Resilient Building Council

# Retrofit Handbook

Bushfire Resilience Rating

resilienceratting.org

Thank you to the following contributors to the development of the Bushfire Resilience Rating Methodology, 2020-2021.

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Thank you to the following contributors to the development of the Bushfire Resilience Rating Home Self-Assessment App, 2021 – 2023.

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# Contents

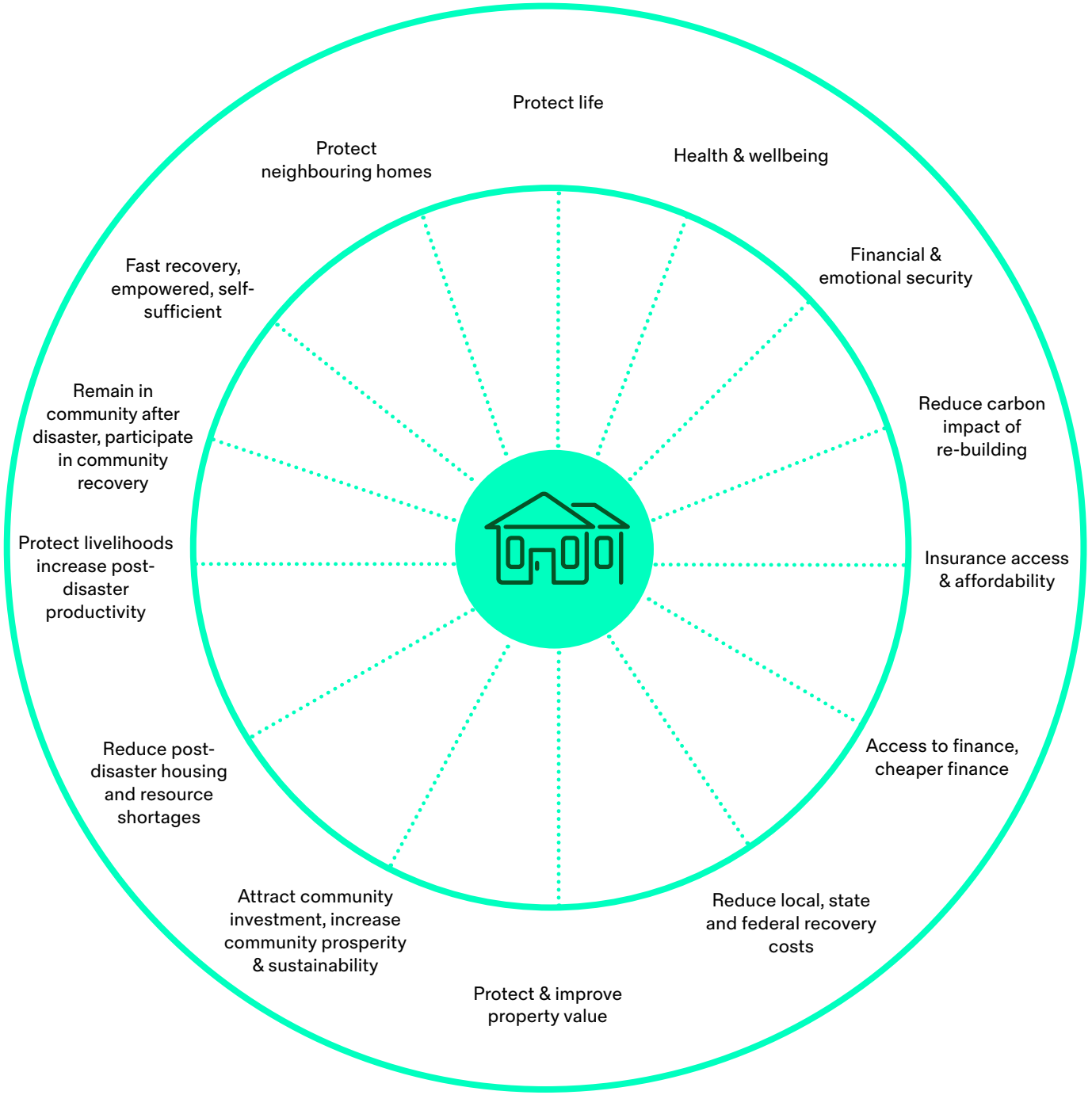
# 1. Introduction

# Benefits of Resilient Housing

The following guide is designed to support the free Bushfire Resilience Home Self-Assessment app, to help you improve the resilience of your home. A well-prepared property should form part of your broader Bushfire Survival Plan.

Making housing safe and resilient to disasters can help protect lives and livelihoods and build sustainable communities – World Bank, Global Program for Resilient Housing.

