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Bush Fire Assessment Report

In relation to a proposed development at:

14 Kanimbla Crescent, Bilgola Plateau, NSW

This assessment has been prepared and certified by: Matthew Toghill. BPAD certified practitioner FPAA Accreditation No: BPAD31642 Report No: 14Kan-01 Date: 20/11/2024	

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Executive Summary

The purpose of the report is to determine the category of bushfire attack and subsequent construction standard for the proposed alterations and additions to the existing dwelling and new carport at No. 14 Kanimbla Crescent, Bilgola Plateau, NSW.

The site had been identified as 'bush fire prone land' for the purpose of Section 146 of the *Environmental Planning and Assessment Act 1979* and the Legislative requirements for building on bush fire prone lands are applicable.

The proposed development is in infill development as defined within Chapter 7 of *Planning for* Bushfire *Protection 2019* and this report has been prepared in accordance with the requirements of Section 4.14 of the Environment Planning and Assessment Act.

This assessment includes an analysis of the hazard, threat and subsequent risk of the development proposal and provides recommendations that satisfy the Objective and Performance requirements of the Building Code of Australia, Planning for Bushfire Protection 2019 [PBP] and Australian Standard AS3959, 2018.

Following a site assessment, it was determined the distance of the development from the closest hazard would keep the Bushfire Attack Level (BAL) to BAL-29, in accordance with the methodology described in PBP and AS3959-2018. The development also meets performance criteria as set out in chapter 7 of PBP in relation to APZ's, siting and design, construction standards, access and egress requirements, water and utility services and landscaping.

1. Description of the subject property

- No. 14 Kanimbla Crescent, Bilgola Plateau
- Lot 92/-/DP28862
- Local Government Area: Northern Beaches
- Land zoning: C4 Environmental Living

Figure 1: Location of the subject site

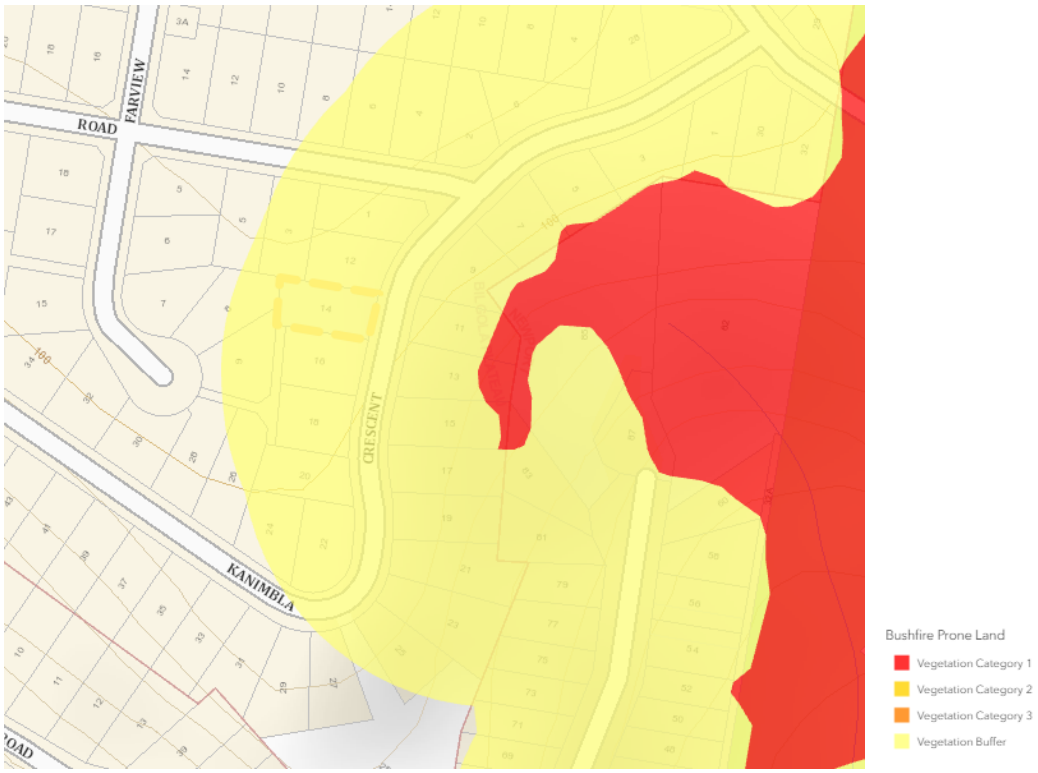

Figure 2: Bushfire prone land map (Source: NSW Planning Portal)

2. Development Proposal and Building Classification

The development proposal is for the alterations and additions to the existing dwelling and new detached carport.

