment 1.

In relation to *Acceptable Solution 3*, the vegetation management and landscaping of the future allotments should comply with the NSW Rural Fire Service document “*Standards for Asset Protection Zones*” (2005). This document has been provided as Appendix 1 of this Report for the benefit of the Client.

9.3 Public Roads

Table 5

ACCESS – PUBLIC ROADS Intent of measures: to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.		COMPLIES / DOES NOT COMPLY
Performance Criteria	Acceptable solutions	
The intent may be achieved where:		
Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources).	5) Public roads are two-wheel drive, all weather roads.	Complies
Public road widths and design that allow safe access for firefighters	6) Urban perimeter roads are two-way, that is, at least two	Complies

while residents are evacuating an area.	traffic lane widths (carriageway 8m minimum kerb to kerb), allowing traffic to pass in opposite directions. Non-perimeter roads comply with Table 5.3b – Road widths for Category 1 Tanker (Medium Rigid Vehicle). 7) The perimeter road is linked to the internal road system at an interval of no greater than 500m in urban areas. 8) Traffic management devices are constructed to facilitate access by emergency services vehicles. 9) Public roads have a cross fall not exceeding 3°. 10) All roads are through-roads. Dead-end roads are not recommended, but if unavoidable, dead-ends are not more than 200m in length, incorporate a minimum 12m outer radius turning circle, and are clearly sign posted as a dead-end and direct traffic away from the hazard. 11) Curves of roads (other than perimeter roads) are a minimum inner radius of 6m and minimal in number, to allow for rapid access and egress. 12) The minimum distance between inner and outer curves is 6m. 13) Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10° or other gradient specified by road design standards, whichever is the lesser gradient. 14) There is a minimum vertical clearance to a height of 4m above the road at all times.	A perimeter road have been designed into development footprint, non-perimeter roads comply with table 5.3b of PBP 2019 Complies Complies Complies Two dead end roads have been designed as part of the development design which are less than 200m in length egress for the roads evacuate away from the bushfire vegetation. Complies Complies Complies Complies
The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	15) The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for	Complies

	areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.	
Roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties that are clearly numbered.	16) Public roads greater than 6.5m wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression. 17) Public roads between 6.5m and 8m wide are “No Parking” on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.	Can Comply Not Applicable The development road is designed with a minimum 15m reserve with 8m bitumen trafficable surface
There is clear access to reticulated water supply.	18) Public roads up to 6.5m wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression. 19) One-way only public access roads are no less than 3.5m wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.	Not Applicable Not Applicable
Parking does not obstruct the minimum paved width.	20) Parking bays are a minimum of 2.6m wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. 21) Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.	Not Applicable Complies For the majority the access to the vegetation interface shall be via the perimeter road.

9.4 Property Access Roads

Table 6

ACCESS – PROPERTY ACCESS Intent of measures: to provide safe access to/from the public road system		COMPLIES / DOES NOT COMPLY
--	--	-----------------------------------

for firefighters providing property protection during a bush fire and for occupants faced with evacuation.		
Performance Criteria	Acceptable Solutions	
The intent may be achieved where:		
Access to properties is provided in recognition of the risk to fire fighters and/or evacuating occupants.	22) At least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200m from a public through-road.	Not Applicable No Specific access requirements apply in an urban area provided a 70m unobstructed path to a public road.
The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. All weather access is provided.	23) Bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes. 24) Roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).	Complies Complies
Road widths and design enable safe access for vehicles	25) <i>A minimum carriageway width of 4m for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70m from the nearest hydrant point to the most external part of a proposed building (or footprint).</i> 26) <i>In forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay.</i> 27) <i>A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches.</i> 28) <i>Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12m outer radius.</i> 29) <i>Internal roads for rural properties provide a loop road around any dwelling or</i>	Not Applicable Not Applicable Complies Not Applicable

	<i>incorporate a turning circle with a minimum 12m outer radius.</i>	Not Applicable
	<i>30) The minimum distance between inner and outer curves is 6m.</i>	Complies
	<i>31) The cross-fall is not more than 10°</i>	Complies
	<i>32) Maximum grades for sealed roads do not exceed 15° and not more than 10°</i> <i>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</i> <i>33) Access to a development comprising more than 3 dwellings have formalised access by dedication of a road and not by right of way.</i>	Not Applicable

