



Government of Western Australia  
Department of Mines, Industry Regulation and Safety  
Building and Energy

# Building for better protection in bush fire areas

A homeowner's guide



version one

# Contents

<b>New building work</b> .....	<b>1</b>
Planning Approval .....	1
Building Approval .....	1
Are you building in a designated bush fire prone area? .....	2
What are the construction requirements in bush fire prone areas? .....	2
<b>Upgrading or rebuilding following a bush fire</b> .....	<b>4</b>
<b>Existing homes</b> .....	<b>4</b>
How can I retrofit my existing home? .....	4
Who can I contact to undertake an inspection of my property? .....	7
Further reading .....	7

## Acknowledgements

Building and Energy in Western Australia acknowledges the assistance provided by the Victorian Building Authority, the City of Armadale, the Shire of Busselton and the Fire and Emergency Services Authority.

## Referenced documents

Standards Australia (2009), Construction of buildings in bush fire-prone areas, Australian Standard 3959, Standards Australia, Sydney.  
Australian Building Codes Board (2011), Building Code of Australia, Australian Building Codes Board, Canberra.

## Disclaimer

The material contained in this booklet provides general guidance and information only and is current at time of publication. Readers should not act or omit to act solely on the basis of anything contained herein. In relation to a particular matter, you should seek appropriate professional advice.

The State of Western Australia and its servants and agents expressly disclaim liability, whether in negligence or otherwise, for any act or omission resulting from reliance on this document or for any consequence of such act or omission.

Western Australia has some of the driest climatic regions in Australia and is prone to bush fire attack, particularly around the south west regions. In the past few years there have been numerous fire events that have devastated bushland areas and destroyed or damaged properties.

Since the early 1990s, it has been mandatory for new homes constructed in designated bush fire prone areas to comply with enhanced building standards. However, some existing homes predate these requirements and often do not achieve the necessary level of protection against bush fire attack.

This guide is provided to assist homeowners be aware of the regulated construction requirements and building standards for new homes and to assist those who wish to upgrade their existing homes for better protection from bush fires.

Improving the design and construction of houses to minimise the damage from bush fires is just one method of reducing the risk from bush fire. Other processes must also be considered, such as planning and subdivision, landscaping, vegetation management and having a bush fire management plan.

## New building work

In Western Australia all new building work is required to comply with the requirements of the Building Code of Australia (BCA). The BCA forms Volumes One and Two of the National Construction Code series and provides minimum technical requirements for the construction of buildings. The BCA also includes specific construction requirements for building in designated bush fire prone areas.

Before you start designing your home, you should contact your local government to determine what approvals may be needed for your property. There may be two parts to approval –

### Planning Approval

Some local governments require planning approval for the design and location of buildings or structures within their jurisdiction. Your local government can provide information about any planning approvals your design may require.

### Building Approval

Before you can start building work, your building will need to be assessed by a qualified building surveyor to ensure compliance with the BCA, including any specific bush fire construction requirements that may be applicable to your property. You will need to provide the building surveyor with detailed plans and specifications of your proposed building work.

Once your design demonstrates compliance with the applicable planning and building requirements, you can then apply to your local government for approval to build.

## Are you building in a designated bush fire prone area?

Several areas in Western Australia have been designated as bush fire prone.

Your local government can advise whether your property is **located in a designated bush fire prone area**.

A designated bush fire prone area means land which has been designated under law as being subject, or likely to be subject, to bush fires. In Western Australia, this has traditionally been done by local governments through their planning schemes. If your property is located in a designated bush fire prone area, there may be additional bush fire construction requirements for buildings on that site.

### Find a building surveyor

Your local government will have qualified building surveyors. Alternatively you can engage the services of a private building surveyor. Check the Yellow Pages or visit the Australian Institute of Building Surveyors at [www.aibs.com.au](http://www.aibs.com.au)

From January 2012, check Building and Energy's website for a list of registered building surveyors at [www.dmirns.wa.gov.au/building-and-energy](http://www.dmirns.wa.gov.au/building-and-energy)

## What are the construction requirements in bush fire prone areas?

If you are building a home or doing building work in a designated bush fire prone area you will be required to comply with the bush fire construction requirements of the BCA. This will require compliance with Australian Standard AS 3959 – Construction of buildings in bush fire prone areas.

If you are constructing in an area that is subject to bush fires but is not in a "designated bush fire prone area", you should be making every attempt to increase the resistance of your building to bush fires by constructing to the same requirements.

The requirements of AS 3959 are intended to improve the performance of buildings when subjected to bush fire attack. The standard applies to residential buildings and non habitable structures such as private garages, carports, sheds and decks associated with the main residential building, and considers such elements as:

- ▶ External doors, windows and screens
- ▶ Walls
- ▶ Roofs
- ▶ Flooring
- ▶ Eaves, gutters and downpipes

Any associated structures such as garages, carports, decks or verandas that are attached or adjacent to your house will need to comply with the requirements of the BCA and AS 3959. This could mean that the structure will need to meet the same construction requirements as your house, or be adequately separated from your house either by the nature of its construction or by its distance from the house.