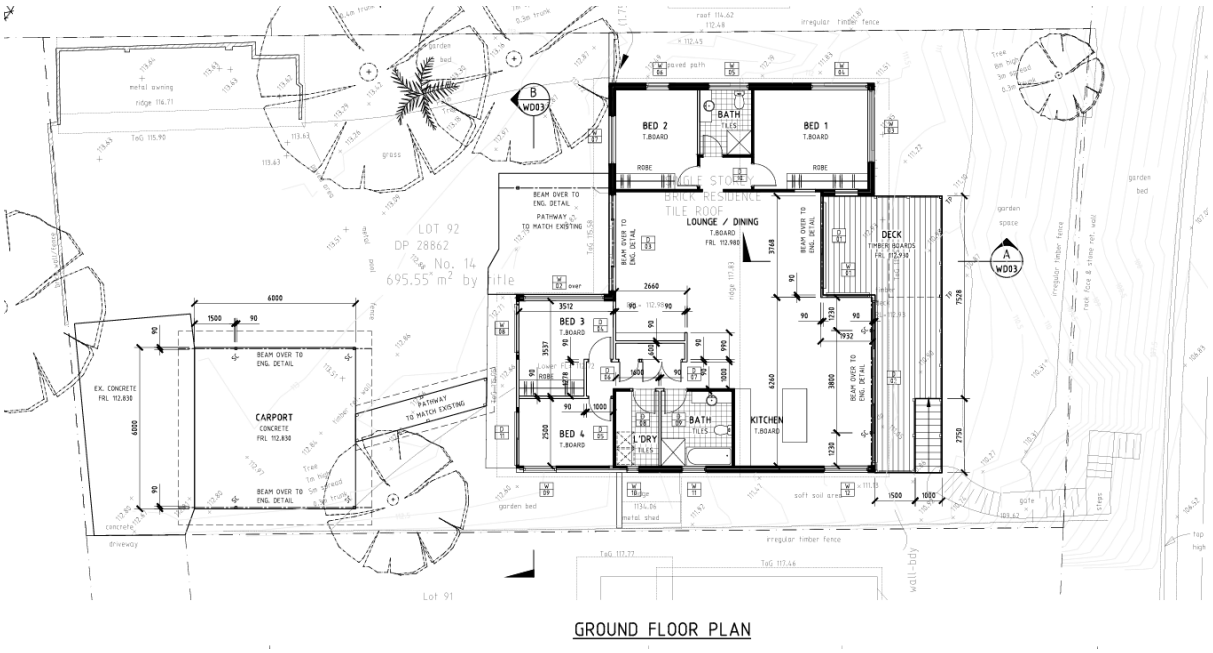

Figure 3: Ground floor plan.

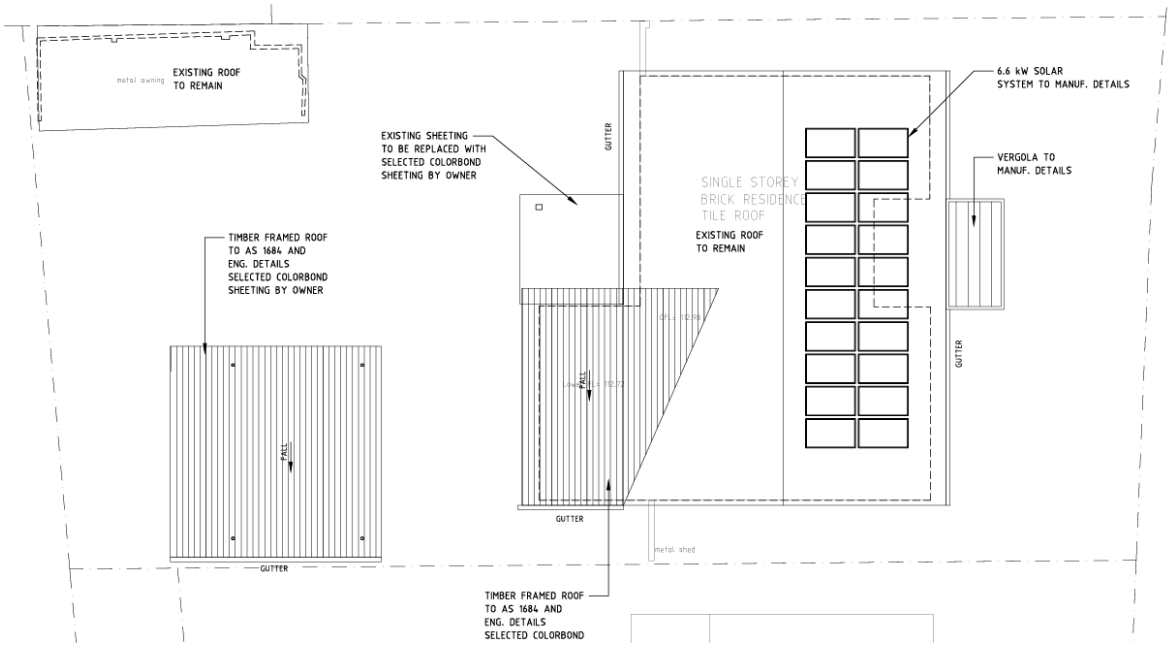

Figure 4: Roof plan.

3. Classification of the Vegetation on and surrounding the site

For the purpose of a Bush Fire Risk Assessment, vegetation within 140m of the site is assessed and classified. In this instance there is an area of Category 1 vegetation to the east of the site which is the most significant threat from bushfire. The vegetation formation within this area consists of Littoral Rainforest (Refer to Figure 6) which for the purpose of this assessment will be classified as 'Rainforest'.

Figure 5: Aerial photo showing vegetation within 140m of the site.