Table 7

Prepared By: Bushfiresafe (Aust) P/L (02) 66451088
Bushfire Assessment for residential subdivision of Lots 46 & 47 DP751395 Miles Street, Yamba

undertaken to ensure they are not fouled by branches.	- lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).	Not Applicable
Gas services Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	54) Reticulated or bottled gas is installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used. 55) All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation. 56) If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal. 57) Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.	Can Comply @ dwelling application Can Comply @ dwelling application Can Comply @ dwelling application Can Comply @ dwelling application

REFERENCES

Clarence Valley Council, 2007 Clarence Valley Council Bushfire Prone Lands Map webpage at: <http://maps.coffsharbour.nsw.gov.au/eview-html/index.html> accessed 4th October, 2020.

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Appendix 1: Guidelines for Asset Protection Zones



GUIDELINES

for

Asset Protection Zones

- WHAT IS AN ASSET PROTECTION ZONE?
- WHERE CAN I PUT AN APZ?
- WHAT WILL THE APZ DO?
- COMPONENTS OF AN APZ
- RECOGNISING A BUSH FIRE HAZARD
- WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING AN APZ?
- ASSET PROTECTION ZONE WIDTHS
- MANAGING BUSH FIRE FUEL TO REDUCE BUSH FIRE HAZARDS
- LANDSCAPING AND BUSH FIRE HAZARD REDUCTION
- HOW CAN I FIND OUT MORE?

June 2003
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NSW RURAL FIRE SERVICE

...for our community

GUIDELINES FOR ASSET PROTECTION ZONES

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INTRODUCTION

Bush fires are a natural and periodic event in the Australian bush. Many Australian plants and animals have adapted to fire over thousands of years and require fire as part of their life cycle. However, development adjacent to bushland areas has increased the risk of fire impacting on people and their assets. Fire management needs to strike a balance between the protection of life and property and the maintenance of ecological processes and systems.

In Australia, bush fires are inevitable and an essential aspect of the Australian landscape. However, the impact on property and life can be mitigated with responsible preparation and management of bush fire hazards. This is the responsibility of all land managers, as well as communities and individuals taking responsibility for their own fire safety.

The level of protection for life or whether or not a house or other assets survive a bush fire ultimately depends on the landowner and their level of preparedness against bush fire attack.

This guideline provides advice to private landowners to assist them in creating and maintaining an Asset Protection Zone (APZ) for residential buildings and other personal assets.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is an area surrounding an asset, managed to reduce bush fire fuels to a level that will minimise the impact of fire on that asset. The APZ serves as a buffer zone between an asset and the bush fire hazard. The primary purpose of the APZ is to ensure that a progressive reduction of bush fire fuels occurs between the bush fire hazard and any habitable structures within the development.

WHERE CAN I PUT AN APZ?

An APZ is located between your house and the bush fire hazard. An APZ may only be implemented on land with the land owners written consent. You cannot undertake any clearing of vegetation on a neighbours property, including National Park estate, Crown land or land under the management of your local council. The APZ should be located wholly within your land. If you believe that the land adjacent to your property is a bush fire hazard and may require clearing to create an APZ, you can lodge a complaint with the RFS your complaint be investigated and appropriate action will be taken if required.

WHAT WILL THE APZ DO?

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



Ember attack on the asset;



Damage to the built asset (eg. a house) from intense radiant heat;



A ground fire burning up to the walls of the house and setting fire to the house

The APZ should provide a safe point for firefighters and home owners to defend their property.

Within this area, bush fire fuels that could become a part of the fire should be minimised. When considering the level of clearing required, you need to keep in mind that the aim of the APZ is to ensure that fuels are discontinuous, that is, the vegetation does not provide a path for the transfer of fire to the asset from the surface to the tree canopy or through the canopy.



RECOGNISING A BUSH FIRE HAZARD

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

Generally, the more flammable and dense the vegetation, the greater the hazard will be. A large area of continuous vegetation on sloping land may also increase the potential bush fire hazard.

The amount and structure of vegetation around a house will influence the severity of damage from a bush fire. Basically, the higher the available fuel loading the more intense a fire will be.

Isolated areas of vegetation

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

This includes the following vegetation:



Bushland areas of less than 1 hectare (100 metres x 100 metres) that are more than 100 metres from a high hazard area;



Strips of vegetation less than 20 metres wide e.g. road and river corridors;



Vegetation not mapped on your local council's Bush Fire Prone Land Map.

