



building in bush fire prone areas

single dwellings

single dwellings



NSW RURAL FIRE SERVICE



This document has been designed for owner/builders as well as architects, building designers and draftspersons who wish to submit plans for building or modifying an existing building in a Bush Fire Prone Area. This document has been designed to support you, and provide you with a process to follow that will assist you to meet the current requirements for bush fire protection.

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Classification of Vegetation Formations



Forests

Open tree canopy dominated by eucalypt species (typically >10m in height) with crowns that touch or overlap. Canopy allows most sunlight to penetrate supporting growth of a prominent understorey layer varying between hard-leaved shrubs to luxuriant soft leaved shrubs, ferns and herbs.



Woodlands

Dominated by an open to sparse layer of eucalypts with the crowns rarely touching. Typically 15-35m high (may be shorter at sub-alpine altitudes). Diverse ground cover of grasses and herbs. Shrubs are sparsely distributed. Usually found on flat to undulating ground.



Tall Heaths (Scrub)

Shrubby vegetation greater than 2 metres tall. Principal plant species include banksias, spider flowers, wattles, legumes, eucalypts, tea-trees, paper barks, she oaks, grass trees, cord rushes and sedges. Grasses are scarce. Not found in arid and semi arid locations. Includes Hawkesbury Sandstone vegetation with scattered overstorey trees and predominantly healthy understorey and coastal heath. May include some mallee eucalypts in coastal locations.



Short Heath (Open Shrub)

Shrubby vegetation less than 2 metres in height. Often more open in canopy. Principal plant species include banksias, spider flowers, wattles, legumes, eucalypts, tea-trees, paper barks, she oaks, grass trees, cord rushes and sedges. Grasses are scarce. Not found in arid and semi arid locations.



Rainforests

Closed and continuous complex tree canopy composed of relatively soft, horizontally-held leaves. Generally lacking in eucalypts. Understorey typically includes ferns and herbs. Vines often present in canopy or understorey. Occur mainly in areas that are reliably moist, mostly free of fire and have soils of moderate to high fertility. Typically coastal and escarpment locations.



Grasslands

Dominated by perennial grasses and the presence of broad-leaved herbs on flat topography. Lack of woody plants. Plants include grasses, daisies, legumes, geraniums, saltbushes and copperburrs.



Managed Land

Non-vegetated or reduced vegetation areas such as: actively grazed pastures, maintained urban yards, maintained lawns, crops, orchards, vineyards, commercial nurseries, playing fields, golf course fairways, cleared parks, non-vegetated areas, formed roads and footpaths including cleared verges, waterways, etc.



Foreword

Bush fire is a major challenge for the community. It has been a natural part of our landscape for thousands of years and remains an ever-present threat. Due to historic settlement patterns and the need to provide housing for people, development has occurred in areas that are bush fire prone placing lives and property at risk.

The NSW Rural Fire Service has a statutory obligation to protect life, property and the environment through fire suppression and fire prevention. Improved land use planning and construction of buildings in bush fire prone areas are intrinsic to the fire management strategies of the Service.

This kit provides applicants with a streamlined approach to meeting the requirements of *Planning for Bush Fire Protection 2006*. It has been designed to assist applicants to provide information in support of a development application and presents options that can be incorporated into the building to mitigate the impact of bush fire on your property.

This kit is divided into two (2) sections. The first section explains how to complete the pull out Bush Fire Assessment Report to ensure you include all the required information about your proposed development. This report should accompany your Development Application.

This document applies to development applications lodged after 1 March 2007.



Fig 1. RFS publication *Planning for Bush Fire Protection 2006*.

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SECTION 1



Who should use this Applicants Kit

This kit will assist people building a new house or altering or adding to an existing building in a bush fire prone area.

Is your property in a bush fire prone area?

Check with your local council to determine if your land is bush fire prone.

If your property is identified as bush fire prone land, you will need to provide the information required by this Applicants Kit to Council in support of your development application.

Why do I need to do this

Due to historic settlement patterns and the need to provide housing for people, development has occurred in areas that are bush fire prone placing lives and property at risk. Buildings can be destroyed or damaged from bush fire due to a number of forms of attack; ember attack, radiant heat and or direct flame contact. Smoke and wind can weaken the building elements and make them more susceptible to these forms of attack.

By improving land use planning including building design, construction and maintenance in bush fire prone areas, development consent authorities (councils) are incorporating management strategies crucial to mitigating the impact of bush fire on buildings and the community.

The NSW Rural Fire Service (RFS) has, under the *Rural Fires Act 1997*, a statutory obligation to protect life, property and the environment through fire suppression and fire prevention.

In response to devastating losses in past bush fires, the NSW Government enacted legislative changes to ensure bush fire matters were considered in the development process.

These legislative changes include section 79BA of the *Environmental Planning and Assessment Act 1979*, which requires all new development on bush fire prone land to comply with *Planning for Bush Fire Protection 2006*. The provisions set out in *Planning for Bush Fire Protection 2006* form the basis for all bush fire planning and bush fire protection measures for new development in NSW.

Planning law in NSW requires new development on bush fire prone land to comply with the provisions of *Planning for Bush Fire Protection 2006*.

Your Obligations & RFS Requirements

Development Applications (DA) on bush fire prone land must be accompanied by a Bush Fire Assessment Report (BFAR) within the Statement of Environmental Effects (SEE: a report required by Council for each development, which explains the likely impacts of the proposal and how you will minimise these impacts).

This BFAR must include all the information listed in Appendix 4 (A4.1) of *Planning for Bush Fire Protection 2006*.

For most simple applications this can be done relatively easily and can be achieved by completing this kit.

The RFS has developed this kit to provide you with the assistance necessary to understand your obligations, and to make it as easy as possible for you to comply with *Planning for Bush Fire Protection, 2006*.

SECTION 1



Single Dwelling Applicant Kit changes

How to use this Kit

The Kit will take you through each step in the bush fire assessment process and help you to describe the site characteristics required to complete this assessment. The assessment will give you the level of bush fire attack for your property and will guide you in determining the appropriate bush fire protection measures (BPM).

BPMs may include asset protection zones (APZ), construction standards, landscaping, water and service supplies to reduce the impact of bush fire on your proposed development and the construction standards necessary to increase the building survivability and meet the NSW legislative requirements.

Complete the pullout Bush Fire Assessment Report (Section 2) as you work through the explanatory notes.

Further detailed guidance is symbolised with the following symbol:



If your development is in the flame zone you will need to provide much more information than is required in the Applicants Kit.

Flame zone developments are outside the scope of Australian Standard AS3959 – 2009 and therefore you may need to talk to a bush fire consultant to assist you in providing evidence of a performance/alternate solution to meet the increased risk of bush fire that will affect your property and the lives of the occupants.

Alternatively, the RFS provides a Fast Fact - Submission Requirements for Alternative Solutions (see RFS web page) which may assist you in submitting your Alternate Solution for a flame zone development.

A

B

PART A

PART B

Property Details

In Section 2 (A), fill in the property details for the site you plan to develop.

It is important to accurately identify your property to be developed. Your Statement of Environmental Effects (SEE) which is generally included as a council requirement with your DA will often include a map showing the property location within the broader locality. If this is not done you should include it in this report.

Your contact details will assist the RFS to quickly obtain additional information or to arrange a site inspection if needed.