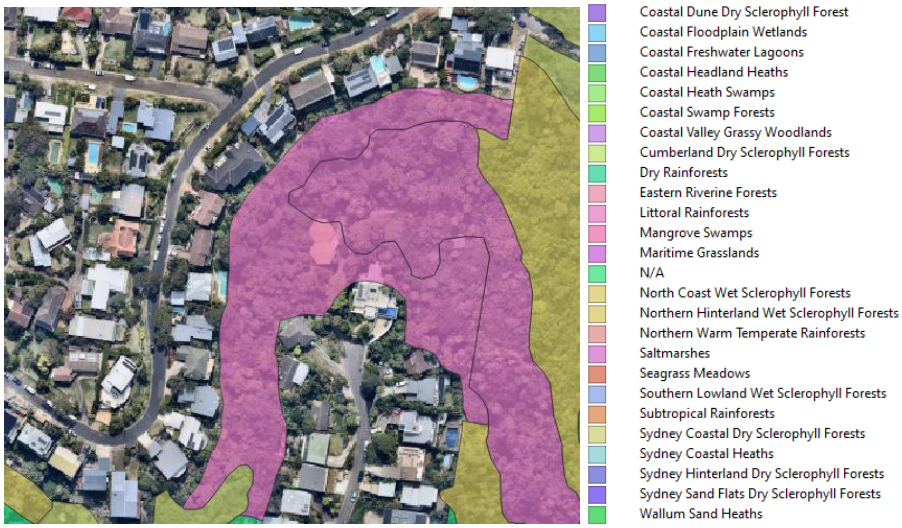

Figure 6: Aerial photo showing vegetation formations surrounding the subject site (Source: NSW Government Central Resource for Sharing and Enabling Environmantla Data).

3.1 Site photos

Photo 1

Photo 2

Photos 1 and 2 showing vegetation to the east of the site.

4. Assessment of effective slope

The effective slope is the slope of the land under the classified vegetation. It has a direct influence on the rate of spread, intensity and ultimate level of radiant heat flux of a fire. The effective slope is the slope of the ground under the hazard (vegetation), not the slope between the vegetation and the building.

Legend: → Direction of effective slope

Figure 7: Contour map.

Transect Line	Effective slope group as per PBP
T1	26m Fall over 70m= 20 degrees ***(Downslope >15-20 degrees)***
T2	26m Fall over 58m= ***24 degrees****

In accordance with Clause A1.4 of PBP, as the slope is in excess of 20 degrees a Performance-Solution will be used to determine the radiant heat exposure.

5. Access and Egress

The site has direct access to Kanimbla Crescent, which is a public road, access and egress for emergency vehicles appears adequate. *Planning for Bushfire Protection 2019* requires no specific access requirements in an urban area where a 70m, unobstructed path can be demonstrated between the most distant external part of the dwelling and the nearest part of the public access road (where the speed limit is not greater 70kph) that supports operational use of emergency firefighter vehicles. As such, there are no formal property access requirements.

6. Adequacy of water supply

The area has reticulated water supply and hydrants are spaced at a regular distance along Kanimbla Crescent and surrounding residential street. No additional water supply is required.

Figure 7: Aerial photo showing the location of street hydrant surrounding the site.

7. Features that may mitigate the impact of a high intensity bushfire

There are no significant features on or adjoining the site that may mitigate the impact of a high intensity bushfire on the proposed development.

8. Environmental impact of any proposed bushfire protection measures.

A review of the NSW Planning Portal shows no part of the site being identified on the Biodiversity Values map. However, the scope of this report is not to assess the environmental values of the property. This report does not authorise the clearing of any vegetation, nor does it include an assessment of potential ecological impacts of any clearing for the purpose of an APZ. Approvals necessary for the clearing of vegetation should be obtained prior to the establishment of any APZ. The bushfire protection measures that are proposed are either within the boundaries of the allotment or part of the constructed building.

9. Bushfire Risk Assessment

9.1 Alterations and additions to the existing dwelling

Figure 8: Aerial photo showing distance to surrounding vegetation.

Table 1; Determination of the category of bushfire attack for the site, and subsequent required building standards (Reference: Table A1.12.5 *Planning for Bush Fire Protection 2019 and Method 2 AS3959 2018*).

Transect	Distance to classified vegetation	Vegetation Classification	Assessment of effective slope	FDI	Bushfire Attack Level
T1	40.00m	Rainforest	Downslope >15-20 degrees	100	BAL-29
T2*	40.00m	Rainforest	Downslope 24 degrees	100	BAL-29

Summary: Based upon the relevant provisions of PBP and AS3959-2018, the maximum anticipated radiant heat attack for the dwelling is <29kW/m2 and the subsequent minimum construction standard is BAL-29 AS 3959- 2018.

Method 2 AS3959 2018 calculations for T2 can be found in Appendix 4 of this report

9.2 New carport

Figure 8: Aerial photo showing distance to surrounding vegetation.

Table 1; Determination of the category of bushfire attack for the site, and subsequent required building standards (Reference: Table A1.12.5 *Planning for Bush Fire Protection 2019 and Method 2 AS3959 2018*).

