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# Development Assessment & Planning

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## BAL Risk Assessment Application Kit

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### New dwellings and alterations and additions to existing dwellings

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#### **FOREWORD**

Bushfire 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 bushfire prone placing lives and property at risk.

The NSW Rural Fire Service (RFS) 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 bushfire prone areas are intrinsic to the fire management strategies of the Service.

This kit provides applicants with a streamlined approach to assist them in preparing their application for a BAL Risk Assessment Certificate as part of the Complying Development process.

This kit explains how to complete the BAL Risk Assessment on the BAL Certificate Application Form to ensure you undertake the process accurately. Upon receiving your BAL Risk Assessment Certificate, you will be required to lodge this with your application for a Complying Development Certificate.

#### ***Who should use this Applicants kit?***

This kit will assist people planning on building a new dwelling or wanting to undertake alterations and additions to an existing dwelling in a bushfire prone area under the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (the Codes SEPP). By using this kit you should be able to determine the bushfire attack level (BAL) for your property. Once this is completed, you can lodge your assessment and appropriate information with a recognised consultant, Council or the RFS (until 25 February 2012) to obtain a BAL Risk Assessment Certificate.

#### ***Is your property in a bushfire prone area?***

Check with Council to determine if your land is bushfire prone. If your property is identified as bushfire prone land, you will need to provide the information required by this kit to your chosen recognised consultant, Council or the RFS in order to obtain a BAL Risk Assessment Certificate to support your Complying Development Certificate.

## ***Why do I need to do this?***

In order to undertake complying development on bushfire prone land your category of bushfire risk (i.e. BAL) for your property must be certified by a recognised consultant, Council or the RFS. Complying development is not permitted on high risk bushfire prone land, i.e. BAL-40 or BAL-FZ (Flame Zone).

If your development is determined as being in a high risk bushfire prone area then you will need to lodge a Development Application with Council as your development is not eligible to be considered as complying development under the Codes SEPP.

## ***Your obligations and Council requirements***

When you lodge your application for a BAL Risk Assessment Certificate it will be checked for accuracy by the qualified consultant, Council or the RFS. If it proves to be in error or the required information is not provided, your BAL Risk Assessment Certificate may not be issued and your proposed development delayed.

This kit has been developed to assist you in assessing the category of bushfire risk (i.e. BAL) for your property so you can determine whether your proposed development may potentially proceed as complying development under the codes SEPP. It aims 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 Bushfire Protection, 2006.

Your application for a BAL Risk Assessment Certificate must be accompanied by the following information:

1. Completed BAL Risk Assessment Application Form (available on Council's web page)
2. Plans – suitably scaled site plan showing existing buildings and proposed works
3. fee
4. Any relevant photos
5. Other submission requirements.

## ***How to use this Kit***

The kit will take you through each step in determining the category of bushfire risk (i.e. BAL bushfire attack level) for your property. Complete the BAL Risk Assessment Application Form as you work through the explanatory notes (Parts A to D) below.

If you determine that your proposed development is a higher risk, i.e. BAL-40 or BAL-FZ (Flame Zone) you may need to contact a bushfire consultant to assist you further. In these scenarios a Development Application may be required to be lodged with Council.

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## BAL Certificate Application Form - Part A

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### *Property Details*

In Part A, fill in the property details for the site you plan to develop.

It is important to accurately identify your property to be developed. Provide the property address and Lot and Deposited Plan number. You also need to include a map showing the property location within the broader locality.

It is important to clearly identify whether your property is in a bushfire prone area. To determine whether your property is identified as being bushfire prone you should check Council's Bushfire Prone Land Map or your s. 149 Planning Certificate which can be obtained from Council.

Tick the box to indicate that the property has been checked that it is located upon Bushfire Prone Land.

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## BAL Certificate Application Form - Part B

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### *Type of Proposal*

In Part 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. Tick the box to show that plans are included. Plans must be suitably scaled, legible and clearly referenced and labelled.

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## BAL Certificate Application Form - Part C

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### *Bushfire Development Standards*

In Part C, tick the applicable box.

The development standards that apply to your proposal under the Codes SEPP are dependent on the land zoning. The zoning of your land can be found on your s. 149 certificate or by contacting Council.