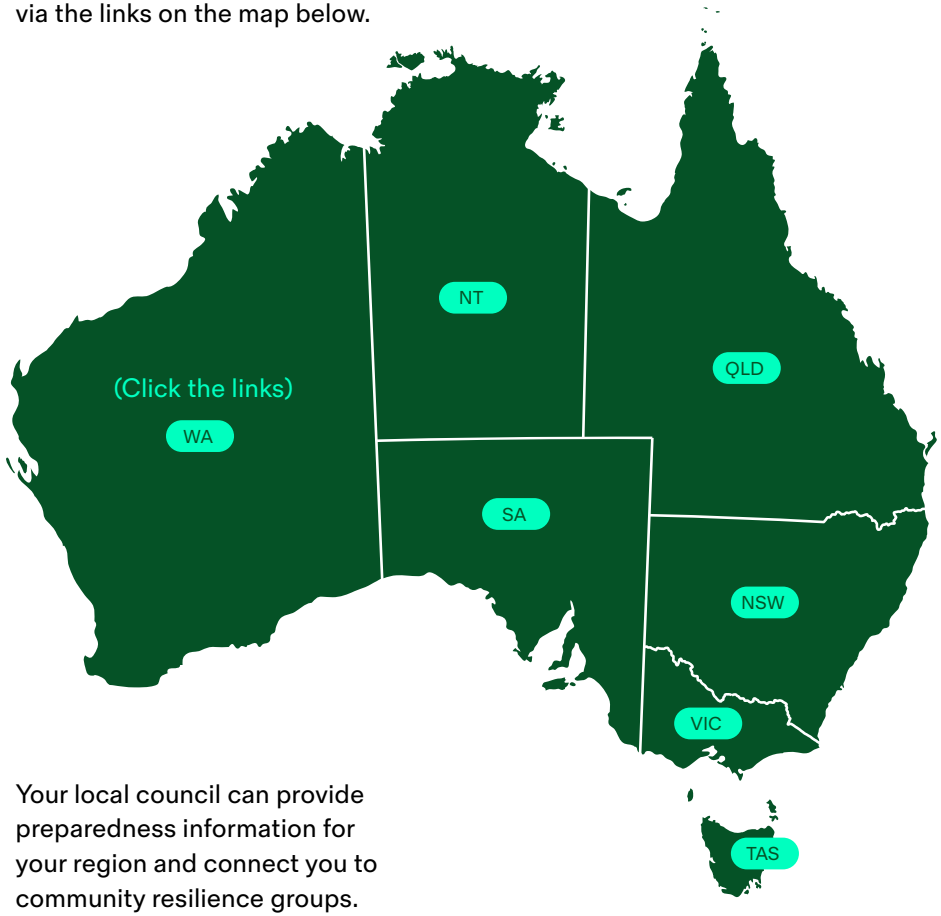
Some of the benefits of resilient housing include:



# 2. Bushfire Survival Planning

# Where to Get Help

Australian States and Territories provide comprehensive information and tools to help you and your community prepare for bushfire and other hazards. Prepare your household Bushfire Survival Plan via the links on the map below.




Your local council can provide preparedness information for your region and connect you to community resilience groups. When moving to a new area or travelling on holidays, check the relevant council website for local preparedness plans, including where to go in an emergency.

The following national resources can help you and your community prepare for extreme weather and emergencies:

**Household emergency planning**
Red Cross, Beyond Blue, Services Australia, Australian Psychological Society, Emerging Minds, Person-Centred Emergency Preparedness, RSPCA, Health Direct , Money Smart

**Emergency warnings**
ACT NSW NT QLD SA TAS VIC WA ABC Emergency BOM

**Business emergency planning**
Australian Small Business and Family Enterprise Ombudsman, Department Agriculture Farming & Fisheries, Business.gov.au

**Landscape management**
Firesticks, CFA Plant Selection, Royal Commission – Indigenous Land and Fire Management, Bushfire Resilience Inc

**Community emergency planning**
Red Cross, Local Councils, Person-Centred Emergency Preparedness, AIDR

**Bushfire behaviour & weather**
BOM, AIDR, Australian Fire Danger Rating System, Geoscience Australia

**Resilient housing**
Bushfire Resilience Rating App, FORTIS House, Bushfire Resilience Inc, Your Home, QLD Best-Practice Guides