Transect	Distance to classified vegetation	Vegetation Classification	Assessment of effective slope	FDI	Bushfire Attack Level
T1	60.00m	Rainforest	Downslope >15-20 degrees	100	BAL-12.5
T2*	60.00m	Rainforest	Downslope 24 degrees	100	BAL-19

Summary: Based upon the relevant provisions of PBP and AS3959-2018, the maximum anticipated radiant heat attack for the new carport is <19kW/m2 and the subsequent minimum construction standard is BAL-19 AS 3959- 2018.

Method 2 AS3959 2018 calculations for T2 can be found in Appendix 4 of this report

10. The extent to which the construction conforms or deviates from Chapter 7 of 'Planning for Bushfire Protection 2019'.

Performance Criteria	**How this development meets acceptable solutions**
The intent may be achieved where:	
In relation to APZ's: -Defendable space is provided onsite. -An APZ is provided and maintained for the life of the building.	Defendable space is provided on all sides of the building. Asset protection zones are provided for on-site and by adjoining development and public roads.
In relation to construction standards: It is demonstrated that the proposed building can withstand bushfire attack in the form of wind, smoke, embers, radiant heat and flame contact.	Construction standards have been recommended in accordance with the requirements of *Planning for Bushfire Protection 2019* and *AS 3959-2018 Construction of buildings in bushfire prone areas*.
In relation to access requirements: Safe operational access is provided [and maintained] for emergency service personnel in suppressing a bushfire while residents are seeking to relocate, in advance of a bushfire.	This site has direct access to public roads, and the access and egress for emergency vehicles and evacuation appears to be adequate.
In relation to water and utility services: -Adequate water and electrical services are provided for fire fighting operations.	The area has reticulated water supply with hydrants spaced at a regular distance along Kanimbla Crescent and surrounding residential streets.
In relation to landscaping: It is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind driven embers to cause ignition.	All new landscaping should Appendix 4 of *Planning for Bushfire Protection 2019* which outlines the requirements for landscaping and property maintenance.
In relation to emergency and evacuation planning	It is advised the residents should complete a *Bushfire Survival Plan* as formulated by the NSW Rural Fire Service and Fire and Rescue NSW.

11. Assessment of the extent to which the development can conform to the Aim and Objectives of 'Planning for Bush Fire Protection 2019' (PBP).

Aim	**Meets Criteria**	**Comment**
The aim of PBP 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 the protection of the environment.	Yes	This threat assessment has determined that the category of bushfire attack for the proposal is BAL-29 and not within the Flame Zone. BAL-29 construction standards have been recommended. Landscaping, defendable space, access and egress, emergency risk management and construction standards are all in accordance with the requirements of PBP 2019 and the aim has been achieved.
Objectives	**Meets Criteria**	**Comment**
Afford building and their occupants protection from exposure to bushfire.	Yes	This threat assessment has determined that the category of bushfire attack for the proposal is BAL-29 and not within the Flame Zone. BAL-29 construction standards have been recommended.
Provide for a defendable space to be located around buildings	Yes	Defendable space can be provided on all sides of the buildings.
Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to other buildings	Yes	Appropriate separation can be provided by a combination of onsite APZ and adjoining developed sites and public roads.
Ensure that appropriate operational access and egress for emergency services personnel and occupants is available.	Yes	This site has direct access to public roads, and the access and egress for emergency vehicles and evacuation appears to be adequate.
Provide for ongoing management and maintenance of BPM's	Yes	All BPM's are provided within the subject site or adjoining managed residential properties and public roads. BPM's can be managed and maintained by the occupants.
Ensure that utility services area adequate to meet the needs of firefighters	Yes	Utility services can be provided in accordance with Table 7.4a of PBP

12. Recommendations

The following recommendations are made for the bushfire protection measures for the proposed alterations and additions to the existing dwelling at No. 14 Kanimbla Crescent, Bilgola Plateau, NSW and are based upon the relevant provisions of the NSW RFS guideline entitled *Planning for Bushfire Protection 2019.*

1) Alterations and additions *Roof, north, east and south elevations*	All new construction shall comply with a minimum standard of section 3 [construction general] and section 7 (BAL-29), *AS 3959-2018* and Chapter 7 of *Planning for Bushfire Protection 2019*.
2) Alterations and additions *West elevation*	All new construction shall comply with a minimum standard of section 3 [construction general] and section 6 (BAL-19), *AS 3959-2018* and Chapter 7 of *Planning for Bushfire Protection 2019*.
3) New carport	All new construction shall comply with a minimum standard of section 3 [construction general] and section 6 (BAL-19), *AS 3959-2018* and Chapter 7 of *Planning for Bushfire Protection 2019*.
4) Asset Protection Zones	-The entire site shall be continually managed as an Inner Protection Area as per Appendix 4 of PBP 2019. -All new landscaping should be designed in accordance with the Asset protection Zone principles of Appendix 4 of PBP 2019.
5) Emergency Risk Management	It is advised the residents should complete a *Bushfire Survival Plan* as formulated by the NSW Rural Fire Service and Fire and Rescue NSW. An emergency evacuation is not recommended as a condition of consent.
6) Adjacent Structures [class 10a & 10b]	Where Class 10a & 10b structures are within 6m from a dwelling in bush fire prone areas it must be built in accordance with the NCC.
7) Water supplies	Reticulated water supply is located on the adjoining road at regular intervals and is easily accessible. No additional water supplies have been recommended.
8) Fences and gates	All fences in bush fire prone areas should be made from either hardwood or non-combustible material. However, in circumstances where the fence connects directly to the dwelling, or in areas of BAL-29 or greater, they should be made of non-combustible material.
8) Electrical services	Where practicable, electrical transmission lines are underground.
10) Gas supply	-Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used. -All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard size. -Connections to and from gas cylinders are metal. -polymer-sheathed flexible gas supply lines are not used. -above-ground gas service pipes are metal, including and up to any outlets.