It is important to clearly identify whether your property is in a bush fire prone area. Tick the box to indicate that the property has been checked against the Council's Bush Fire Prone Land Map.

Type of Proposal

In Section 2 (B), tick the applicable boxes for the type of proposal.

Provide a brief written description of the type of building and your proposal; i.e. single or two storeys and what you are proposing to do. With alterations and additions, list the proposed works.

Attach a copy of the plans for the building you are proposing to build or the modifications you are making. Include a copy of any plans for landscaping. Tick the box to show that plans are included.

The design of a building can be enhanced to reduce the effects of bush fire attack by:

- *providing ember protection and building away from the flame zone*
- *avoiding building on ridge tops and saddles;*
- *building on level ground wherever possible;*
- *building on cut-in benches rather than elevated;*
- *avoiding raised floors, utilise concrete slabs (raft construction);*
- *locating the habitable buildings near the property entrance for easier access/egress;*
- *using non-combustible fencing and barriers (e.g. courtyards, fenced off areas for gardens, BBQ areas and the like) to shield the building from the hazard;*
- *reducing the bulk of a building (height and width) facing a bush fire hazard;*
- *simplifying the design of buildings to reduce the numbers of re-entrant corners.*

PART C

Bush Fire Attack and Level of Construction

To determine the bush fire attack and required level of construction for a building the following steps must be followed:

- STEP 1: Determine vegetation types around the building and convert from Keith vegetation type to AUSLIG (1990)
- STEP 2: Determine the distance from asset to property boundary in each direction
- STEP 3: Determine the distance between each vegetation formation and the building
- STEP 4: Determine the effective slope
- STEP 5: Determine the relevant FDI
- STEP 6: Match the relevant FDI, appropriate vegetation, distance and effective slope to determine the appropriate APZ and level of construction

STEP 1

Determine the vegetation

You will need to determine the vegetation around your property (that is able to support a bush fire) to at least 140 metres in all directions from the proposed building. Managed gardens and the like are not included.

Check the chart at the inside rear cover of this document to determine your vegetation type.

For each compass direction (normally north, south, east and west) surrounding your home, identify on the assessment sheet, using the table provided on the inside rear fold-out cover, what vegetation type is adjacent to your property. You will also need to identify distances from dwelling to boundaries for the same compass points.

Another option (if you are not sure) is to take photographs facing each direction from the proposed building envelope. Label the aspect (e.g. view north west) on the back and include as part of your application.

NOTE: Where there is more than one vegetation type each type shall be classified separately with the worst case scenario (predominant vegetation is not necessarily the worst case scenario) applied.

David Keith's Ocean Shores to Desert Dunes	AUSLIG (1990) Pictorial Analysis
Rainforest	Rainforest
Forested Wetlands	Forest
Wet Sclerophyll Forest	Forest
Dry Sclerophyll Forest	Forest
Woodlands (Grassy)	Woodland
Plantations (Pine)	Forest
Tall Heath (Scrub)	Scrub
Short Heath	Shrubland

Table 1: Vegetation conversion

Convert the vegetation

The BCA2010 uses AUSLIG (1990) vegetation classifications while PBP uses Keith. It is therefore necessary to convert Keith vegetation classifications to AUSLIG (1990) using Table 1. above.



STEP 2 Determine the distance from asset to property boundary

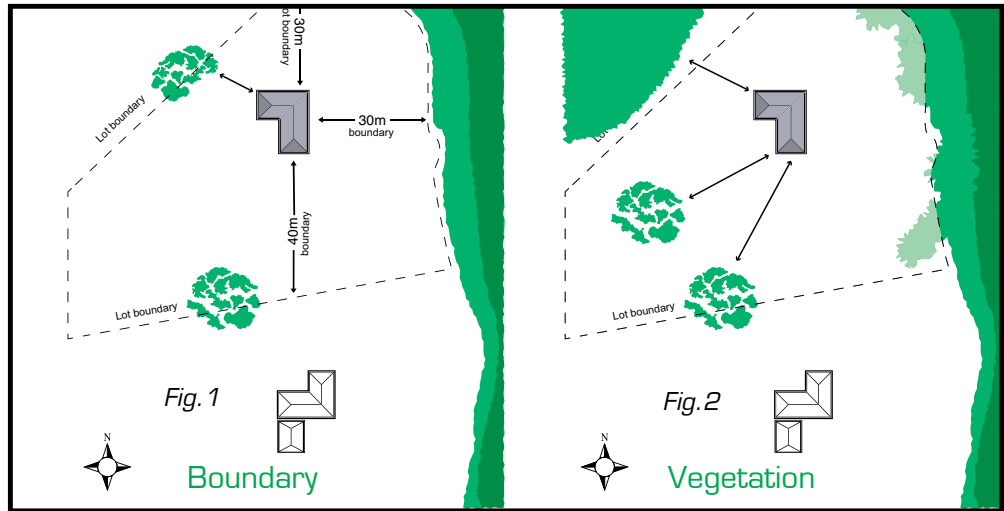


Fig.1 Example of a simple layout sketch with distances noted to boundary
 Fig.2 Example of a simple layout sketch with distances noted to vegetation

STEP 3 Determine the distance

Firstly you will need to identify whether vegetation is located within your property or within an adjoining property.

For vegetation located within your property:
 Measure the distance to vegetation and record.

For vegetation located within an adjoining property:
 Measure the distance from the building to vegetation which is located on an adjoining property and record. Vegetation located on an adjoining property requires a plan of management supported by a legally binding agreement between the adjoining property manager/owner and yourself permitting the in perpetuity management of that portion of vegetation providing the threat to your building.

If management cannot be guaranteed in-perpetuity then measure to your boundary and record.

STEP 4 Determine the Effective Slope

The effective slope is the slope under the vegetation that provides the bush fire threat. Assess the effective slope over a distance of at least 100m from the asset.

Commonly, properties will have slopes that vary over the 100m. The effective slope is the part of the overall slope that will have the greatest influence on the bushfire behaviour. This effective slope may be only a portion of the 100m but should represent a substantial portion. If you are unable to determine the effective slope you should seek further assistance from a specialist consultant.

As a guide see page 7



The slope of the land influences the speed that a fire will travel. Fire will travel faster and with greater intensity uphill because vegetation in front of the fire is pre-heated and will more readily ignite.