# Life Safety

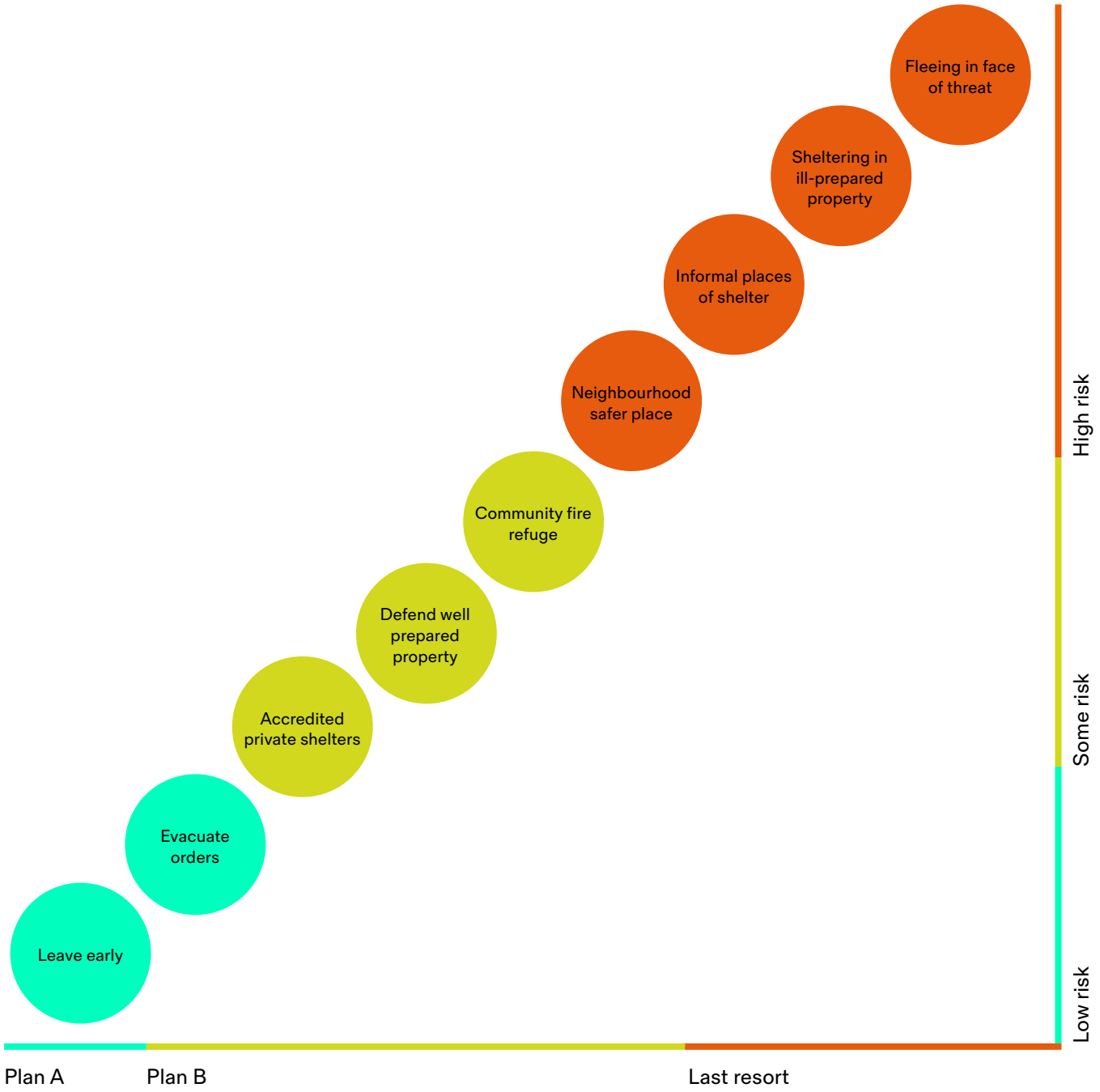
Leaving early is the safest option.

In a crisis, events happen that you may not have planned for, such as fallen trees blocking escape routes, loss of communications, water and power, injury and stress, road closures, limited visibility, and the loss of your home and other shelters you may have planned to rely on in an emergency.

Your Bushfire Survival Plan should include multiple contingency plans in case your primary and secondary plans fail. A well prepared, resilient home provides safer shelter if early evacuation wasn't possible.

Your plans should consider the risks to your household and the degree of physical and mental preparedness, equipment and resources required.

Ensure your contingency plans prioritise the lowest-risk options, such as those on the left side of the diagram shown here.



# Accredited Private Shelters

Accredited private shelters (bunkers) are a place of last resort that can provide temporary protection from bushfire attack. Accredited private shelters have fewer points of potential failure compared to a larger building like a home, but there are still risks that need to be managed. Careful consideration of siting, landscaping, maintenance, and operation is critical. More information is available from the Australian Building Codes Board, the Victorian Building Authority and the CFA.

# Toxic Gases

Building materials, home furnishings and nearby stored items such as cars, caravans, boats, fuels and paints produce toxic gases when exposed to bushfire attack. Consider the toxicity when selecting building materials and furnishings and keep toxic stored items away from the home.

More information about indoor and outdoor air quality is available from the Australian Building Codes Board and the Department of Energy, Climate Change, Environment and Water.

# 3. High Fire Danger Days

# Home Preparation Checklist

On high fire danger days, the most important action is to implement your Bushfire Survival Plan.

If evacuation has not been possible, use the checklist on this page to prepare for bushfire attack.

If you are leaving early, you can follow relevant actions on this page, only if you have time. Do not delay your plan to leave early.

Print this page and place it where you will be reminded to implement these important actions.