Based on your zoning there are two sets of development standards that relate to bushfire prone land, one for Residential zones (R1, R2, R3, R4 and RU5) and one for Rural zones (RU1, RU2, RU3, RU4, and R5) In order to be potentially eligible to be considered complying development your proposal must satisfy the applicable development standards.

#### **1. Residential Zones**

If your proposed development falls under the provisions of Codes SEPP and your land is identified as being bushfire prone, complying development can be carried out provided that

development standards for development on residential zoned land (R1, R2, R3, R4 or RU5) can be met. These development standards are:

The development conforms to the specifications and requirements of the following that are relevant to the development:

1.
  - i. *Planning for Bush Fire Protection* (ISBN 0 9751033 2 6), published by NSW Rural Fire Service, December 2006; and
  - ii. Addendum: Appendix 3 (ISBN 0 9751033 2 6, published by NSW Rural Fire Service in 2010) to *Planning for Bushfire Protection* (ISBN 0 9751033 2 6); and
  - iii. If another document is prescribed by the regulations for the purposes of section 79BA of the Environmental Planning and Assessment Act 1979 – that document
2. The part of the lot on which the development is to be carried out is not in bushfire attack level-40 (BAL-40) or the flame zone (BAL-FZ); and
3. The lot has direct access to a public road or a road vested in or maintained by Council; and
4. A reticulated water supply is connected to the lot; and
5. A hydrant is located less than 60 metres from the location of the lot of the proposed development; and
6. Mains electricity is connected to the lot; and
7. Reticulated or bottled gas on the lot is installed and maintained in accordance with AS/NZS1596:2008: The storage and handling of LP Gas and the requirements of relevant authorities (metal piping must be used); and
8. Any gas cylinders on the lot that are within 10m of a dwelling house:
  - i. Have the relevant valves directed away from the dwelling house; and
  - ii. Are enclosed on the hazard side of the installation; and
  - iii. Have metal connections to and from the cylinders; and
  - iv. There are no polymer sheathed flexible gas supply lines to gas meters adjacent to the dwelling.

NOTE: The requirements of the *AS3959-2009: Construction of buildings in bushfire-prone areas* set out in the Building Code of Australia also apply.

## 2. Rural Zones

If your proposed development falls under the provisions of Codes SEPP and your land is identified as being bushfire prone, complying development can be carried out provided that development standards for development on rural zoned land (RU1, RU2, RU3, RU4, and R5) can be met. These development standards are:

1. The development conforms to the specifications and requirements of the following that are relevant to the development:

- i. *Planning for Bush Fire Protection* (ISBN 0 9751033 2 6) published by the NSW Rural Fire Service in December 2006;
  - ii. Addendum: Appendix 3 (ISBN 0 9751033 2 6, published by NSW Rural Fire Service in 2010) to *Planning for Bush Fire Protection* (ISBN 0 9751033 2 6); and
  - iii. If another document is prescribed by the regulations for the purposes of section 79BA of the *Environmental Planning and Assessment Act 1979* – that document. And
2. The part of the lot on which the development is to be carried out and any associated access way is not in bushfire attack level-40 (BAL-40) or the flame zone (BAL-FZ); and
  3. The lot has direct access to a public road or a road vested in or maintained by Council; and
  4. The development is located within 200m of that road; and
  5. There is sufficient access designed in accordance with the acceptable solutions identified in clause 4.1.3 (2) of *Planning for Bush Fire Protection* (ISBN 0 9751033 2 6) published by the NSW Rural Fire Service in December 2006; and
  6. A 20,000L water supply with 65mm metal Storz outlet with a gate or ball valve is provided for fire fighting purposes on the lot (the gate or ball valve, pipes and tank penetrations are to be designed to allow for a full 50mm inner diameter water flow through the Storz fitting and must be of a metal construction); and
  7. Reticulated or bottled gas on the lot is installed and maintained in accordance with AS/NZS1596:2008: The storage and handling of LP Gas and the requirements of relevant authorities (metal piping must be used); and
  8. All fixed gas cylinders on the lot are located at least 10, from flammable material and are enclosed on the hazard side of the installation; and
  9. Any cylinders on the lot that are within 10m of a dwelling house:
    - i. Have the release valves directed away from the dwelling house; and
    - ii. Have metal connections to and from the cylinders; and
  10. There are no polymer sheathed or flexible gas supply lines to gas meters adjacent to the dwelling.