As a guide to measuring the slope you could try using the method page 8



The slope is determined in terms of the following classes, relative to the location of the hazard:

- all upslope vegetation (considered to be flat - 0)
- >0 to 5° downslope
- >5 to 10° downslope
- >10 to 15° downslope
- >15 to 18° downslope

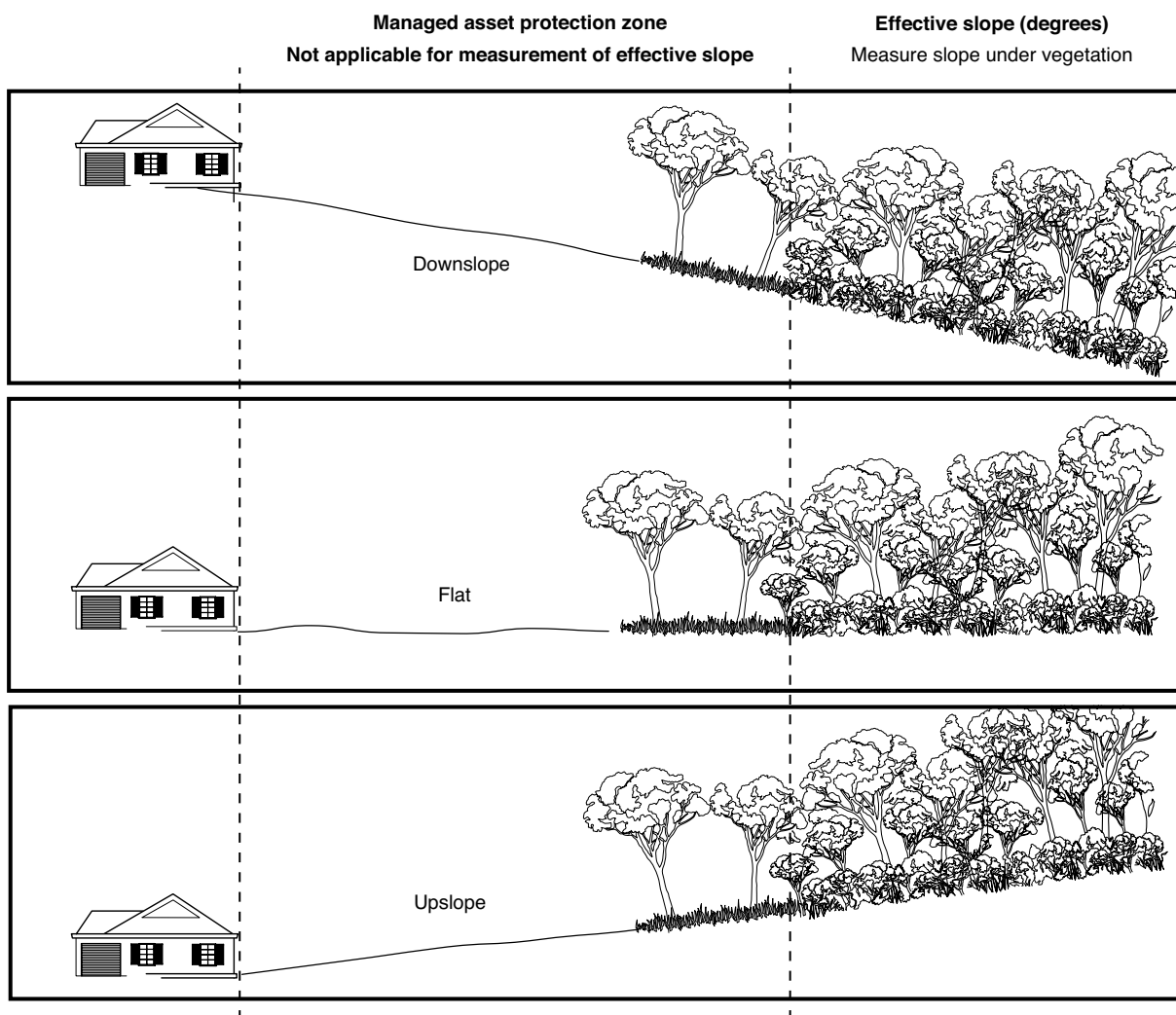


Fig 3. Shows how to refer to the slope in any direction relative to the building

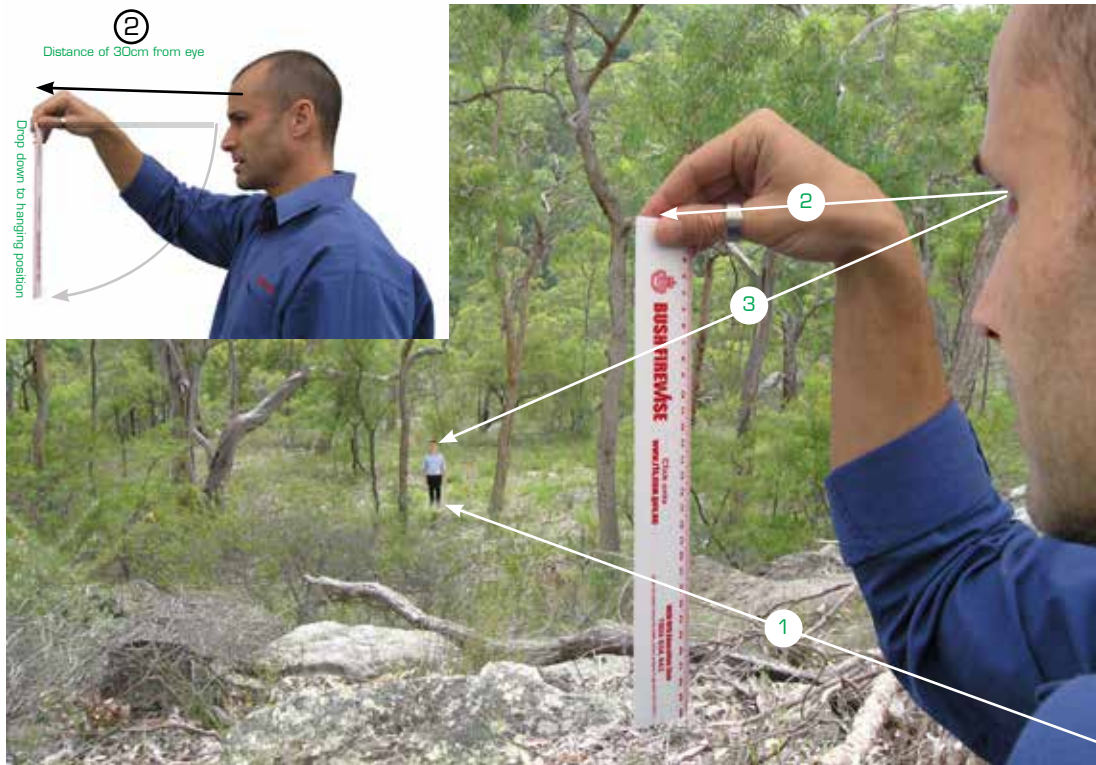


Fig 4. Simple slope assessment methodology.

Simple method for estimating slope:

- ① **Pick a spot between 40 and 100m away** and have an assistant of similar height stand as a reference point. If you do not have an assistant pick a nearby tree as a reference point and tie a bright ribbon or tape around the trunk at your eye height.
- ② Standing at the edge of the slope or at some point on the slope to be measured, **hold one end of a centimetre rule 30cm in front of your face, level with your eye** so that it hangs down.
- ③ Looking past the rule at the assistants head or marker, **note how many centimetres** on the rule their head is **below your eye level**.
- ④ The table below will **convert this to a slope range**.
- ⑤ It is important to hold the end of the rule at eye level and let it hang straight down 30cm in front so that a reasonable level of accuracy is gained.

Measurement on rule (cm)	Converted slope range
Less than or equal to 0	Upslope or flat
0 - 3	0 - 5°
3 - 5	5 - 10°
5-8	10-15°
8-10	15 -18°
Greater than 10	Greater than 18°

STEP 4 Determine FDI

To determine the relevant Fire Danger Index (FDI), identify your Council area and determine the corresponding Fire Danger Index rating from the list (see Table 1). The FDI is based on the weather history for a region that will influence bush fire behaviour.