13. Summary

This report consists of a bushfire risk assessment for alterations and additions to the existing dwelling at No. 14 Kanimbla Crescent, Bilgola Plateau, NSW.

The report concludes that the proposed development is on designated bushfire prone land and the legislative requirements for development of bushfire prone areas are applicable. The proposed development will be constructed to the minimum standard required in accordance with the guidelines of *Planning for Bushfire Protection 2019* and *AS 3959-2018 Construction of buildings in bushfire prone areas.*

This report has considered all of the elements of bushfire attack and provided the proposed development is constructed in accordance with the recommendations of Section 12 of this report, it is my considered opinion that the development satisfies the Objectives and Performance requirements of the *Building Code of Australia, Planning for bushfire Protection 2019 and Australian Standard AS3959, 2018.* However, as a performance-based solution has been used to calculated the radiant heat for the dwelling, referral to the NSW RFS is required.

Note: Not with standing the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand a bushfire attack on every occasion. This report is a Bushfire Hazard Assessment that provides the required information to assist Local Councils and the Rural fire Service in determining compliance in accordance with Planning for Bushfire Protection 2019 and AS3959, 2018. The local Council is the final consenting authority and the construction of the building must comply with the recommendations included in the council's conditions of consent.

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Certificate IV Building and Construction
Certificate III in Public Safety (firefighting and emergency operations)

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

13. References

Australian Building Codes Board
Building Code of Australia
Volume 1 & 2
Canprint

Australian Building Codes Board [2001]
Fire Safety Engineering Guidelines
Edition 2001
ABCB Canberra

D. Drysdale D. [1998]
Introduction to Fire Dynamics 2nd Edition
John Wiley & Sons Ltd

NSW Government Environmental Planning and Assessment Act [1979]
Part 79BA-Consultation and development consent- Certain bushfire prone land
NSW Government Printer

Planning for Bushfire Protection 2019
A guide for Councils, Planners, Fire Authorities and Developers
This document provides the necessary planning considerations when developing areas for residential use in residential, rural residential, rural and urban areas when development sites are in close proximity to areas likely to be affected by bushfire events and replaces Planning for Bushfire Protection 2006.
This document is essential reading. Download a copy from the RFS website or purchase a copy through the NSW Government online shop or phone 9228 6333.

Ramsay C & Rudolph L [2003]
Landscape and building design for bushfire prone areas
CSIRO Publishing

Standards Australia [2018]
Australian Standards 3959
Australian Building Code Board

Appendix 1: Performance criteria and acceptable solutions as per Table 7 *Planning for bushfire Protection 2019*

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
ACCESS	
The intent may be achieved where:	
firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	property access roads are two-wheel drive, all-weather roads.
the capacity of access roads is adequate for firefighting vehicles.	the capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.
there is appropriate access to water supply.	hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.
firefighting vehicles can access the dwelling and exit the property safely.	at least one alternative property access road is provided for individual dwellings or groups of dwellings that are located more than 200 metres from a public through road; There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: minimum 4m carriageway width; in forest, woodland and heath situations, rural property roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay; a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; property access must provide a suitable turning area in accordance with Appendix 3; curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; the minimum distance between inner and outer curves is 6m; 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; and a development comprising more than three dwellings has formalised access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, 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.

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
WATER SUPPLIES	
The intent may be achieved where:	
an adequate water supply is provided for firefighting purposes.	reticulated water is to be provided to the development, where available; and a static water supply is provided where no reticulated water is available.
water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; hydrants are not located within any road carriageway; and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
the integrity of the water supply is maintained.	all above-ground water service pipes external to the building are metal, including and up to any taps.
a static water supply is provided for firefighting purposes in areas where reticulated water is not available.	where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d; a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet; ball valve and pipes are adequate for water flow and are metal; supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; a hardened ground surface for truck access is supplied within 4m; above-ground tanks are manufactured from concrete or metal; raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959); unobstructed access can be provided at all times; underground tanks are clearly marked; tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; all exposed water pipes external to the building are metal, including any fittings; where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
ASSET PROTECTION ZONES	
The intent may be achieved where:	
APZs are provided commensurate with the construction of the building; and A defendable space is provided.	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.
APZs are managed and maintained to prevent the spread of a fire to the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.
the APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are wholly within the boundaries of the development site. APZ are located on lands with a slope less than 18 degrees.
Home-based child care: the building must not be exposed to radiant heat levels exceeding 29kW/m² (1090K).	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
LANDSCAPING	
The intent may be achieved where:	
landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	compliance with the NSW RFS *'Asset protection zone standards'* (see Appendix 4); a clear area of low-cut lawn or pavement is maintained adjacent to the house; fencing is constructed in accordance with section 7.6; and trees and shrubs are located so that: the branches will not overhang the roof; the tree canopy is not continuous; and any proposed windbreak is located on the elevation from which fires are likely to approach.
EMERGENCY MANAGEMENT	
Home-based child care: a bush fire emergency and evacuation management plan is prepared.	a Bush Fire Emergency Management and Evacuation Plan is prepared by the operator consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*, and the AS 3745:2010.