NOTE: The requirements of AS3959-2009: *Construction of buildings in bushfire-prone areas* set out in the Building Code of Australia also apply.

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## BAL Certificate Application Form - Part D

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### ***Bushfire Attack Level (BAL) and Risk Assessment***

In Section 2 – Part D, complete steps 1 to 5.

To determine the bushfire attack and required BAL for a building the following steps must be followed:

- Step 1. Determine vegetation types surrounding the building using the vegetation chart in Appendix 1.
- Step 2. Determine the distance between each vegetation formation and the building.
- Step 3. Determine the effective slope.
- Step 4. Determine the relevant Fire Danger Index (FDI).
- Step 5. Match the relevant FDI, appropriate vegetation, distance and effective slope to determine the appropriate APZ and Bushfire Attack Level.

### **Step 1. Determine the vegetation**

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

Check the chart in Appendix 1 (Classification of Vegetation Formations) of this kit to determine your vegetation type.

For each compass direction (normally north, south, east and west) surrounding your home, identify (using the above mentioned vegetation classification provided in Appendix 1) what the vegetation type is adjacent to your development site and indicate it on the application form (Section 2).

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) and include as part of your application.

NOTE: Where a mix of vegetation types exist, the type of vegetation providing the greater bushfire hazard is to be used.

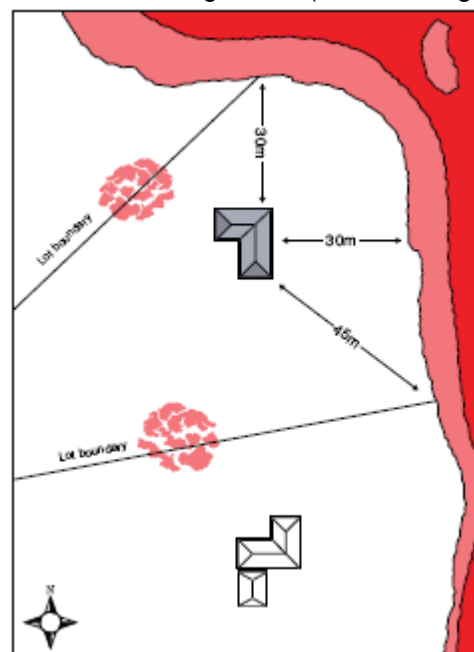
### **Step 2. Determine the distance**

You will need to determine the separation distance between the vegetation (from the edge of the foliage cover) and the building for each direction. This separation distance is often referred to as an APZ – asset protection zone.

#### **What is an APZ?**

An asset protection zone (APZ) is an area between a bushfire 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 bushfire. The different construction standards require a complimentary APZ to achieve a complete solution. These APZs will generally



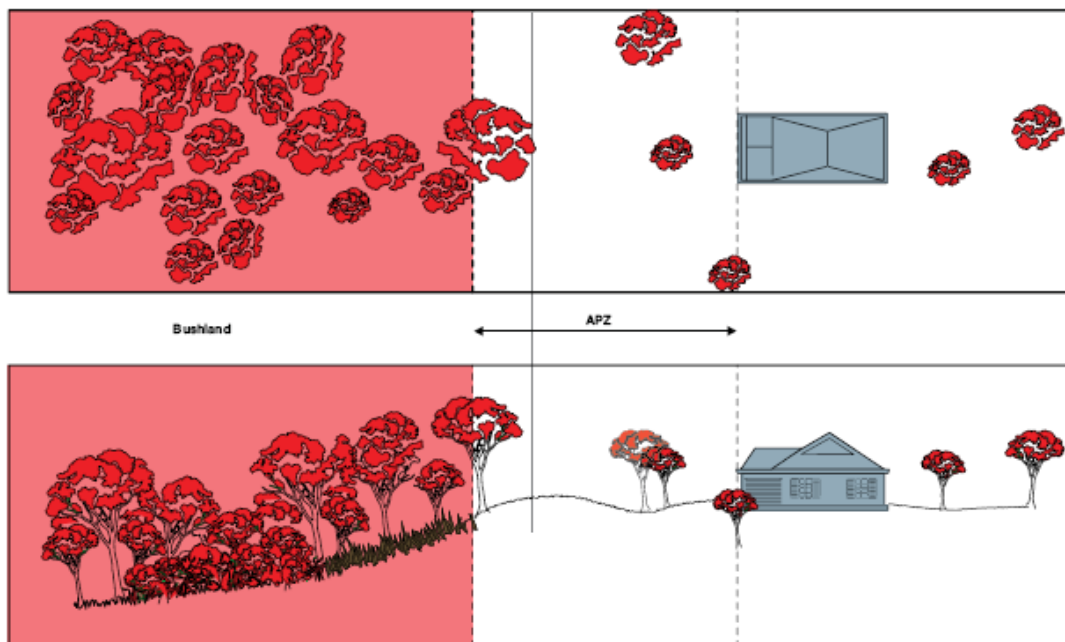
Example of simple layout sketch with distances noted to vegetation f 16