Example:
If you live in Tamworth
your FDI would be (80).

FDI is the number in
brackets e.g. (80)

<p>1. FAR NORTH COAST (80) Ballina Byron Clarence Valley Kyogle Lismore Richmond Valley Tweed</p> <p>2. NORTH COAST (80) Bellingen Coffs Harbour Gloucester Great Lakes Greater Taree Hastings Kempsey Nambucca</p> <p>3. GREATER HUNTER (100) Cessnock Dungog Lake Macquarie Maitland Muswellbrook Newcastle Port Stephens Singleton Upper Hunter</p> <p>4. GREATER SYDNEY REGION (100) All Sydney Metropolitan Councils Plus Gosford, Blue Mountains, Hawkesbury and Wyong</p> <p>5. ILLAWARRA/SHOALHAVEN (100) Kiama Shellharbour Shoalhaven Wingecarribee Wollondilly Wollongong</p> <p>6. FAR SOUTH COAST (100) Bega Valley Eurobodalla</p> <p>7. MONARO ALPINE (80) Bombala Cooma Monaro Snowy River</p>	<p>8. ACT (N/A) Australian Capital Territory</p> <p>9. SOUTHERN RANGES (100) Palerang Goulburn Mulwaree Queanbeyan Upper Lachlan Yass Valley</p> <p>10. CENTRAL RANGES (80) Bathurst Blayney Cabonne Cowra Lithgow Mid Western Regional Oberon Orange</p> <p>11. NEW ENGLAND (80) Armidale Dumaresq Glen Innes Severn Guyra Tenterfield Uralla Walcha</p> <p>12. NORTHERN SLOPES (80) Gunnedah Gwydir Inverell Liverpool Plains Tamworth Regional</p> <p>13. NORTH WESTERN (80) Moree Plains Narrabri Walgett Warrumbungle</p> <p>14. UPPER CENTRAL WEST PLAINS (80) Bogan Coonamble Gilgandra Warren</p> <p>15. LOWER CENTRAL WEST PLAINS (80) Bland Dubbo Forbes Lachlan</p>	<p>Narromine Parkes Temora Weddin Wellington</p> <p>16. SOUTHERN SLOPES (80) Boorowa Cootamundra Gundagai Harden Tumbarumba Tumut Young</p> <p>17. EASTERN RIVERINA (80) Albury Coolamon Greater Hume Junee Lockhart Wagga Wagga</p> <p>18. SOUTHERN RIVERINA (80) Berrigan Conargo Corowa Deniliquin Jerilderie Murray Urana Wakool</p> <p>19. NORTHERN RIVERINA (80) Carrathool Griffith Hay Leeton Murrumbidgee Narrandera</p> <p>20. SOUTH WESTERN (80) Balranald Wentworth</p> <p>21. FAR WESTERN (80) Bourke Brewarrina Broken Hill Central Darling Cobar Unincorporated NSW</p>
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Table 2. The Fire Danger Index for each LGA in NSW

STEP 5 | Level of Construction

Match the relevant FDI, appropriate vegetation, separation distance and effective slope to determine the category of bush fire attack and level of construction applicable to the site from the following tables.

If your proposal is greater than 100m from vegetation then there are no construction requirements.

Vegetation Formation (class)	FDI 80	Categories of Bush Fire Attack (AS 3959-2009)				
		BAL- FZ	BAL- 40	BAL- 29	BAL- 19	BAL-12.5
		Distance (m) of the site from the predominant vegetation class				
All upslopes and flat land (0 degrees)						
Forests (wet and dry sclerophyll)		<16	16-<21	21-<31	31-<42	42-100
Woodlands		<10	10-<14	14-<20	20-<29	29-100
Tall heath		<7	7-<9	9-<13	13-<19	19-100
Short heath		<10	10-<13	13-<19	19-<27	27-100
Low woodland (semi-arid)		<6	6-<8	8-<12	12-<17	17-100
Arid shrublands		<6	6-<9	9-<13	13-<19	19-100

Table 3. Example - How to determine level of construction

How to use this

1. Determine the vegetation + convert to AUSLIG (1990)
2. Determine distance between building footprint and the hazard
3. Determine Slope
4. Determine your FDI
5. Note your bush fire attack level (BAL)

EXAMPLE:

Alterations to an existing building 24m away from forest vegetation on flat land in Tamworth.

- Step 1. Vegetation = forest
- Step 2. Distance = 24m
- Step 3. Slope = flat
- Step 4. FDI = 80
- Step 5. Bush fire attack level = BAL- 29

Table 4. - FDI 100

Vegetation Formation (class)	Categories of Bush Fire Attack (AS 3959-2009)				
	BAL- FZ	BAL- 40	BAL- 29	BAL- 19	BAL-12.5
	Distance (m) of the site from the predominant vegetation class				
All upslopes and flat land (0 degrees)					
Forests	<19	19-<25	25-<35	35-<48	48 - 100
Woodlands	<12	12-<16	16-<24	24-<33	33 - 100
Shrubland	<7	7-<9	9-<13	13-<19	19 - 100
Scrub	<10	10-<13	13-<19	19-<27	27 - 100
Mallee/Mulga	<6	6-<8	8-<12	12-<17	17 - 100
Rainforest	<8	8-<11	11-<16	16-<23	23 - 100
Grassland	<6	6-<9	9-<13	13-<19	19 - 50
Downslope > 0 to 5 degrees					
Forests	<24	24-<32	32-<43	43-<57	57 - 100
Woodlands	<12	15-<21	21-<29	29-<41	41 - 100
Shrubland	<7	7-<10	10-<15	15-<22	22 - 100
Scrub	<11	11-<15	15-<19	19-<27	27 - 100
Mallee/Mulga	<7	7-<9	9-<13	13-<20	20 - 100
Rainforest	<10	10-<14	14-<20	20-<29	29 - 100
Grassland	<7	7-<10	10-<15	15-<22	22 - 50
Downslope > 5 to 10 degrees					
Forests	<31	31-<39	39-<53	53-<69	69 - 100
Woodlands	<20	20-<26	26-<37	37-<50	50 - 100
Shrubland	<8	8-<11	11-<17	17-<25	25 - 100
Scrub	<12	12-<17	17-<24	24-<35	35 - 100
Mallee/Mulga	<7	7-<10	10-<15	15-<23	23 - 100
Rainforest	<13	13-<18	18-<26	26-<36	36 - 100
Grassland	<8	8-<11	11-<17	17-<25	25 - 50
Downslope > 10 to 15 degrees					
Forests	<39	39-<49	49-<64	64-<82	82 - 100
Woodlands	<25	25-<33	33-<45	45-<60	60 - 100
Shrubland	<9	9-<13	13-<19	19-<28	28 - 100
Scrub	<14	14-<19	19-<28	28-<39	39 - 100
Mallee/Mulga	<8	8-<11	11-<18	18-<26	26 - 100
Rainforest	<17	17-<23	23-<33	33-<45	45 - 100
Grassland	<9	9-<13	13-<20	20-<28	28 - 50
Downslope > 15 to 20 degrees					
Forests	<50	50-<61	61-<78	78-<98	98 - 100
Woodlands	<32	32-<41	41-<56	56-<73	73 - 100
Shrubland	<10	10-<15	15-<22	22-<31	31 - 100
Scrub	<15	15-<21	21-<31	31-<43	43 - 100
Mallee/Mulga	<9	9-<8	13-<20	20-<29	29 - 100
Rainforest	<22	22-<29	29-<42	42-<56	56 - 100
Grassland	<11	11-<15	15-<23	23-<32	32 - 50

Note: "Forests" refers to wet sclerophyll forest, dry sclerophyll forest and plantation forest (including pine plantations).