**General Actions**

- [x] 1. Follow your Bushfire Survival Plan
- [ ] 2. Put on protective clothing
- [ ] 3. Help children and vulnerable family members get prepared
- [ ] 4. If you are evacuating, let family and friends know where you are going
- [ ] 5. If you have not been able to evacuate, let family and friends know where you are
- [ ] 6. Charge up phones, monitor radio, tv and phone alerts
- [ ] 7. Do not use power tools, lawnmowers or any equipment that could start a fire

**Outside the Home**

- [ ] 8. Bring pets inside
- [ ] 9. Turn off gas supply
- [ ] 10. Open gates to prepare exit route and to enable firefighter access
- [ ] 11. Park your car at least 10m from the home and other structures, facing outwards towards your planned exit route. Pack your evacuation kit into the car, including woolen blankets and water
- [ ] 12. Prepare water pumps and roll out fire hoses if you have them
- [ ] 13. Turn on evaporative coolers to wet filters, then turn evaporative coolers off prior to evacuation or ember/fire arrival
- [ ] 14. Block downpipes with tennis balls, and fill gutters with water
- [ ] 15. Wet down timber cladding, windowsills, decks, retaining walls, mulch, garden beds and any other combustible materials on or near the home
- [ ] 16. Move smaller combustible items into storage sheds or at least 5m from the home, such as mats, furniture, plastic bins, surf boards. Ensure there are no combustible items near the windows or walls of the home, exit pathways or other structures.
- [ ] 17. Move larger combustible items 15m away from the home, exit pathways and other structures, such as cars, boats, caravans
- [ ] 18. Nail or screw fibre cement sheets over windows if you have some pre-prepared
- [ ] 19. Move any stored items and debris from around the posts of attached structures, such as carports, decks, pergolas and verandahs
- [ ] 20. Move any stored items under floor space and under decks
- [ ] 21. Close bushfire window shutters
- [ ] 22. Activate external sprinkler system as planned, monitor water usage to allow enough water for ember attack and fire arrival, and post-fire ember attack

**Inside the Home**

- [ ] 23. Fill up basins, baths, buckets and bottles with water in case you lose access to your water supply
- [ ] 24. Put wet towels against external door thresholds, or anywhere there are gaps into your home
- [ ] 25. Check all external windows, doors and screens have been closed
- [ ] 26. Close all internal doors to compartmentalise the house as much as possible
- [ ] 27. Put a ladder in place for checking the ceiling cavity
- [ ] 28. Move items, including furniture, away from windows, take down curtains
- [ ] 29. Close your wood heater door and air vents

# 4. During a Bushfire

# Sheltering

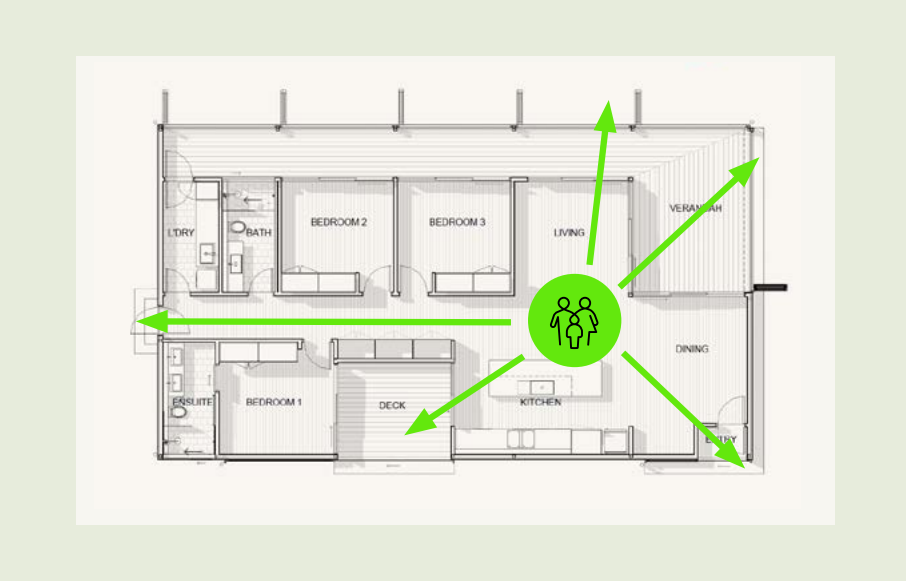
If you are sheltering in place in your home, ensure you are located where you can quickly escape the home if it starts to ignite. Ideal locations to shelter inside the home during a bushfire are on the floor level directly accessible to the ground outside. You should shelter in areas that have multiple exit pathways to cleared outdoor spaces - see the landscaping advice in this guide.

Upper storeys, basements, and bathrooms, laundries, bedrooms and other rooms without multiple ground level exits are dangerous to shelter in as you can become trapped.

Having a good view is helpful to monitor outdoor conditions. Observe outdoor conditions through windows and glass doors but maintain your distance as high levels of radiant heat or flying debris could impact glazing.

Make sure exit pathways are made from non-combustible materials such as tile, pavers, fibre cement decking boards, or stone. Keep exit pathways and your cleared landscaped escape area free from combustible materials and away from structures.

Fortis House




# Monitoring

Use firefighting hoses, or wet mops if you have lost water supply, to put out spots fires if it is safe to be outside. Use a hose to wet down the evaporative cooler filters, remember to make sure the evaporate cooler is off.