If you are not sure whether or not there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service District Office for further details.

Isolated areas of vegetation may not be considered a significant bush fire hazard



CAUSE OF DAMAGE FROM BUSH FIRE

Houses can be ignited during bush fires by any of the following ways:

a) Wind

The wind during a bush fire can be extremely strong. This may throw debris and branches of the trees that are too close causing damage to buildings (especially windows & roofs). This will create openings and make the structure more prone to ember attack.



b) Embers

Embers (sparks) are the main cause of houses catching alight during bush fires. Extreme fire weather days are accompanied by strong to gale force winds, which carry burning debris. Embers gain entry to houses through broken windows or gaps in and around walls or roof cladding and ignite the contents. Embers can also lodge between and ignite horizontal timber decking, guttering, steps and windowsills. They can be blown up against and ignite timber used for supports, floor joists, posts and steps.



c) Radiation

Radiant heat can crack windows, allowing embers to enter. Radiant heat also preheats the buildings and contents, increasing the risk of ignition by embers and flame. In severe situations this may cause such things as curtains and fabric furnishings to burst into flames.



d) Flame contact

A significant risk to an asset is from ignition of vegetation growing directly against a dwelling, in turn igniting the dwelling through those areas described above.



People may also be adversely affected by smoke generated by bush fires, particularly in sensitive locations such as schools, nursing homes and hospitals.

WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING AN 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 land owner/ manager. You cannot undertake any clearing of a neighbour's land without their agreement (this includes NPWS, councils etc.). All works must be undertaken wholly within the boundary of the affected property.

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection 2001*. Any approvals required will have to be obtained as part of the Development Application process. *Planning for Bushfire Protection 2001* outlines the distance requirements for APZs around new dwellings including the requirements for an Inner and Outer Protection Area.

If you wish to create or maintain an APZ for an existing structure you may be required to obtain a Bush Fire Hazard Reduction Certificate or other environmental approval. The RFS offers a free environmental assessment and certificate issuing service. Contact the Fire Mitigation Officer at your local RFS Fire Control Centre to determine if you can use this approval process.

If you intend to use fire to remove the bush fire hazard from your property you may also need to obtain a fire safety Permit through the RFS or NSW Fire Brigades. The RFS document *Before You Light That Fire* explains when a permit is required.

ASSET PROTECTION ZONE WIDTHS

The practical extent of APZs depends on the type of vegetation and slope of the land. Fires are more intense when they run uphill therefore, if the fuel is downslope of the house the distance of the APZ from the asset will need to be greater than if it is upslope of the asset.

Calculating an APZ

The RFS Bush Fire Environmental Assessment Code allows for a maximum distance of clearing based on likely environmental impact. These distances (below) are based on the most common vegetation type found in NSW and are specifically for the stream lined assessment process required for the issue of a Bush Fire Hazard Reduction Certificate.

a) Residential Dwellings



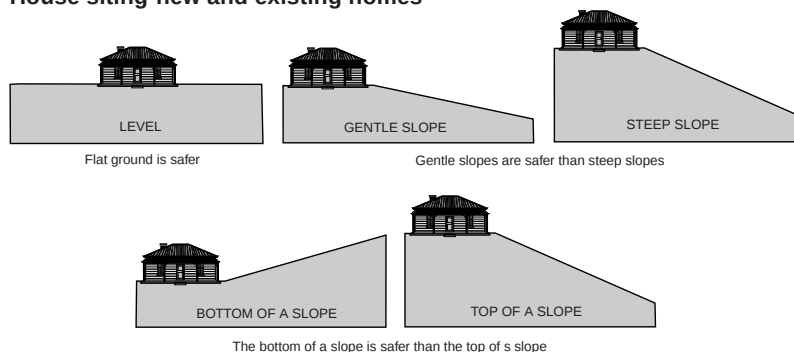
Bush Fire Environmental Assessment Code distances for APZ (distances are measured from the wall of the dwelling towards the hazard);

Slope	Distance
Hazard upslope (<18°)	20 metres
Hazard downslope 0°-5°	25 metres
Hazard downslope 5°-10°	30 metres
Hazard downslope 10°-15°	40 metres
Hazard downslope 15°-18°	50 metres

b) Other Buildings

APZs protecting other buildings and infrastructure such as farm sheds can be up to 10 metres.