While AS 3959 improves the performance of buildings subject to bush fire attack, there is no guarantee that a building will survive a bush fire on every occasion. This is due to the unpredictable behaviour of fire and extreme weather conditions.

Assessment of your property's bush fire risk level to determine construction requirements

AS 3959 requires that your property be assessed to determine a "Bush fire Attack Level" (BAL). The standard defines BAL as:

*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, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bush fire.*

Standards Australia (AS 3959-2009)

Once assigned, the BAL will determine the appropriate construction requirements for your property. The determination of a property's BAL in accordance with AS 3959 for designated bush fire prone areas is a site specific assessment that will take into consideration a number of factors including the slope of the land, types of surrounding vegetation and its proximity to any other buildings or structures on the site.

At the end of the assessment your property will be assigned one of these BALs. Your assigned BAL will determine the specific construction requirements for your building.

Bush fire Attack Level	Description of risk and levels of exposure
<b>BAL – LOW</b>	There is insufficient risk to warrant specific construction requirements.
<b>BAL – 12.5</b>	Risk of radiant heat is considered low. Primarily risk of ember attack.
<b>BAL – 19</b>	Risk is considered moderate. Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux between 12.5 and 19 kW m <sup>2</sup> .
<b>BAL – 29</b>	Risk is considered high. Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux between 19 and 29 kW m <sup>2</sup> .
<b>BAL – 40</b>	Risk is considered very high. Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames.
<b>BAL – FZ</b>	Risk is considered extreme. Direct exposure to flames from fire front in addition to heat flux and ember attack.

If your property is not in a designated bush fire prone area, you should consider having the site assessed to determine its BAL. You can then make an informed decision on the extent to which you wish to include some design requirements of the AS 3959 to enhance the protection of your home against bush fires.

A registered building surveyor or appropriately qualified practitioner can advise on specific construction methods that can be included in the design of your home.



## Upgrading or rebuilding following a bush fire

There may be some instances where an area has been designated as bush fire prone after your original home was built. So if you intend to rebuild or upgrade your home, you may need to comply with the requirements of the BCA and AS 3959.

Even if your building work is not in a designated bush fire prone area, you should make every attempt to increase the resistance of your home to bush fires by constructing to the same requirements.

The building surveyor will be able to advise you of any requirements if you are upgrading or rebuilding your home after it has been damaged or destroyed by a bush fire.

The process for approval to upgrade, repair or rebuild will be similar to applying for building approval for a new house. After a bush fire event, many local governments will have procedures in place to ensure that applications are quickly dealt with to ensure a smooth and speedy transition of your application.

Contact your local government to find out what planning and building approvals you may require.

## Existing homes

Building Standards and regulations are generally not retrospective. If you purchase an existing house in an area that has been declared a designated bush fire prone area after the house was constructed, there may not be a regulatory requirement to upgrade to the new standards.

If you are thinking about constructing additions or carrying out extensive renovations to the existing house, you should seek advice from your local government, qualified building surveyor or other appropriately qualified practitioner, as to whether the existing house needs to be upgraded and what design features would improve the building's performance when subjected to bush fire attack.

If you are thinking of purchasing an existing house in or near any bushland, whether it has or has not been designated as bush fire prone, it is recommended you consider having a bush fire assessment carried out prior to making an offer. This will help you make an informed decision on whether the house is adequately protected against bush fire attack and what you would need to do if you wish to upgrade or rebuild.

### **How can I retrofit my existing home?**

Depending on your level of retrofitting, you may require approval from your local government.

The following are just some examples of building improvements that may be retrofitted to your home in accordance with AS 3959, up to and including BAL 29. If your BAL is higher than BAL 29, you need to discuss the requirements for your building with your building surveyor or other appropriately qualified and experienced practitioners.

## Flooring

To prevent burning embers entering under the floor space, any raised floors should have the perimeter enclosed with non-combustible material. For example, a timber framed house on stumps should have the area between the floor and the ground covered with material such as masonry, concrete or non-combustible sheeting or timbers that are naturally fire resistant or treated with a fire retardant.