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 bushfire prone area and must be regularly maintained.

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

APZ's on adjoining unmanaged land will not be accepted. It will only be considered under exceptional circumstances when an agreed legal arrangement (such as an easement) is able to be achieved and will need to be submitted with an 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 and maintenance (available from the RFS website or your local Fire Control Centre).



Asset Protection Zone (APZ)

### Step 3. Determine the Effective Slope

Assess the effective slope over a distance of at least 100m from the building site towards the vegetation that is the bushfire hazard in each direction. On steeper slopes, a greater distance should be assessed up to 140m.

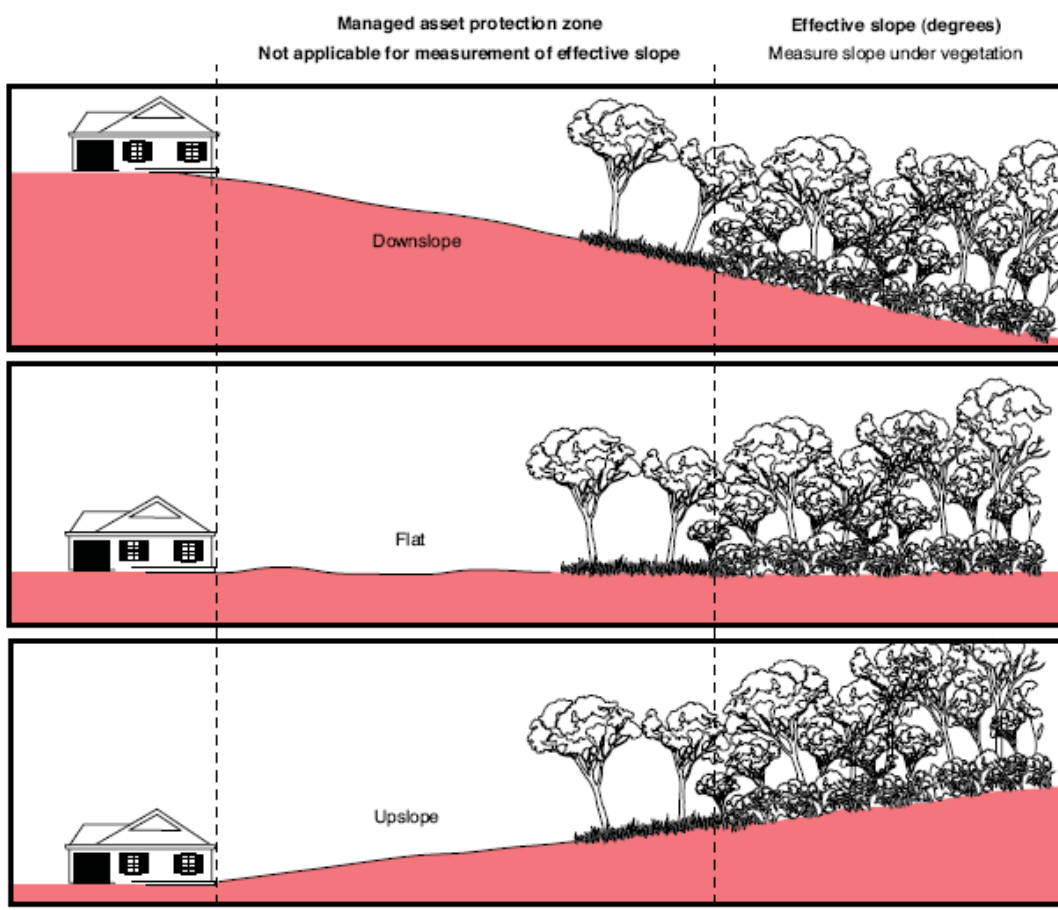
Commonly, properties will have slopes that vary over the 100m. the effective slope is the part of the overall slope that will have the greatest influence on the bushfire behaviour. The effective slope may be only a portion of the 100m but should represent a substantial portion. If you are unable to determine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