Note: the above specifications and requirements apply in relation to residential infill developments but may be used to guide the application of BPMs for 'other' developments (see Chapter 8).

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
ELECTRICITY SERVICES	
The intent may be achieved where:	
location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	where practicable, electrical transmission lines are underground; and where overhead, electrical transmission lines are proposed as follows: 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 ISSC3 *Guideline for Managing Vegetation Near Power Lines*.
GAS SERVICES	
location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side; connections to and from gas cylinders are metal; polymer-sheathed flexible gas supply lines are not used; and above-ground gas service pipes are metal, including and up to any outlets.
CONSTRUCTION STANDARDS	
the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).
proposed fences and gates are designed to minimise the spread of bush fire.	fencing and gates are constructed in accordance with section 7.6.
proposed Class 10a buildings are designed to minimise the spread of bush fire.	Class 10a buildings are constructed in accordance with section 8.3.2.
Home-based child care: the proposed building can withstand bush fire attack in the form of wind, localised smoke, embers and expected levels of radiant heat.	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1 of this document around the entire building or structure; and the existing dwelling is required to be upgraded to improve ember protection. This is to be achieved by enclosing or covering openings with a corrosion-resistant steel, bronze or aluminium mesh with a maximum aperture of 2mm. Where applicable this includes the openable portion of the windows, vents, weepholes and eaves, but does not include roof tile spaces. Weather strips, draught excluders or draught seals shall be installed at the base of side hung external doors as per AS 3959. The subfloor space must be enclosed.

Appendix 2: 7.5.2 NSW State Variations under G5.2(a)(i) and 3.10.5.0(c)(i) of the NCC

Certain provisions of AS 3959 are varied in NSW based on the findings of the Victorian Bush Fires Royal Commission and bush fire industry research.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC; clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:

- be non-combustible; or
- comply with AS/NZS 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and
- clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- fascias and bargeboards, in BAL-40, shall comply with:
- clause 8.4.1(b) of AS 3959; or
- clause 8.6.6 of AS 3959.

The interpretation of this variation is:

Enclosed subfloors: For subfloor supports there are no requirements for supporting posts, columns, stumps, stringers piers and poles for subfloor supports for BAL 12.5 and BAL 19 when the subfloor space is enclosed with a wall that complies with the determined BAL level for the site.
Unenclosed subfloors: For unenclosed subfloor supporting posts, columns, stumps, stringers piers and poles the requirements are upgraded from BAL 12.5 and BAL 19 to BAL 29 level.
Enclosed verandas: There are no requirements for supporting posts, columns, stumps, stringers piers and poles for verandas, decks, steps and landings when the subfloor space is enclosed with a wall that complies with the determined BAL level for the site.
Unenclosed verandas: The requirements for supporting posts, columns, stumps, stringers piers and poles for verandas, decks, steps, and landings are upgraded from BAL 19 and BAL 12.5 to BAL 29 level.

For unenclosed subfloors of the main building or verandas, decks, steps and landings for BAL 12.5, 19 and BAL29 supporting posts, columns, stumps, stringers piers and poles shall be:

1. A non-combustible material; or
2. A Bushfire resistant timber; or
3. A combination of 1 and 2

Acceptable timber species:
Black-butt, Turpentine, Silver Top Ash, Spotted Gum, Red Iron Bark, Kwila, Red River Gum

Sarking: To comply with the NSW State variation any sarking used for BAL 12.5 shall:

- Be Non-combustible; or
- Comply with AS/NZ 4200.1 be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS1530.2

Appendix 3: Asset Protection Zones (APZ's)