Inside the home, check for signs of smoke or fire inside the ceiling cavity and extinguish. Monitor for potential ignitions in walls, under decks and under floor space, extinguish where you can. If the home starts to ignite and you don't have an accredited private bushfire shelter, move to your cleared area outside, stay low, covered in woolen blankets.

Monitoring – Photo supplied by Joseph Feil ©

# After a Bushfire

After the passage of the bushfire fire front, continue to monitor inside and outside the home for ignitions. There may be small ignitions that develop slowly and ember attack can continue long after the main fire front has passed. Monitoring may take a long time and a lot of effort. Share tasks between members of your household so everyone can get a chance to rest, eat and drink.

Further advice on preparing for bushfire, surviving bushfire and bushfire recovery is available from your State and Territory emergency services. More information about dangers to avoid on fire affected property is available from WorkSafe.

# 5. About the Bushfire Resilience Rating

# Purpose

The Bushfire Resilience Rating Home Self-Assessment app is a free community service, developed by independent experts and funded by the Australian federal government.

The purpose of the Bushfire Resilience Rating system is to help you know which actions will measurably improve the resilience of your home. Every home is different, and every location has different risks.

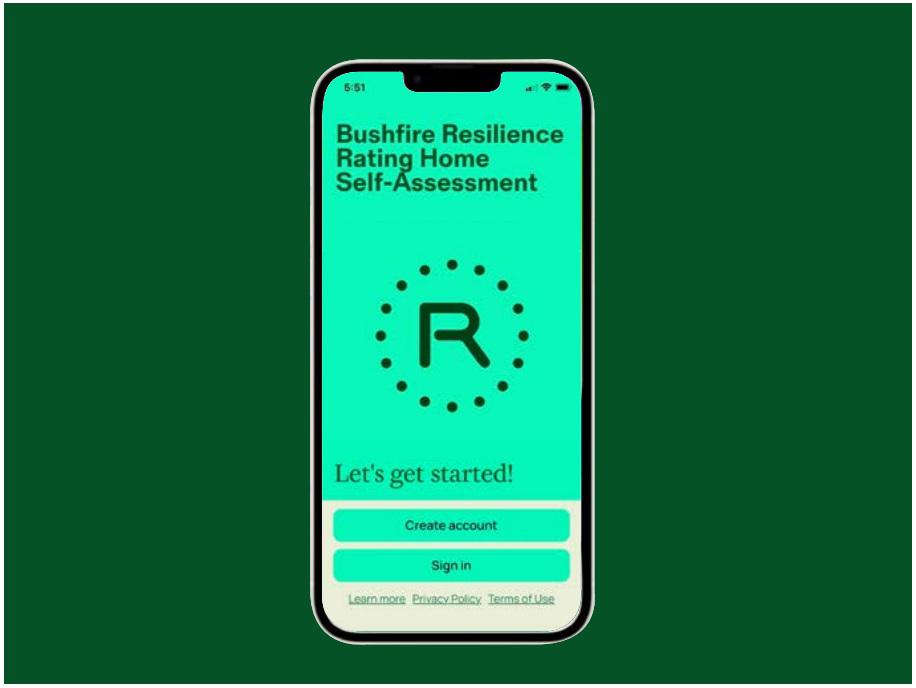
The Resilience Rating Home Self-Assessment app helps you assess your own home. You will receive customised recommendations to improve your home's Resilience Rating. Recommendations are likely to include many small actions you can take immediately.

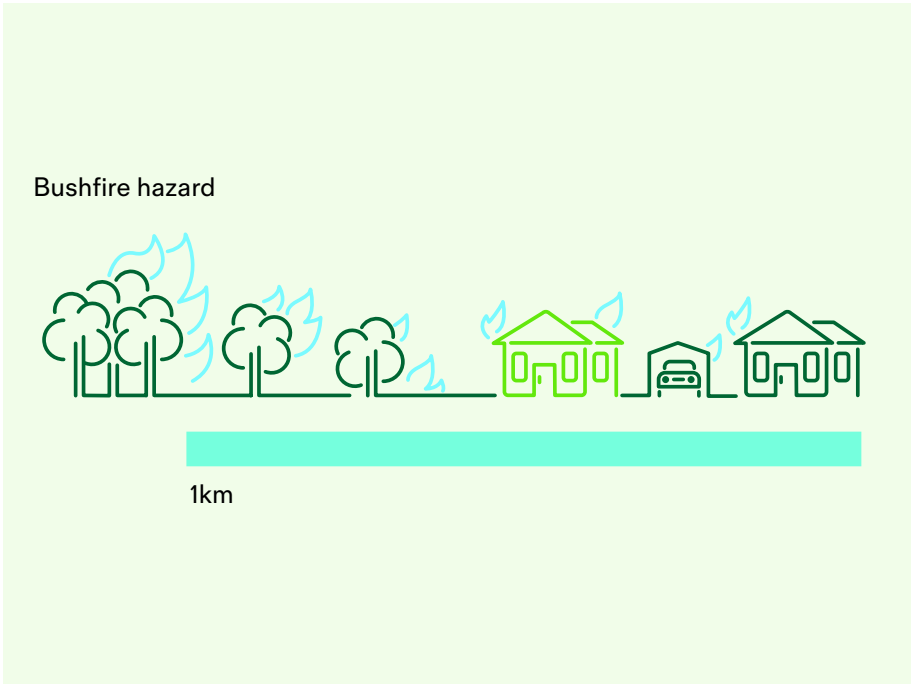
When designing a new home, RBC's FORTIS House provides free best-practice principles and home designs for multi-hazard resilience, the Queensland government have published best-practice guidance for Queensland homes, and the federal government's Your Home website has information on sustainable homes, including resilience.