House siting-new and existing homes





Ground fuels such as fallen leaves, twigs and barks should be removed on a regular basis.

MANAGING BUSH FIRE FUEL TO REDUCE BUSH FIRE HAZARDS

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

Reduction of fuel does not have to be as drastic as removing all vegetation. Environmentally this would be disastrous and often 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.

Bush fire fuels can be managed by:

a) Removal or pruning of trees, shrubs and understorey

The management of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation. Vegetation can act as a windbreak and radiant heat barrier.

The majority of leaves and ground cover should be removed from the surface. Valuable native trees and shrubs should be retained as clumps or islands and should retain a covering of at least 20% of the area.

The pattern of cleaning should involve:

- Removing noxious and environmental weeds first;
- Removing highly flammable species such as species within the genus *Melaleuca* and *Leptospermum*.
- Removal of trees and shrubs less than 3 metres in height.
- Removal of significant native species last.

Refer to the landscaping section in this document for more detailed information.

b) Raking or manual removal of fine fuels

Ground fuels such as fallen leaves, twigs and barks should be removed on a regular basis. The most flammable fuel is dry vegetation, sticks and other debris less than 6mm in diameter.

c) Mowing of grass

Grass needs to be kept short.

d) Slashing and trittering

Slashing and trittering are economical methods of fuel reduction in an APZ. For slashing or trittering to be effective, the cut material must be removed or allowed to rot down well before summer starts. Slashing and mowing may leave grass in rows thus increasing fuel in some places. Tritering or turbo mowing also mulches the vegetation leaving the fuel where it is cut. Ensure you remove the clippings and dispose of them in a green waste bin where available or compost on site (it is illegal and dangerous to dump clippings in the bush).

When correctly applied, this method has the advantage of inhibiting the growth of weeds. Weeds should be completely removed, as they tend to be extremely flammable as well as growing and spreading at a fast rate.

e) Ploughing and grading

Ploughing and grading can produce effective firebreaks, however, these areas may need constant maintenance. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

f) **Burning (hazard reduction burning)**

Burning off (or hazard reduction burning) is a method of removing unwanted ground litter and bush fire hazards through the use of fire. Controlled burning or prescribed burning of vegetation is more often used by land management agencies for strategic bush fire management.

Before any vegetation is burned within an APZ, the type of fire should be determined i.e. is it a pile burn or is it a burn of an area of bushland (prescribed burn). The type of burn may determine the types of conditions to be imposed as part of any environmental approval.

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 burn will get out of control. More bush fires result from escaped burning off work than from any other single cause. Planning for the use of fire must therefore ensure that it is effective and environmentally sound.

During the planning phase for a prescribed burn, there are many considerations such as smoke management, scorch height, frequency of burning and cut off points for the fire. For further information refer to the document entitled *Guidelines for Low Intensity Hazard Reduction Burning* (produced by the NSWRFSS).

g) **Pile Burning**

In some cases you may use pile burning to remove material that has been cleared in creating or maintaining an APZ. 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 to undertake the burning. In these areas you will need to justify why you cannot remove the material through the normal garbage collection system. For further information refer to the document *Guideline for Pile Burning*.

LANDSCAPING AND BUSH FIRE HAZARD REDUCTION

Your home and garden can blend with the natural environment and be landscaped for fire protection at the same time.

To produce a garden that protects your home, it is necessary to plan the layout of the garden and to give consideration to features such as fire resistant plants, barriers and windbreaks.

Layout of gardens in an APZ

The following advice is recommended when creating and maintaining garden that is part of an APZ:



Ensure that vegetation does not provide a path for the transfer of fire to the house;



Remove all noxious weeds. Local councils can provide a list of noxious weeds for their local government area and information on control options for different types of weeds. Refer to Appendix A for a list of weeds 'prohibited for sale' in Sydney.



Separate tree crowns by at least 2 metres so that the canopy is not continuous; and do not permit a canopy to overhang to within 5 metres of the dwelling.



Plant or clear vegetation into clumps rather than continuous rows;



Prune low branches 2 metres from the ground to prevent a ground fire from spreading into trees;



Locate vegetation far enough away so that plants will not ignite the house 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 or provide non flammable pathways directly around the curtilage of the dwelling;



Gardens should not directly abutt the dwelling. Where this does occur gardens should contain non-flammable plants and any mulch should be well watered;



Do not erect brush type fencing and do not plant “pencil pine” type trees, which are highly flammable.

Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large areas/quantities of garden mulch, stacked flammable building materials etc should be stored away from the house. These areas 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.

Fire resistant plants

While the design of the garden is important, so too is the type of plant species selected. No plant is fireproof, however, many plants have features that minimise the extent to which they contribute to the spread of bush fires.

Given the right conditions, all plants will burn. Low to moderate fires scorch or burn plants, while severe bush fires cause more damage. In extreme circumstances, high-intensity fires can incinerate most plants and spread the fire further into the property bush fire protection area.

Fire resistant plants, which are hard to burn, 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.

If possible, water plants during summer to maintain leaf moisture content. The higher the moisture content of the leaves, the less likely the plants are to ignite. Native plants from the local area are less likely to suffer from drought and these should be used in preference to introduced species.

Trees with loose, fibrous or stringy bark should be avoided in the APZ. These trees can easily ignite and encourage the ground fire to spread up to and then through the crown of the trees. Wind can carry burning bark, especially loose, flaky or ribbon bark, away to start new fires. When deciding which trees to plant in the APZ, it is recommended that you use trees that have smooth bark and are planted so that the final tree height and crown width complies with recommended separation distances.

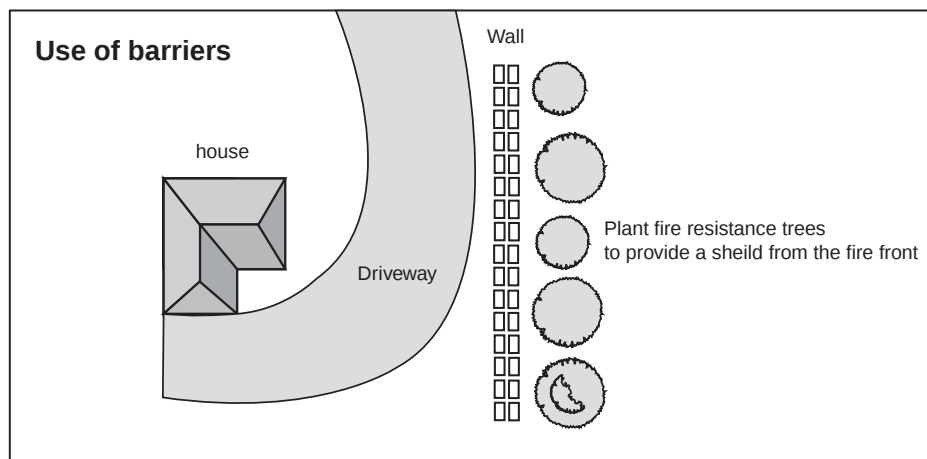
A combination of fire resistant plants and shrubs planted on your property will assist in reducing the spread of fire during bush fire incidents. As mentioned earlier, when choosing fire resistant plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

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

Barriers

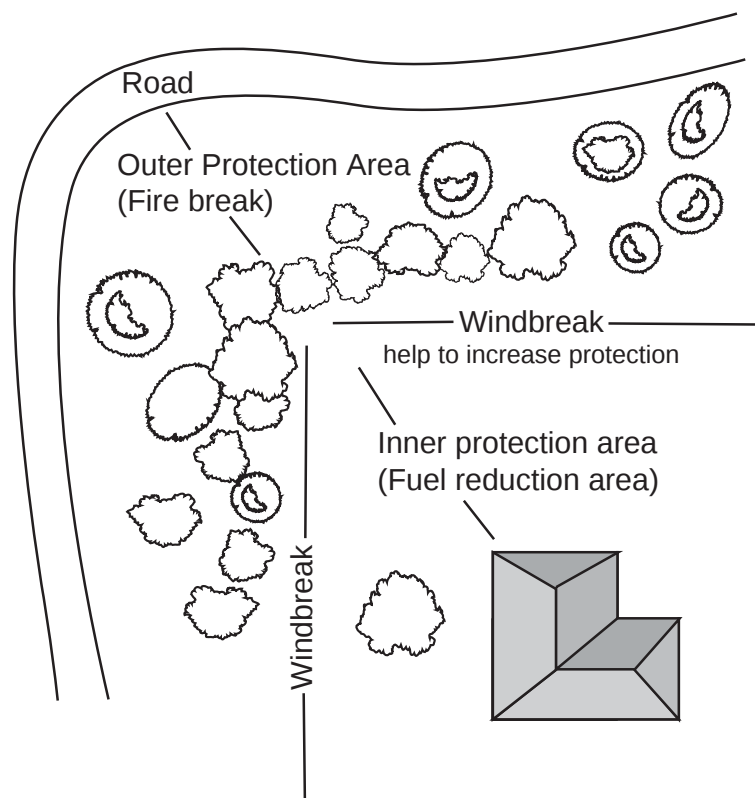
You can stop many embers (sparks) and slow down a bush fire by creating barriers around your assets.