Table 5. - FDI 80

Vegetation Formation (class)	Categories of Bush Fire Attack (AS 3959-2009)				
	BAL- FZ	BAL- 40	BAL- 29	BAL- 19	BAL-12.5
	Distance (m) of the site from the predominant vegetation class				
All upslopes and flat land (0 degrees)					
Forests	<16	16-<21	21-<31	31 -<42	4 - 100
Woodlands	<10	10-<14	14-<20	20 -<29	29 - 100
Shrubland	<7	7-<9	9-<13	13-<19	19 - 100
Scrub	<10	10-<13	13-<19	19-<27	27 - 100
Mallee/Mulga	<6	6-<8	8-<12	12-<17	17 - 100
Rainforest	<6	6-<9	9-<13	13-<19	19 - 100
Grassland	<6	6-<8	8-<12	12-<17	17 - 50
Downslope > 0 to 5 degrees					
Forests	<20	20-<27	27-<37	37-<50	50 - 100
Woodlands	<13	13-<17	17-<25	25-<35	35 - 100
Shrubland	<7	7-<10	10-<15	15-<22	22 - 100
Scrub	<11	11-<15	15-<22	22-<31	31 - 100
Mallee/Mulga	<7	7-<9	9-<13	13-<20	20 - 100
Rainforest	<8	8-<11	11-<17	20-<24	24 - 100
Grassland	<7	7-<9	9-<14	14-<20	20 - 50
Downslope > 5 to 10 degrees					
Forests	<26	26-<33	33-<46	46-<61	61 - 100
Woodlands	<20	20-<26	26-<37	31-<43	43 - 100
Shrubland	<8	8-<11	11-<17	17-<25	25 - 100
Scrub	<12	12-<17	17-<24	24-<35	35 - 100
Mallee/Mulga	<7	7-<10	10-<15	15-<23	23 - 100
Rainforest	<11	11-<15	15-<22	22-<31	31 - 100
Grassland	<8	8-<10	10-<16	16-<23	23 - 50
Downslope > 10 to 15 degrees					
Forests	<33	33-<42	42-<56	56-<73	73 - 100
Woodlands	<21	21-<28	28-<39	39-<53	53 - 100
Shrubland	<9	9-<13	13-<19	19-<28	28 - 100
Scrub	<14	14-<19	19-<28	28-<39	39 - 100
Mallee/Mulga	<8	8-<11	11-<18	18-<26	26 - 100
Rainforest	<14	14-<19	19-<28	28-<39	39 - 100
Grassland	<9	9-<12	12-<18	18-<26	26 - 50
Downslope > 15 to 20 degrees					
Forests	<42	42-<52	52-<68	68-<87	87 - 100
Woodlands	<27	27-<35	35-<48	48-<64	64 - 100
Shrubland	<10	10-<15	15-<22	22-<31	31 - 100
Scrub	<15	15-<21	21-<31	31-<43	43 - 100
Mallee/Mulga	<9	9-<13	13-<20	20-<29	29 - 100
Rainforest	<18	18-<25	25-<36	36-<48	48 - 100
Grassland	<10	10-14	14-<21	21-<30	30 - 50

Note: "Forests" refers to wet sclerophyll forest, dry sclerophyll forest and plantation forest (including pine plantations).

Table 6. - FDI 50

Vegetation Formation (class)	Categories of Bush Fire Attack (AS 3959-2009)				
	BAL- FZ	BAL- 40	BAL- 29	BAL- 19	BAL-12.5
	Distance (m) of the site from the predominant vegetation class				
All upslopes and flat land (0 degrees)					
Forests	<12	12-<16	16-<23	23-<32	32 - 100
Woodlands	<7	7-<10	10-<15	15-<22	22 - 100
Shrubland	<7	7-<9	9-<13	13-<19	19 - 100
Scrub	<10	10-<13	13-<19	19-<27	27 - 100
Mallee/Mulga	<6	6-<8	8-<12	12-<17	17 - 100
Rainforest	<5	5-<6	6-<9	9-<14	14 - 100
Tussock Moorland	<7	7-<9	9-<14	14-<20	20 - 100
Grassland	<5	5-6	6-<10	10-<14	14 - 50
Downslope > 0 to 5 degrees					
Forests	<14	14-<19	19-<27	27-<38	38 - 100
Woodlands	<9	9-<12	12-<18	18-<26	26 - 100
Shrubland	<7	7-<10	10-<15	15-<22	22 - 100
Scrub	<11	11-<15	15-<22	22-<31	31 - 100
Mallee/Mulga	<7	7-<9	9-<13	13-<20	20 - 100
Rainforest	<6	6-<8	8-<12	12-<17	17 - 100
Tussock Moorland	7-<8	8-<10	10-<16	16-<23	23 - 100
Grassland	<5	5-7	7-<11	11-<16	16 - 50
Downslope > 5 to 10 degrees					
Forests	<18	18-<24	24-<34	34-<46	46 - 100
Woodlands	<11	11-<15	15-<23	23-<32	32 - 100
Shrubland	<8	8-11	11-<17	17-<25	25 - 100
Scrub	<12	12-<17	17-<24	24-<35	35 - 100
Mallee/Mulga	<7	7-<10	10-<15	15-<23	23 - 100
Rainforest	<7	7-<10	10-<15	15-<22	22 - 100
Tussock Moorland	<9	9-<12	12-<18	18-<26	26 - 100
Grassland	<6	6-8	8-<13	13-<19	19 - 50
Downslope > 10 to 15 degrees					
Forests	<22	22-<30	30-<41	41-<56	56 - 100
Woodlands	<14	14-<19	19-<28	28-<40	40 - 100
Shrubland	<9	9-<13	13-<19	19-<28	28 - 100
Scrub	<14	14-<19	19-<28	28-<39	39 - 100
Mallee/Mulga	<8	8-<11	11-<18	18-<26	26 - 100
Rainforest	<9	9-<13	13-<19	19-<28	28 - 100
Tussock Moorland	<10	10-<13	13-<20	20-<29	29 - 100
Grassland	<7	7-10	10-<15	15-<22	22 - 50
Downslope > 15 to 20 degrees					
Forests	<28	28-<37	37-<51	51-<67	67 - 100
Woodlands	<18	18-<25	25-<36	36-<48	48 - 100
Shrubland	<10	10-<15	15-<22	22-<31	31 - 100
Scrub	<15	15-<21	21-<31	31-<43	43 - 100
Mallee/Mulga	<9	9-<13	13-<20	20-<29	29 - 100
Rainforest	<12	12-<17	17-<25	25-<35	35 - 100
Tussock Moorland	<11	11-<15	15-<23	23-<33	33 - 100
Grassland	<8	8-11	11-<17	17-<25	25 - 50

Note: This table covers the NSW Alpine resort areas of:

- The Perisher Range – Perisher, Smiggin Holes, Blue Cow and Guthega.
 - Thredbo Alpine Village
 - Charlottes Pass
 - Mount Selwyn
 - Bullocks Flat
 - Ski Rider
 - Kosciuszko Mountain Retreat
 - Sponars Chalet
- Forests are based on forest types found.