# Participation

Homes up to 1km away from bushfire hazards are included in the voluntary Bushfire Resilience Rating Home Self-Assessment program.

The risk of home ignition reduces the greater the distance from bushfire hazards, however fire can spread to your home at this distance via windborne embers, structure-to-structure fires, ground fires and spot fires.



# Regulation

Ensure all building work meets relevant local and state government approvals and laws. If in doubt contact your local council or a building inspector, see AIBS website.

The Bushfire Resilience Rating do not replace existing regulations. You will still need to meet minimum standards for new builds and major renovations. However, the voluntary Ratings system complements regulations, by:

- Providing clarity by measuring the resilience of homes through an easily communicated Ratings scale
- Helping households and the building industry achieve higher levels of resilience than required by minimums standards
- Addresses risks not covered by existing regulation such as maintenance and ignition from adjacent items, for example.

The Fire Protection Association of Australia's list of accredited Bushfire Planning and Design practitioners can provide on-site assessments and advice.

RBC's professional on-site assessment and certification program will be available from mid-2024 for integrated bushfire, cyclone, storm, flood, heatwave and energy efficiency ratings.

# The Rating System

The purpose of the app is to help improve the resilience of your home to bushfire attack. A high Resilience Rating means that your home is more likely survive a bushfire and is more likely to be operational within days or weeks of a bushfire, rather than taking months or years to repair or re-build.

The Ratings system assesses the ability of a home to defend itself, called 'passive protection', and assumes people have evacuated and aren't present to put out spot fires or manually activate safety systems.

Active systems such as external sprinklers can help improve the resilience of the home, but do not currently contribute to the Bushfire Resilience Rating self-assessment calculation. It is recommended that you seek professional advice on the best sprinkler system for your home, considering remote activation, your water capacity and property vulnerabilities. Regular testing and maintenance are crucial to the reliability of sprinkler systems.

The purpose of designing new homes and retrofitting older homes to defend themselves is to:

- Encourage people to protect their lives by leaving early, knowing the home is well prepared to defend itself
- Provide safer shelter should leaving early fail
- Reduce pressure on firefighters to protect homes, as longer bushfire seasons and increasing risk limits the capacity of emergency services resources

The Bushfire Resilience Rating measures residual risk (probability of building loss), which is the risk that remains after considering the resilience of your home to local bushfire risk.

The Rating system considers the bushfire risk projected at your location, assuming a reasonable worst-case scenario.

**Lowest resilience** **Highest resilience**


Majority of older homes → Homes built to minimum bushfire building standards → Best practice bushfire resilient homes

**Probability of building loss**

# Strike Zones

The Rating system considers causes of building loss identified by Australian and international post-disaster research, engineering first principles and expert consensus. For more information on the Rating system methodology, see here.

Strike Zones are the areas of the home vulnerable to bushfire attack. There are 30 potential Strike Zones, which the self-assessment app will assess.

**The main cause of building loss is ember attack, via:**

Embers entering gaps in the building and igniting it from the inside

Embers igniting nearby materials, leading to ignition of the home, via:

Vegetation including trees, shrubs, garden beds and ground cover such as grasses, mulch and leaf litter

Stored materials such as, cars, caravans, boats, plastic bins, outdoor furniture

Attached structures, such as decks, steps, pergolas, verandahs, carports

Nearby structures such as neighbouring homes, sheds, outbuildings, fences, retaining walls

Homes near bushland may also be exposed to high levels of radiant heat and/or flame contact from the bushfire flame front. The level of radiant heat exposure from a bushfire flame front can be estimated through a BAL assessment, which is required as part of planning and building regulations for new homes and major renovations.

High winds, including winds generated by the bushfire itself, can cause trees, branches and other debris to impact the home. Winds can loosen building materials to enable ember entry and will dry out materials making them easier to ignite.