Barriers may include stone, masonry walls and earth mounds or other non-combustible fencing. Such barriers will help protect assets from possible attack of burning embers, heat radiation and direct flame contact.



Wind breaks

Rows of trees provide a more than useful windbreak, trapping embers and flying debris, which would otherwise reach the house.



Tree crowns will rarely carry fire without a significant fuel loading on the ground providing supporting fuel & heat.

By reducing the wind speed, a row of trees also slows the rate of spread of a bush fire and a dense foliage traps radiant heat, lowering bush fire intensity.

To be effective a windbreak should



*Be located on the side of the property from which extreme fire weather normally approaches.
In NSW this is typically the northwest aspect.*



Be of sufficient length (generally 100 metres minimum length if possible)



Be located at a distance of 1 to 3 times the height of fully grown trees if possible;



Use smooth barked eucalyptus or deciduous trees;



Allow 50-60% of the wind to pass through.

Windbreaks should be located towards the outer edge of the APZ.

Ground fuel should be reduced around the windbreak so as to prevent any approaching bush fire from climbing into the crowns of the trees and spreading further.

HOW CAN I FIND OUT MORE?

If you require any further information please contact:

- your local NSW Rural Fire Service District Office; or
- call the NSW RFS Education Line 1 800 654 443 (Monday to Friday, 9am to 5pm), or
- the NSW RFS website at www.rfs.nsw.gov.au.

**Produced by the NSW Rural Fire Service, Locked Mail Bag 17,
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APPENDIX A

Which plants NOT to grow? (Species list)

Weeds should be completely removed, as they tend to be extremely flammable and grow and spread at a fast rate. Below is a list of weeds 'Prohibited from Sale' in Sydney. NSW Agriculture has a full list of weeds for each Local Government Area in the State.

Noxious & Environmental Weeds

Common Name	Botanical Name	Locality
Lantana	Lanatan Cummara	All Sydney
Turkey Rhubarb	Acetosa sagitatta	North
Madeira Vine	Anredera cordifolia	All Sydney
Giant Reed	Arundo donax	All Sydney, Blue Mts
Bridal Creeper	Asparagus asparagoides	Blue Mts
Asparagus fern	A. densiflorus	North, Central, Coastal
Climbing Asparagus	A. plumosus	North, Central, Coastal
Cabomba	Cabomba spp.	All Sydney
Balloon Vine	Cardiospermum grandiflorum	North, South, Coastal
Camphor Laurel	Cinnamonum camphora	Blue Mts, North
Cotoneaster	Cotoneaster glaucophyllus	Coastal
	C. pannosus	Coastal
Montbretia	Crocasmia x crocosmiiflora	Blue Mts
Cape Ivy	Delairea odorat	North, Central, Coastal
Cockspur Coral Tree	Erythrina crista-galli	Coastal
Morning Glory	Ipomea cairica	North, South, Coastal
	I. indica	North, South, Coastal
Cape Broom	Genista monspessulana	North, Coastal, Central, Blue Mts
Kochia	Kochia scopari	All Sydney
Broadleaf Privet	Ligustrum lucidum	All Sydney
Narrowleaf Privet	L. sinens	All Sydney
Cat's claw Creeper	Macfadyena urguis-cati	North, Central, Coastal
Fishbone Fern	Nephrolepis cordifolia	Coastal
Rhizomatous Bamboo	Phyllostachys spp.	Blue Mts
Willow	Salix spp.	All Sydney
Senna	Senna pendula	Coastal
Wandering Jew	Tradescantia fluminensis	North, Coastal

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the identified bushfire prone vegetation and required asset protection zones for the proposed development and should not be used for any other purpose.