Heat Flux Exposure	Description	AS 3959-2009 Construction Level
N/A	Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements.	Bush Fire Attack Level – Low (BAL-LOW)
≤ 12.5	Attack by burning debris is significant with radiant heat (not greater than 12.5 kW/m ²). Radiant heat is unlikely to threaten building elements (eg unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.	Bush Fire Attack Level – 12.5 (BAL-12.5)
>12.5 ≤19	Attack by burning debris is significant with radiant heat levels (not greater than 19 kW/m ²) threatening some building elements (screened glass). Specific construction requirements for embers and radiant heat are warranted.	Bush Fire Attack Level – 19 (BAL-19)
>19 ≤29	Attack by burning debris is significant and radiant heat levels (not greater than 29 kW/m ²) threaten building integrity. Specific construction requirements for ember and higher radiant heat are warranted. Some flame contact is possible.	Bush Fire Attack Level – 29 (BAL-29)
>29 ≤40	Radiant heat levels and flame contact likely to significantly threaten building integrity and result in significant risk to residents who are unlikely to be adequately protected.	Bush Fire Attack Level – 40 (BAL-40)
>40	Significant radiant heat and significant higher likelihood of flame contact from the fire front will threaten building integrity and result in significant risk to residents.	Bush Fire Attack Level – Flame Zone (BAL-FZ)

Table 7. Heat flux exposure and appropriate bush fire attack levels

Construction standards described above may be varied by increasing or reducing the distance from the vegetation.

It is important that you understand the level of risk associated with your proposal.

Table 7 identifies the various levels of bush fire attack and provides a description of the likely bush fire behaviour.

What is an APZ?

An asset protection zone (APZ) is an area between a bush fire hazard and the building, which is managed to minimise fuel loads, inhibit a fire path and reduce the effects of heat, flame, ember and smoke attack. Put simply it keeps the effects of the fire away from the building. The size of the APZ is based on vegetation type, slope and levels of construction.

Construction standards alone do not provide sufficient protection from the impacts of a bush fire. The different construction standards require a complementary APZ to achieve a complete solution. These APZs will generally become larger as the level of construction is lowered to compensate for the reduced protection in the building standard. An APZ is required for every application to develop land in a bush fire prone area and must be regularly maintained.

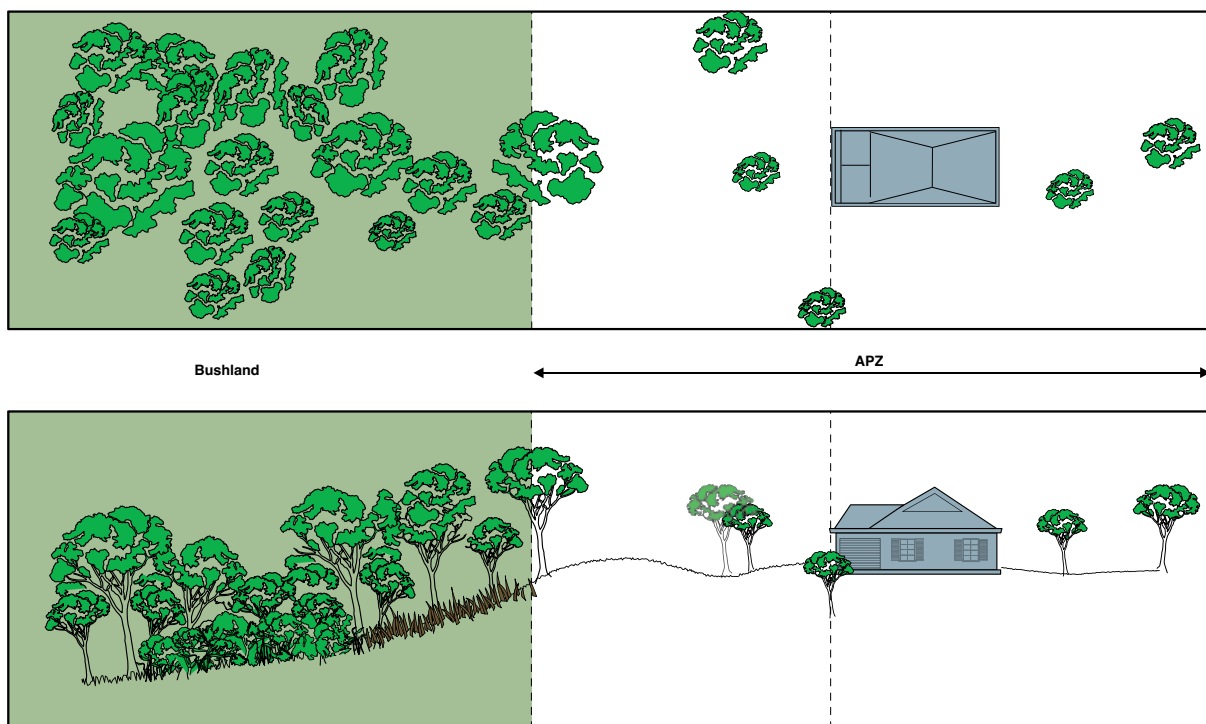


Figure 5. Asset Protection Zone (APZ)

The APZ should be contained wholly within the proposed development site; but can also include existing roads, other buildings and managed properties. Unmanaged land or land that is not to be managed will not be considered as an APZ.

APZ's on adjoining unmanaged land will only be considered under exceptional circumstances and then only when an agreed legal arrangement (such as an easement) is able to be achieved and submitted with your development application.

It is expected that the APZ will be maintained by the owner of the land being developed. See Standards for APZ for more information about design & maintenance (available from the RFS website or your local Fire Control Centre).



The RFS has produced Standards for APZ that can be obtained from RFS web page or your local Fire Control Centre for more information.

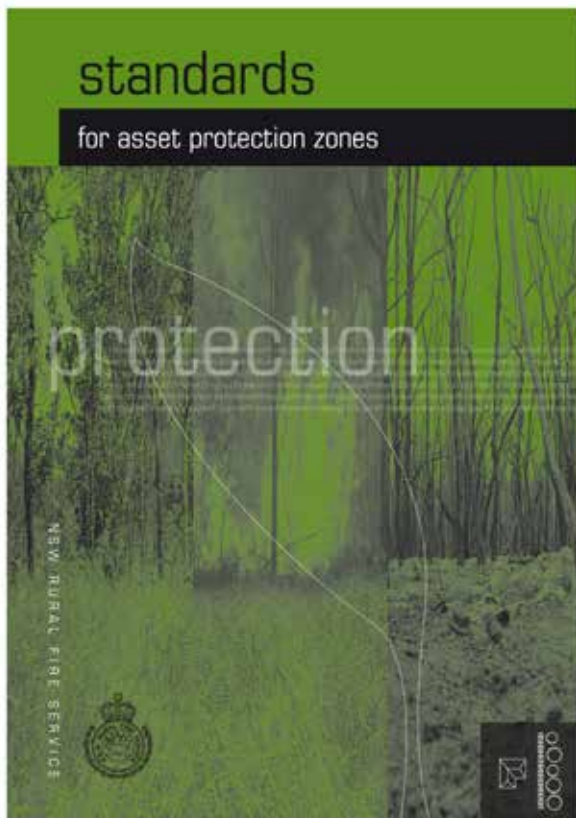


Fig 6. RFS publication describing APZs



Asset Protection Zone Landscaping and Maintenance

The protection of life and property from the devastating impacts of bush fires will depend on the level of preparedness and maintenance of the property.