A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

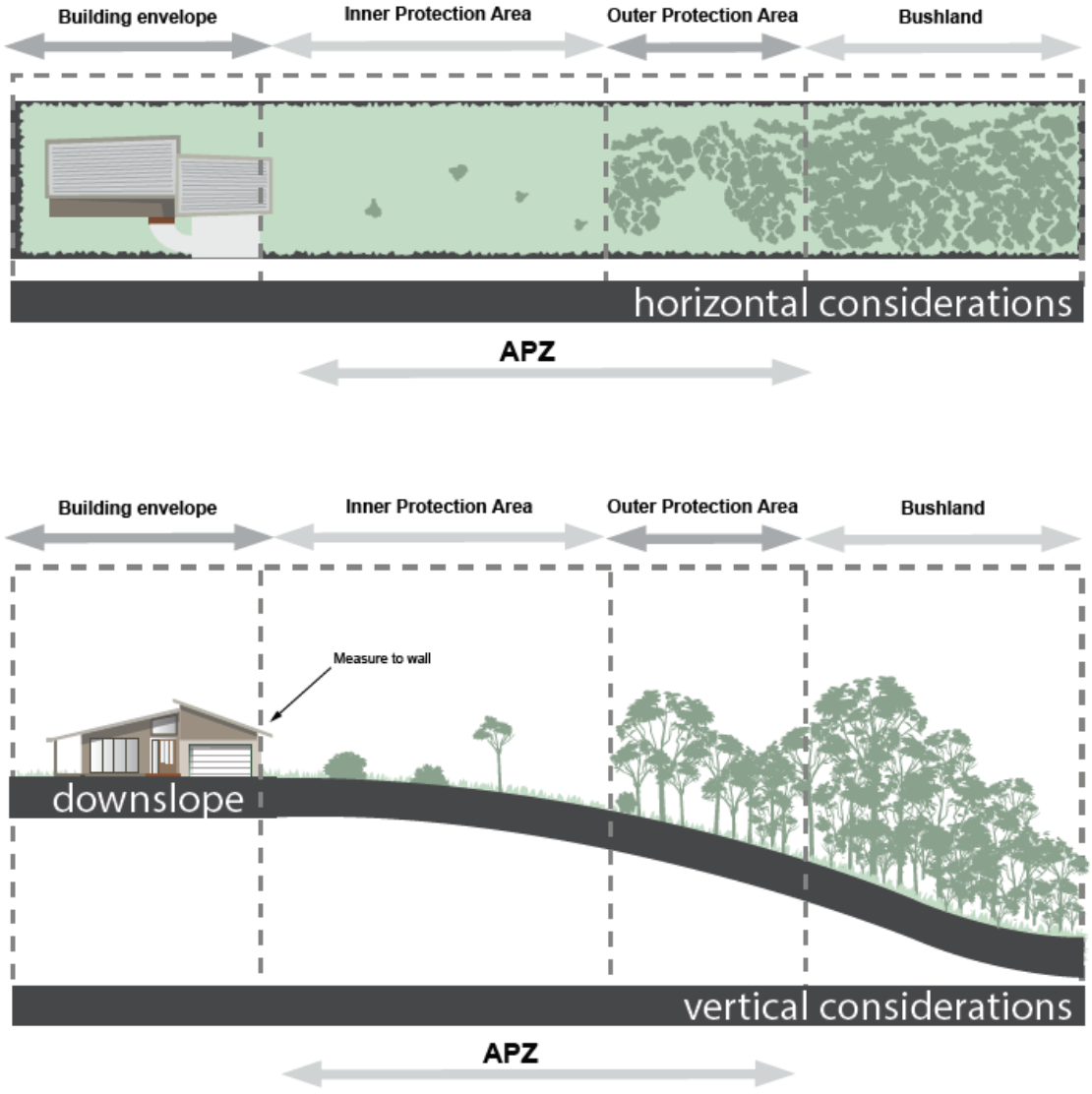
Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

Figure A4.1

Typical Inner and Outer Protection Areas.



Appendix 4: Method 2 AS3959 2018 calcultaion for T2

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 20/11/2024 **Assessment Date:** 20/11/2024

Site Street Address:	14 Kanimbla Crescent (Dwelling), Bilgola Plateau
Assessor:	Matthew Toghill; Bushcon Australia Pty Ltd
Local Government Area:	Northern Beaches **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: T1

Vegetation Information

Vegetation Type:	Rainforest		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	24 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	10	**Overall Fuel Load(t/ha):**	13.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope:	19 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	40

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K):**	1090

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100

Program Outputs

Level of Construction:	BAL FZ	**Peak Elevation of Receiver(m):**	6.29
Radiant Heat(kW/m2):	26.12	**Flame Angle (degrees):**	71
Flame Length(m):	42.44	**Maximum View Factor:**	0.43
Rate Of Spread (km/h):	6.29	**Inner Protection Area(m):**	40
Transmissivity:	0.798	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	42870		

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 20/11/2024 **Assessment Date:** 20/11/2024

Site Street Address:	14 Kanimbla Crescent (Carport), Bilgola Plateau
Assessor:	Matthew Toghill; Bushcon Australia Pty Ltd
Local Government Area:	Northern Beaches
Alpine Area:	No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: T2

Vegetation Information

Vegetation Type:	Rainforest		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	24 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	10	**Overall Fuel Load(t/ha):**	13.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope:	19 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	60

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K):**	1090

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100

Program Outputs

Level of Construction:	BAL 19	**Peak Elevation of Receiver(m):**	0.17
Radiant Heat(kW/m2):	14.68	**Flame Angle (degrees):**	79
Flame Length(m):	42.44	**Maximum View Factor:**	0.254
Rate Of Spread (km/h):	6.29	**Inner Protection Area(m):**	60
Transmissivity:	0.76	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	42870		

Appendix 5: Northern Beaches Council Bushfire Certificate

BUSHFIRE RISK ASSESSMENT CERTIFICATE

THIS FORM IS TO BE COMPLETED BY A RECOGNISED CONSULTANT IN BUSHFIRE RISK ASSESSMENT IN ACCORDANCE WITH SECTION 4.14 1(b) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 NO 203

PROPERTY ADDRESS:	14 Karimbla Crescent, Bilgola Plateau.
DESCRIPTION OF PROPOSAL:	- Alterations & Additions - New carport.
PLAN REFERENCE: (relied upon in report preparation)	Job No. 05/24 Dated: Sept '24 (A).
BAL RATING:	BAL-29. (If the BAL rating is **FZ** the application is to be referred to NSW RFS for assessment.)
DOES THE PROPOSAL RELY ON ALTERNATE SOLUTIONS:	YES NO (Circle the relevant response) (If **YES** the application is to be referred to NSW RFS for assessment.)