ATTACHMENT 1

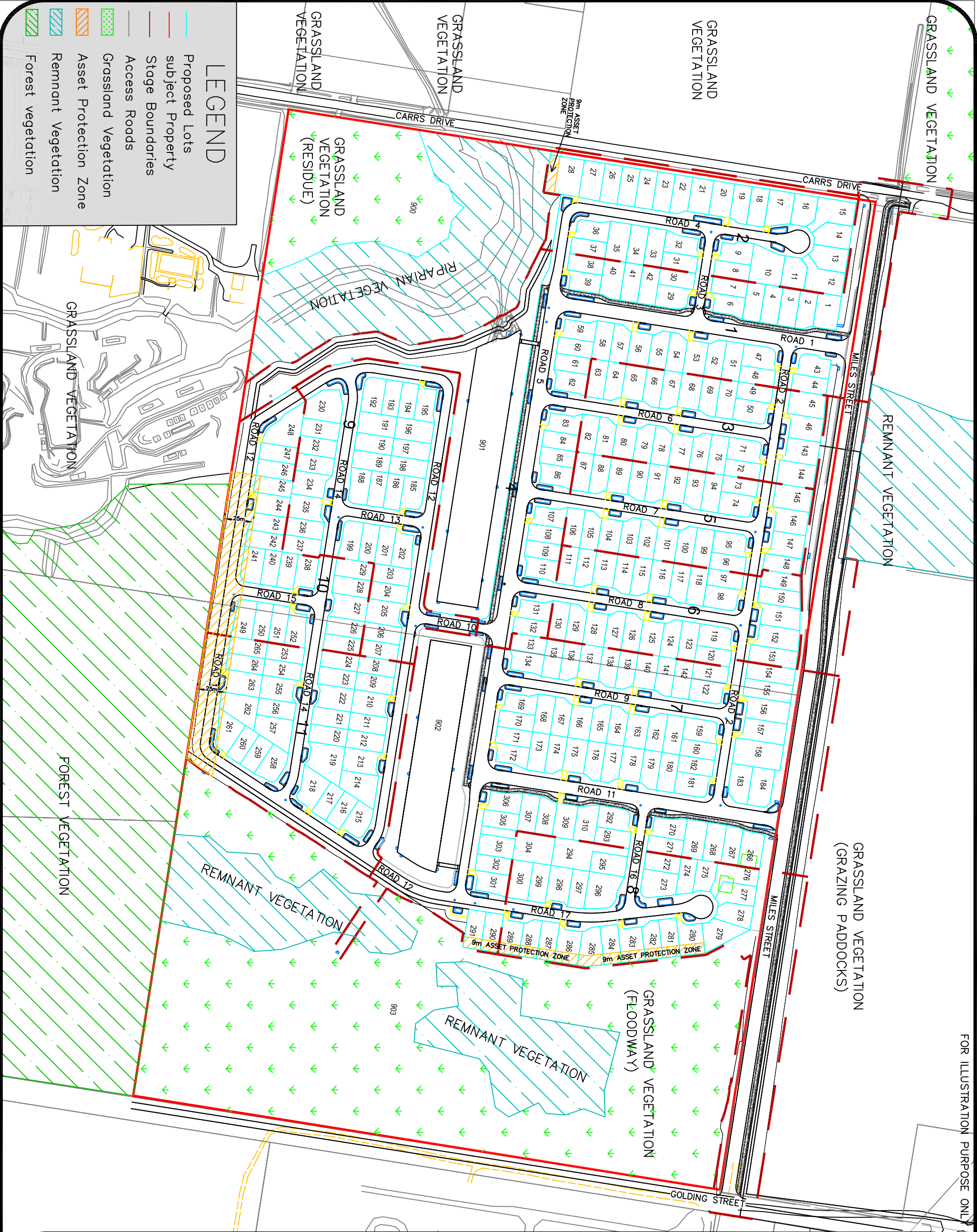
APZ & VEGETATION COMMUNITIES

Bushfiresafe (Aust)
20 Macleachlan St
Macleon NSW 2463
(02) 6645 1088



Project Asset Protection Zones for proposed residential subdivision at Lots 46 & 47 Miles Street, Yamba

Date: May 2021
Scale: 1:21070



LEGEND

- Proposed Lots
- subject Property
- Stage Boundaries
- Access Roads
- Grassland Vegetation
- Asset Protection Zone
- Remnant Vegetation
- Forest vegetation