## External doors and windows

Burning embers and smoke can enter a house through external doors and windows. The following methods will help prevent this from occurring:

- ▶ External side hung doors should be:
  - non-combustible or made of solid timber with a minimum thickness of 35mm;
  - sealed with weather strips or draught seals;
  - protected with metal screens, either mesh or perforated sheet, made of corrosion-resistant steel, bronze or aluminium; and
  - tight fitting with any gaps between the frames and walls sealed.
- ▶ Sliding doors should be protected with metal screens, either mesh or perforated sheet, made of corrosion-resistant steel, bronze or aluminium, or fitted with bush fire shutters.
- ▶ Windows should be protected with metal screens or bush fire shutters.
- ▶ If metal screens or bush fire shutters are not fitted to windows and external doors, glass should be toughened safety glass.
- ▶ Frames supporting the mesh screens for both doors and windows should be made of metal or bush fire resisting timber.
- ▶ All external hardware for windows and external doors should be made of metal.

## External walls

It is recommended that all external walls be constructed of non-combustible material such as masonry or concrete.

To improve the resistance of timber or steel framed construction against bush fire attack, it may be possible to retrofit existing framed homes with fire resistant wall cladding or timber that is naturally fire resistant or treated with a fire retardant.

### **Gutters and downpipes**

To help prevent burning embers igniting leaf litter in your gutters, consider installing non-combustible gutter and valley leaf guards. Gutters should be made of non-combustible material and box gutters flashed at the junction with the roof. The standard does not provide for specific construction material requirements for downpipes.



### **Roofs**

Roofs, roofing systems and accessories should be non-combustible and the roof/wall junction should be sealed to prevent gaps. Ember guards made of mesh or perforated sheet, constructed of corrosion-resistant steel, bronze or aluminium, should be fitted over roof ventilation points such as gable and roof vents.

### **Evaporative air conditioners**

During a bush fire, burning embers can travel very quickly over many kilometres depending on the prevailing conditions.

A home that may not appear to be in direct danger from flames can be threatened with travelling embers which can be drawn into and ignite an evaporative air conditioner. This can spread fire into the roof or ceiling space and cause considerable damage or even complete loss of the home.

The Keelty Perth Hills Bush fire Review 2011 recommended that residents in areas prone to bush fires retrofit their homes and evaporative air conditioners in compliance with AS 3959. This requires evaporative air conditioners to be fitted with non-combustible covers (ember protection screens) with a mesh or perforated sheet with a maximum aperture of 2mm and made of corrosion-resistant steel, bronze or aluminium.

### **Retrofitting existing evaporative air conditioners**

If you have an existing evaporative air conditioner, and it does not comply with AS 3959, you should make every effort to install a protective non-combustible ember screen over the air intake to prevent burning embers entering the house.

For more information about ember protection screens, contact the manufacturer of your existing evaporative air conditioner or visit [www.dmirs.wa.gov.au/building-and-energy](http://www.dmirs.wa.gov.au/building-and-energy) or go to [www.dfes.wa.gov.au](http://www.dfes.wa.gov.au)

### **New evaporative air conditioners**

If you are considering the installation of a new evaporative air conditioner, you should ensure that the unit complies with the ember protection requirements of AS 3959.



## **Who can I contact to undertake an inspection of my property?**

An assessment of your property should be carried out by a qualified person with experience in bush fire design and/or management. Your building surveyor will rely on the bush fire assessment to determine the appropriate construction requirements for your building and may either carry out the assessment, or refer you to a suitably qualified practitioner.

## **Further reading**

FESA has a number of publications to assist people living in bush fire prone areas to establish a bush fire management plan. Visit [www.dfes.wa.gov.au](http://www.dfes.wa.gov.au) or call 08 9323 9300.

The Victorian Building Authority has produced several publications with information for people retrofitting existing homes located in bush fire areas and for those who are rebuilding after losing their homes in the State's devastating bush fires in 2009. Visit [www.vba.vic.gov.au](http://www.vba.vic.gov.au)

Standards Australia publishes detailed information about Australian Standards. A registered building surveyor or appropriately qualified practitioner can advise you on the requirements of AS 3959 however, if you wish to search for standards and purchase online visit [www.saiglobal.com](http://www.saiglobal.com)

Government of Western Australia

## **Department of Mines, Industry Regulation and Safety**

### **Building and Energy**

**1300 489 099**

8.30am – 4.30pm

Level 1 Mason Bird Building  
303 Sevenoaks Street  
(entrance Grose Avenue)  
Cannington Western Australia 6107

### **Online**

Website: [www.dmirs.wa.gov.au/building-and-energy](http://www.dmirs.wa.gov.au/building-and-energy)

Email: [be.info@dmirs.wa.gov.au](mailto:be.info@dmirs.wa.gov.au)

### **Mailing address**

Locked Bag 100  
East Perth WA 6892

### **Regional offices**

Goldfields/Esperance	(08) 9021 9494
Great Southern	(08) 9842 8366
Kimberley	(08) 9191 8400
Mid-West	(08) 9920 9800
North-West	(08) 9185 0900
South-West	(08) 9722 2888

**National Relay Service: 13 36 77**

**Translating and Interpreting Service (TIS) 13 14 50**

**This publication is available in other formats  
on request to assist people with special needs.**