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 20° downslope

NOTE: As a guide to measuring the slope you could try using the simple method shown on pages 9 and 10.



Above: 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 40m 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 ribbon or tape around the trunk at 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 (this is your eye level).
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 slope 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**

The Fire Danger Index for the Wagga Wagga City Council Local Government Area is 80. The FDI is based on the weather history for a region that will influence bushfire behaviour.

#### **Step 5. Bushfire Attack and Level of Construction**

Match the relevant FDI, appropriate vegetation, separation distance and effective slope to determine the category of bushfire attack and the appropriate BAL applicable to the site from the following tables.

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

#### **Determining your BAL**

Use the tables below to determine the Bushfire Attack Level (BAL) that applies to the building for each direction. Of the BALs determined for each direction, select the one that provides the highest protection as this will apply to the entire building.

For most vegetation types, buildings more than 100m from the bushfire prone vegetation do not require any specific construction requirements however, homeowner's are encouraged to provide basic measures such as suitable window screening and gutter guards to minimise the impacts of ember attack (as embers can travel greater than 100 metres).

Where a building is to be constructed close to bushfire prone vegetation, Australian Standard AS3959 describes the construction standards to protect against any bushfire 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. Those buildings which can provide the separation distances to achieve BAL-12.5 to BAL-29 will be regarded as lower risk and may potentially be considered as complying development.

#### **BAL-40 and Flame Zone**

Where buildings are unable to meet the separation distances for BAL-12.5 to BAL-29 (i.e. BAL-40 or BAL-FZ) they will be regarded as higher risk development and will no longer be eligible to be considered complying development. Building which exceed BAL-29 are those which are exposed to significant radiant heat and potential flame contact. They will require special design and construction solutions supported by evidence of satisfactory performance. Expert assistance from a bushfire consultant may be required in designing and assessing this type of building.

If Table 1 – The Fire Danger Index for each LGA in NSW is greater than 80, buildings must comply with the requirements for complying development and will need to submit a Development Application through Council in order to potentially obtain Development Consent.

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 (shrub)		<7	7-<9	9-<13	13-<19	19-100
Short heath (shrub land)		<10	10-<13	13-<19	19-<27	27-100
Rainforest		<6	6-<8	8-<12	12-<17	17-100
Grasslands		<6	6-<9	9-<13	13-<19	19-100

**Table 1 – Example of how to determine level of construction**

### A) How to use this

1. Determine the vegetation
2. Determine distance between building footprint and the hazard
3. Determine Slope
4. Determine your FDI
5. Note your bushfire 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

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
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
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
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	99 - 100
Mallee/Mulga	<8	8-<11	11-<18	18-<26	26 - 100
Rainforest	<14	14-<19	19-<28	28-<39	39 - 100
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

**Table 2 – FDI 80**

NOTE: "Forests" refers to wet sclerophyll forest, dry sclerophyll forest and plantation forest (including pine plantations and forested wetlands). Until Grasslands have been adopted by the Australian Standards they have not been included in this table.

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.	Bushfire Attack Level – Low (BAL-LOW)
≤ 12.5	Attack by burning debris is significant with radiant heat (not greater than 12.5 kW/m <sup>2</sup> ). Radiant heat is unlikely to threaten building elements (eg unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.	Bushfire 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 <sup>2</sup> ) threatening some building elements (screened glass). Specific construction requirements for embers and radiant heat are warranted.	Bushfire Attack Level – 19 (BAL-19)
>19 ≤29	Attack by burning debris is significant and radiant heat levels (not greater than 29 kW/m <sup>2</sup> ) threaten building integrity. Specific construction requirements for ember and higher radiant heat are warranted. Some flame contact is possible.	Bushfire 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.	Bushfire 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.	Bushfire Attack Level – Flame Zone (BAL-FZ)

**Table 3 – Heat flux exposure and appropriate bushfire attack levels**

NOTE: If you have determined your BAL risk assessment correctly and it is above BAL 29, then your development proposal cannot be considered complying development. A development application will be required.