# Strike Zones (Cont.)

**Roof**

1. Ember entry
2. Burning roof debris at gutters and valleys
3. Ignition of attached structures

**Walls**

4. Ember entry
5. Horizontal surfaces
6. Window ledge
7. Embers at 2nd storey roof level
8. Wall and deck
9. Windowsills
10. Mulch and garden beds
11. Deck and glazing
12. Timber handrails

**Doors**

13. Glass doors and decks
14. Doors and door frames
15. Gaps around doors
16. Gaps around garage doors

**Under floor**

17. Ember entry

**Skylights**

18. Failure of skylight allowing ember entry

**Evaporative coolers**

19. Embers ignite filters

**Gas**

20. Gas lines & bottles

**Vents**

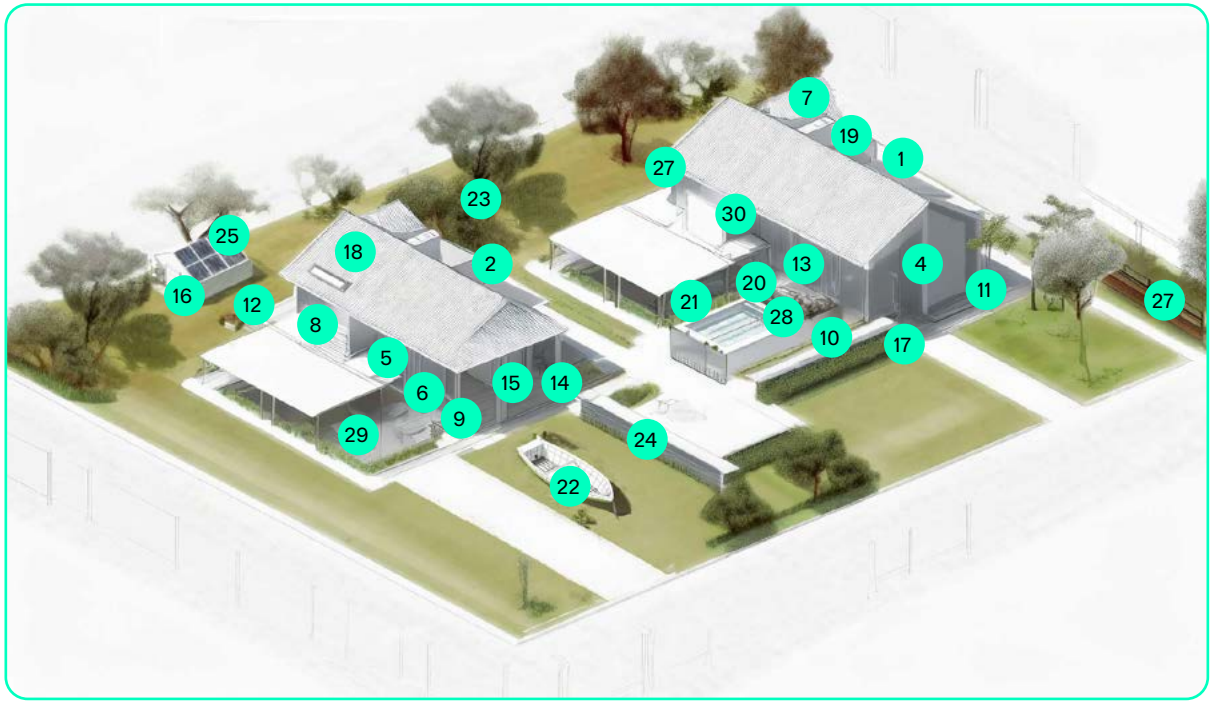
21. Vents & other openings

**Radiation/Flame Contact**

22. Cars, boats, caravans
23. Vegetation
24. Timber retaining walls
25. Storage shed
26. Fences
27. Neighbouring homes and other structures
28. Other adjacent combustibles