I Matthew Toghill of Bushcare Australia Pty Ltd.
(Print Name) (Trading or Company Name)

have carried out a bushfire risk assessment on the above mentioned proposal and property. A detailed Bushfire Assessment Report is attached which includes the submission requirements set out in *Appendix 2* of *Planning for Bushfire Protection 2019* together with recommendations as to how the relevant specifications and requirements are to be achieved.

REPORT REFERENCE:	14Kar-01
REPORT DATE:	20.11.24
CERTIFICATION NO/ACCREDITED SCHEME:	BPAD31642

I hereby certify, in accordance with *Section 4.14 of the Environmental Planning and Assessment Act 1979 No 203*:

1. That I am a person recognised by the *NSW Rural Fire Service* as a qualified consultant in bushfire risk assessment; and

2. That subject to the recommendations contained in the attached Bushfire Risk Assessment Report the proposed development conforms to the relevant specifications and requirements

I am aware that the Bushfire Assessment Report, prepared for the above mentioned site is to be submitted in support of a development application for this site and will be relied upon by Northern Beaches Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *Planning for Bushfire Protection 2019*.

SIGNATURE: _____ **DATE:** 20.11.24

Note: this certificate must be completed and signed by a person recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment in accordance with Section 4.14 of the EP&A Act 1979 No 203.

****

This form has been prepared by Northern Beaches Council for attachment to the Bushfire Assessment Report.

Abbreviations and definitions

AS 3959	Australian Standard AS 3959:2018 *Construction of buildings in bush fire-prone areas*
AS 2419.1:2005	Australian Standard AS 2419.1:2005 *Fire hydrant installations System design, installation and commissioning*
AS 2441:2005	Australian Standard AS 2441:2005 *Planning for emergencies in facilities*
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BFPL	Bushfire prone land
BRPL Map	Bushfire prone land map
BPM's	Bushfire protection measures
BFSA	Bushfire safety authority
DA	Development application
DCP	Development Control Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
FDI	Fire Danger index
FFDI	Forest Fire Danger Index
IPA	Inner Protection Area
kW/m2	Kilowatts per metre squared
LGA	Local government area
NASH	Nation Association of Steel Framed Housing Steel Framed Construction in Bushfire Areas 2021
NCC	National Construction Code
OPA	Outer Protection Area
PBP	*Planning for Bush Fire protection 2019*
RF Act	*Rural Fires Act 1997*
RF Reg	*Rural Fires Regulation 2013*
NSW RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire protection Purpose
SFR	Short fire run

Asset Protection Zone: A fuel reduced area surrounding a built asset or structure which provides a buffer zone between a bush fire hazard and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.

Bush Fire Attack level (BAL): A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. IN the NCC, the BAL is used as the basis for establishing the requirements for construction to improve protection of building elements.

Bush fire: An unplanned fire burning in vegetation, also referred to as wildfire.

Bush fire prone land (BFPL): An area of land that can support a bush fire or is likely to be subject to bush fire attack, as designated on a bush fire prone land map.

Bush fire prone land map: A map prepared in accordance with the NSW RFS requirements and certified by the Commissioner of the NSW RFS under EP&A Act s.10.3(2).

Bush fire protection measures (BPMs): A range of measures used to minimise the risk from a bushfire that need to be complied with. BPM's include APZ's, construction provisions, suitable access, water and utility services, emergency management and landscaping.

Bush fire safety authority (BFSA): An approval by the commissioner of the NSW RFS that is required for a subdivision for residential or rural residential purpose or for a SFPP development listed under section 100B of the RF Act.

Consent authority: As identified in the EP&A Act, in relation to development consents, usually the local council.

Defendable space: An area adjoining a building that is managed to reduce combustible elements free from constructed impediments. It is a safe working environment in which efforts can be undertaken to defend the structure, before and after the passage of a bush fire.

Effective slope: The land beneath the vegetation which most significantly effects fire behaviour, having regard to the vegetation present.

Fire Danger Index (FDI): The chance of a fire starting, its rate of spread, its intensity and the difficulty potential for its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects.

Inner protection Area (IPA): The component of a APZ which is closest to the asset (measured form unmanaged vegetation). It consists of an area maintained to minimal fuel loads so that a fire path is not created between the hazard and the building.

Managed land: Land that has vegetation removed or maintained to a level that limits the spread and impact of bush fire. This may include developed land (residential, commercial or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ.

Outer Protection Area (OPA): The outer component of an APZ, where fuel loads are maintained at a level where the intensity of an approaching bush fire would be significantly reduced. Applies to Forest vegetation only.

Special Fire Protection Purpose (SFPP) developments: Developments where the vulnerable nature of the occupants means that a lower radiant heat threshold needs to be accommodated for in order to allow for the evacuation of occupants and emergency services.

Vegetation classification: Vegetation types identified using the formations and classifications within *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and ACT (Keith, 2004).*