# 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 <i>Planning for Bush Fire Protection</i> , 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 and aesthetically pleasing than acceptable solutions. It is up to the applicant to demonstrate how the product, design or material can meet the performance requirement.
AS3959	Australian Standard AS3959 Construction of buildings in bushfire-prone areas, Standards Australia, 2009, that outlines construction standards applicable to residential developments in bushfire prone areas.
Asset Protection Zone (APZ)	An area surrounding a development managed to reduce the bushfire 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.
BAL – Bushfire Attack Level	A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, which is the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire.
BAL Risk Assessment	A site specific assessment procedure that is required as part of the complying development process. It provides a rating based on the expected level of bushfire attack in accordance with AS3959-2009 and Addendum Appendix 3 of <i>Planning for Bush Fire Protection</i> 2006.
BAL Risk Assessment Certificate	A Certificate issued by either a bushfire consultant, Council or the RFS which confirms the BAL for your particular development site.
Building Footprint	The area shown on a plan over which a building can be erected.
Bushfire Prone Area/Land	Is an area of that land that can support a bushfire or is likely to be subject to bushfire attack. In general, a bushfire prone area is an area mapped for a local government area that identifies the vegetation types and associated buffer zones. Bushfire Prone Land Maps are prepared by Council and certified by the Commissioner of the RFS under section 146(2) of the Environmental Planning and Assessment Act 1979.
Bushfire Protection Measures (BPMs)	Are a range of measures (controls) available to minimise risk arising from a bushfire. BPMs include APZs, construction standards, suitable access arrangements, water and utility services, emergency management arrangements and landscaping.

Bushfire Assessment Report	Report submitted in support of a development application by an applicant which determines the extent of bushfire attack to a development and the measures used to mitigate that attack. Appendix 4 of <i>Planning for Bush Fire Protection</i> , 2006 provides the information requirements for a bushfire assessment. See also clause 46 of the Rural Fires Regulation.
Codes SEPP	State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
Complying Development	Development that meets predetermined standards contained within local environmental plans, development control plans or state environmental planning policies. Under the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 – Codes SEPP, complying development applies to all new development which occurs on low risk bushfire prone land. This process excludes the need for lodgement of a development application and helps to fast track development approval.
Complying Development Certificate	A certificate issued by Council for consent to carry out development such as building, subdivision, or the use of a building or land.
Bushfire Development Standards	Are a range of standards (controls) listed under the General Housing Code and Rural Housing Code that apply to a new development undertaken on low risk bushfire prone land and which are available to minimise the risk arising from a bushfire. Standards include APZs, construction standards, suitable access arrangements, water and utility services, emergency management arrangements and landscaping.
Flame Zone	The distance from a bushfire at which there is significant potential for sustained flame contact to a building. Determined by the calculated distance at which radiant heat of the design fire exceeds 40kW/m <sup>2</sup> or calculated by the sustained flame length, whichever is less.
Fire Danger Index (FDI)	A relative number denoting an evaluation of rate of spread, or suppressed 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.
Planning for Bushfire Protection	A guide for Councils, Planners, Fire Authorities and Developers prepared by the NSW Rural Fire Service and revised in 2006. Addendum Appendix 3 was included in 2010.
Qualified Consultant	Consultants who have been recognised by the NSW Rural Fire Service and NSW Department of Planning as suitably qualified. This recognition is for the purposes of 79BA of the Environmental Planning and Assessment Act 1998 and the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
RFS	New South Wales Rural Fire Service.

# Appendix 1

## 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, watties, 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 (Shrubland)

Shrubby vegetation less than 2 metres in height. Often more open in canopy. Principal plant species include banksias, spider flowers, watties, 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.

Photos supplied by Holoptes Fire Project