The best planning and design can be undone by poor maintenance and lack of forethought when landscaping a development, and therefore the survival of your house and assets ultimately depends on the householder.

Determine Level of Construction

Use the Tables 4,5 and 6 to determine the level of construction that applies to the building for each direction. Of the levels determined for each direction, select the level of construction that provides the highest construction standard as this will apply to the entire building.

For most vegetation types, buildings more than 100m from the bush fire prone vegetation do not require any specific construction requirements however, homeowners are encouraged to provide basic measures such as window screens and gutterguard to minimise ember attack.

Where a building is to be constructed close to bush fire prone vegetation, Australian Standard AS3959 describes the construction standards to protect against any bush fire attack. These are an acceptable construction solution or a deemed-to-satisfy solution where construction requirements are known, tried and tested and easily achieved at the construction stage.

Where buildings are unable to meet the APZ distances for BAL-12.5- BAL- 40 or they will experience flame contact they will be considered to be in the flame zone. These buildings will require special design and construction solutions supported by evidence of satisfactory performance. Expert assistance from a bush fire consultant may be required in designing and assessing this type of building.

PART D

Flame Zone

If your property's category of bush fire attack is flame zone, you are unable to comply with *AS3959-2009 'Construction of buildings in bushfire-prone areas'*.

If your building is in the flame zone there are two options you can choose between:

- 1 The RFS will conduct an assessment based on the information provided in this kit and make recommendations to Council. OR
- 2 You can opt to provide evidence of an alternative solution for the relevant bush fire protection measures for your proposed site.

Another option is to site the building outside the flame zone by allocating more land for an increased APZ. This will permit you to lower your required level of construction.

If you choose Option 2 - you will need to outline your proposed alternative solutions and additional fire protection measures. You will also be required to provide evidence showing that the solution or measure meets the performance/testing criteria (by an authorised testing facility) for consideration by the NSW Rural Fire Service. You may need to employ the services of a suitably qualified bush fire consultant.

Additional construction requirements for a building in the flame zone are unique to each property. Generally these requirements may include:

- No exposed timber
- Specialised glazing
- Radiant Heat Barriers
- Drenching (Sprinkler Systems)

The RFS may also recommend that improvements are made to an existing building that will result in better protection than existing conditions would provide. These may include:

- Screening of existing windows for ember protection.
- Leafless gutters and valleys.
- Sealing of weepholes and external doors.



Fig 7. Building in the Flame Zone

PART E

Water Supplies

During major bush fires, basic services such as reticulated water supplies can be seriously jeopardised and may even be reduced to such an extent that they are non-existent. Applicants should ensure they have adequate supplies of water (i.e. tanks, pools, etc) that will be available if the mains system fails or is not available (i.e. rural areas). Additional water can be either a dedicated or static water supply.

Dedicated water supply is a supply of water dedicated for fire-fighting purposes. This supply of water provides opportunities for water replenishment for fire-fighting vehicles and ensures availability of water for property protection by adequately prepared owners.

Static water supply is an alternative source of water that cannot be guaranteed in a bush fire event, such as a rainwater tank, swimming pool or dam in addition to the mains water supply that could be utilised to fight fires.

Figure 8. Gate Valve



Figure 9. Ball Valve

65mm Storz Fitting



Water Requirements:

- The minimum dedicated water supply required for firefighting purposes for each occupied building excluding drenching systems, is provided in accordance with Table 7. below;
- Any onsite stored water supply shall be easily identifiable from the street frontage with appropriate signage directing fire fighters towards the side of the asset where the supply is located;
- A 65mm Storz outlet for firefighting purposes is made available at the lowest possible point on the tank;
- Gate or Ball valve and pipes are adequate for water flow and are metal rather than plastic;
- 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 4 metres of the access hole;
- Above ground tanks are manufactured of concrete or metal and raised tanks have their stands protected.
- Plastic tanks are not to be used, but can be used as an alternate solution if an appropriate protection measure for the tank is submitted.

Tanks on the hazard side of a building:

- Have all above ground water pipes external to the building made of metal including and up to any taps.
- Have shielding to protect pumps from radiant heat and direct flame contact.

Table 8. - Dedicated water supply requirements for various non-reticulated developments

Development Type	Water Requirement
Residential Lots (<1,000m ²)	5,000 l/lot
Rural-residential Lots (1,000 – 10,000m ²) <1 ha	10,000 l/lot
Large Rural/Lifestyle Lots (>10,000m ²) >1 ha	20,000 l/lot
Dual Occupancy	2,500 l/unit
Townhouse/Unit Style (e.g. Flats)	5,000 l/unit up to 20,000l maximum.

Note: The figures in the above table are additional to Basix requirements.

F

PART F



Gas Supplies

The plans submitted with this application should show the location and type of bottled gas services within the property.

Reticulated or bottled gas is installed and maintained in accordance with *AS1596* and the requirements of relevant authorities. Metal piping is to be used.

All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.

If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a mechanism to combustion. Connections to and from gas cylinders are to be metal.

Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

DICTIONARY

Additional definitions can be found in *Planning for Bush Fire Protection, 2006*.

Acceptable Solution

The acceptable solutions that meet the requirements of *Australian Standard AS3959 – Construction in bushfire-prone areas or Planning for Bush Fire Protection, 2006*.

Alternative Solution

Solutions that offer more flexibility to an applicant. The solutions provide scope for innovation and allow the designer to consider and account for site-specific conditions and constraints. They are often more economical, functional or aesthetically pleasing than acceptable solutions. It is up to the applicant to demonstrate how the product, design or material can meet the performance requirement of .

AS3959

Australian Standard AS3959 Construction of buildings in bushfire-prone areas, Standards Australia, 2009, that outlines construction standards applicable to residential developments in bush fire prone areas.

Asset Protection Zone (APZ)

An area surrounding a development managed to reduce the bush fire hazard to an acceptable level. The width of the APZ will vary with slope, vegetation and construction level. The APZ, consists of an area maintained to minimal fuel loads so that a fire path is not created between the hazard and the building.

Building footprint

The area shown on a plan over which a building can be erected.

Bush fire prone area/land

Is an area of land that can support a bush fire or is likely to be subject to bush fire attack. In general, a bush fire prone area is an area mapped for a local government area that identifies the vegetation types and associated buffer zones. Bush Fire Prone Land Maps are prepared by local councils and certified by the Commissioner of the RFS under section 146(2) of the *Environmental Planning and Assessment Act 1979*.

Bush fire protection measures (BPMs)

Are a range of measures (controls) available to minimise the risk arising from a bush fire. BPMs include APZs, construction standards, suitable access arrangements, water and utility services, emergency management arrangements and landscaping.

Bush Fire Assessment Report

A report submitted in support of a development application by an applicant which determines the extent of bush fire attack to a development and the measures used to mitigate that attack. Appendix 4 of *Planning for Bush Fire Protection, 2006* provides the information requirements for a bush fire assessment. See also clause 46 of the *Rural Fires Regulation*.

Development Application (DA)

Application normally made to the local council for consent to carry out development such as building, subdivision, or the use of a building or land.

Flame zone

The distance from a bush fire at which there is significant potential for sustained flame contact to a building. Determined by the calculated distance at which the radiant heat of the design fire exceeds 40kW/m² or calculated by the sustained flame length, whichever is the lesser.

Fire Danger Index (FDI)

A relative number denoting an evaluation of rate of spread, or suppression difficulty for specific combinations of fuel, fuel moisture and wind speed. This data is then indexed into comparative FDIs based on the regions within NSW.

Infill development

Development of land by the erection of or addition to a residential building (or buildings) which does not require the spatial extension of services including public roads, electricity, water or sewerage and is within an existing allotment.

SECTION TWO - BUSH FIRE ASSESSMENT REPORT (Attach to DA)

PART A Property Details

Applicants Name:

Contact Phone Number; (H): (.....) (M):

Council:..... Council Reference (if known):

Lot: DP:

Address to be developed:

My property is on Bush Fire Prone Land: Yes

PART B Type of Proposal

Type of Proposal:

- | | |
|---|--|
| <input type="checkbox"/> New Building | <input type="checkbox"/> Urban |
| <input type="checkbox"/> Dual Occupancy | <input type="checkbox"/> Rural Residential |
| <input type="checkbox"/> Alteration/Additions to an existing building | <input type="checkbox"/> Isolated Rural |

Proposal Description: *e.g. two storey house with attached garage*

Copy of plans attached Yes

PART C Bush Fire Attack and Level of Construction

Step 1: Assess the vegetation about the proposed building in all directions and convert from Keith to AUSLIG (1990) using Table1

CATEGORY	NORTH	EAST	SOUTH	WEST
Converted vegetation	<input type="checkbox"/> Forest	<input type="checkbox"/> Forest	<input type="checkbox"/> Forest	<input type="checkbox"/> Forest
	<input type="checkbox"/> Woodland	<input type="checkbox"/> Woodland	<input type="checkbox"/> Woodland	<input type="checkbox"/> Woodland
	<input type="checkbox"/> Shrubland	<input type="checkbox"/> Shrubland	<input type="checkbox"/> Shrubland	<input type="checkbox"/> Shrubland
	<input type="checkbox"/> Scrub	<input type="checkbox"/> Scrub	<input type="checkbox"/> Scrub	<input type="checkbox"/> Scrub
	<input type="checkbox"/> Mallee/Mulga	<input type="checkbox"/> Mallee/Mulga	<input type="checkbox"/> Mallee/Mulga	<input type="checkbox"/> Mallee/Mulga
	<input type="checkbox"/> Rainforest	<input type="checkbox"/> Rainforest	<input type="checkbox"/> Rainforest	<input type="checkbox"/> Rainforest
	<input type="checkbox"/> Tussock	<input type="checkbox"/> Tussock	<input type="checkbox"/> Tussock	<input type="checkbox"/> Tussock
	<input type="checkbox"/> Moorland	<input type="checkbox"/> Moorland	<input type="checkbox"/> Moorland	<input type="checkbox"/> Moorland
	<input type="checkbox"/> Managed Land	<input type="checkbox"/> Managed Land	<input type="checkbox"/> Managed Land	<input type="checkbox"/> Managed Land

Copy of any relevant photos attached Yes

Step 2: Determine the distance from asset to boundary line

ASPECT	NORTH	EAST	SOUTH	WEST
Distance m m m m

Step 3: Determine the distance from the building line to the vegetation in each direction as above

ASPECT	NORTH	EAST	SOUTH	WEST
Distance m m m m

Step 4: Determine the effective slope that will influence bush fire behaviour in each direction

CATEGORY	NORTH	EAST	SOUTH	WEST
Slope under the hazard (over 100m) [in degrees]	<input type="checkbox"/> upslope/flat	<input type="checkbox"/> upslope/flat	<input type="checkbox"/> upslope/flat	<input type="checkbox"/> upslope/flat
	<input type="checkbox"/> >0 to 5	<input type="checkbox"/> >0 to 5	<input type="checkbox"/> >0 to 5	<input type="checkbox"/> >0 to 5
	<input type="checkbox"/> >5 to 10	<input type="checkbox"/> >5 to 10	<input type="checkbox"/> >5 to 10	<input type="checkbox"/> >5 to 10
	<input type="checkbox"/> >10 to 15	<input type="checkbox"/> >10 to 15	<input type="checkbox"/> >10 to 15	<input type="checkbox"/> >10 to 15
	<input type="checkbox"/> >15 to 18	<input type="checkbox"/> >15 to 18	<input type="checkbox"/> >15 to 18	<input type="checkbox"/> >15 to 18

Step 5: Determine the Fire Danger Index (FDI) that applies to your local government area (see page 9). Circle the relevant FDI below

FDI	<input type="checkbox"/> 100	<input type="checkbox"/> 80	<input type="checkbox"/> 50
-----	------------------------------	-----------------------------	-----------------------------

Step 6: Match the relevant FDI, vegetation, distance and slope to determine the required APZ and Construction level

FDI	<input type="checkbox"/> 100 (see Table 4, page 11)	<input type="checkbox"/> 80 (see Table 5, page 12)	<input type="checkbox"/> 50 (see Table 6, page 13)
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Identify the bush fire attack level for each direction, select the highest level for the entire building and record below. Note BAL-12.5 is the lowest construction level within the scope of AS3959.

Bush Fire Attack Level

- BAL- FZ
- BAL- 40
- BAL- 29
- BAL- 19
- BAL-12.5
- No requirement

Does your proposal meet the required construction level YES NO

PART D

Flame Zone

Provide details and evidence of an alternative solution.

If you determine your house is located in the flame zone you may wish to seek the advice of a specialist bush fire consultant.

PART E Water Supplies

Does your property have a reticulated (piped) water supply?; If so, please provide details on the distance to the nearest fire hydrant on your site plan.

Reticulated (piped) water supply is available

Yes No Distance (m) to hydrant from house.

Do you have or do you plan to have a dedicated water supply for firefighting purposes?

Yes No

Development Type	Water Requirement	Planned	Existing
Residential Lots (<1,000m ²)	5,000 l/lot		
Rural-residential Lots (1,000-10,000m ²)	10,000 l/lot		
Large Rural/Lifestyle Lots (>10,000m ²)	20,000 l/lot		
Dual Occupancy	2,500 l/unit		
Townhouse/Unit Style (e.g. Flats)	5,000 l/unit up to 20,000l maximum		

Do you have or do you plan to have a static water supply (e.g. pool, tank or dam). Include approx. size in litres and also include tank material if using a tank:

Water supply type	Capacity	Construction material	Planned	Existing
e.g. pool	50,000l	Above ground rolled steel with plastic liner		

NOTE: Check with your local council concerning their Local Environmental Plan (LEP) or their Development Control Plan (DCP) as this may dictate the type and size of tank.

PART F Gas Supplies

GAS

Do you have reticulated (piped) or bottled gas?

TYPE OF GAS

Reticulated gas Yes No
 Bottled gas Yes No



NOTE: When attaching development plans please ensure they clearly show location and details of electricity and gas (where relevant) on your property.