**Wind**

29. Debris impact
30. Loosen materials, enable ember entry



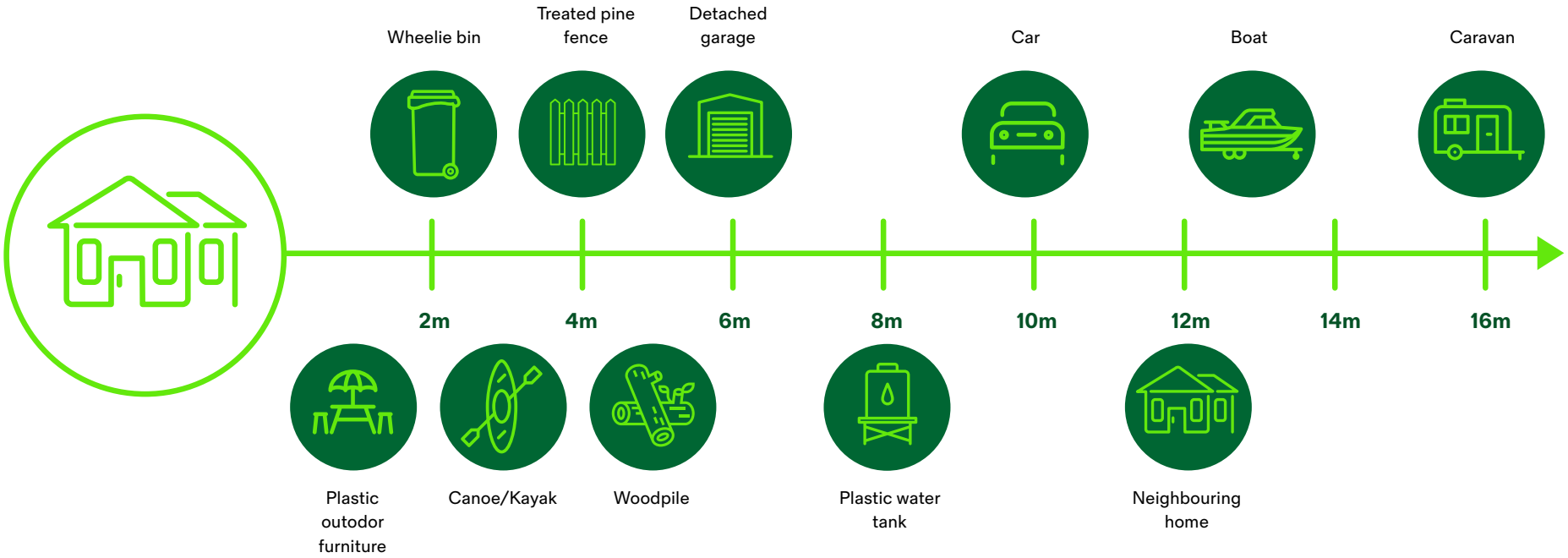
# Separation Zones

Separation Zones illustrate the typical distance items need to be from your home to prevent their ignition leading to loss of your home.

Items like cars, caravans, boats and nearby structures, which when ignited by embers, could lead to excessive radiation at the wall of the house causing breakage of glass, sagging of the cladding (further increasing the susceptibility to ember attack) or burning of the cladding. If the glazing breaks or the cladding is ignited due to excessive radiation or direct flame contact, then the house will be lost, even highly resilient homes are vulnerable .

Precise distances depend on factors such as the object's size and materials, the resilience of the home including windows and cladding material, the wind speed on the day and other variables. The separation zones assume reasonable worst-case scenarios to provide conservative guidance.

The home self-assessment app will ask you questions about these items to determine which mitigation actions are required for immoveable items, such as neighbouring property.



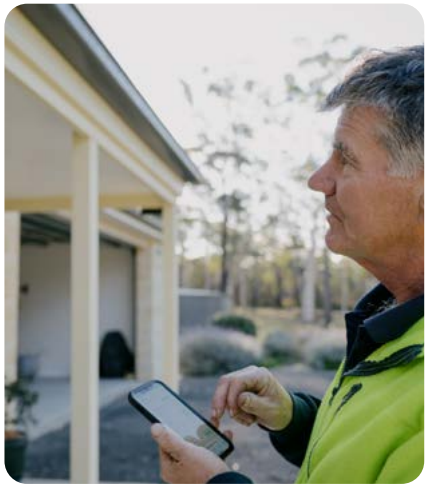
# 6. How to use the Home Self Assessment App

# Key Information About The Home Self-Assessment App

The number, complexity and interplay of the ways bushfires attack homes makes it difficult for people to know which actions will be effective for their individual situation, particularly given the unique nature of homes and local risk factors.

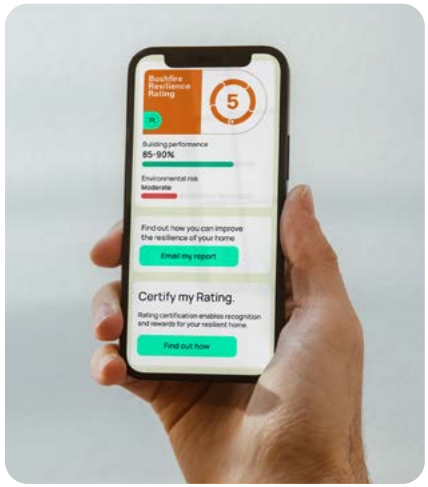
The purpose of the Bushfire Resilience Rating Self-Assessment App is to translate complex science into a free, easy-to-use tool, so all Australians can assess their own home and take effective actions to improve the home's resilience.

- The Bushfire Resilience Ratings self-assessment app is a free community service, thanks to funding from the Australian federal government
- It takes around 20-30 minutes to complete the home self-assessment, the app is available here and you can use it on your phone, tablet or PC
- When you have completed the self-assessment, the app will provide an estimated Bushfire Resilience Rating of your home
- You will receive your recommendations report via email, which includes customised actions you can take to improve your home's Resilience Rating
- You can update the self-assessment app as you make home improvements
- You can recalculate your home's Resilience Rating, so you can see the positive impact of your actions as you make them



**Step 1**
Use the app to assess your home


**Step 2**
Read your recommendations report. Use this Retrofitting Guide to take action




**Step 3**
Update the app & get your improved Rating

**Step 4**
Share your knowledge and the app to help others in your community

# 7. Resilience Rating Recommendations Guide

# How to Use the App and Handbook

The following section provides information about implementing the actions provided in your free Bushfire Resilience Rating Home Self-Assessment Report. Recommendations are listed in the same order as the assessment categories in the app.

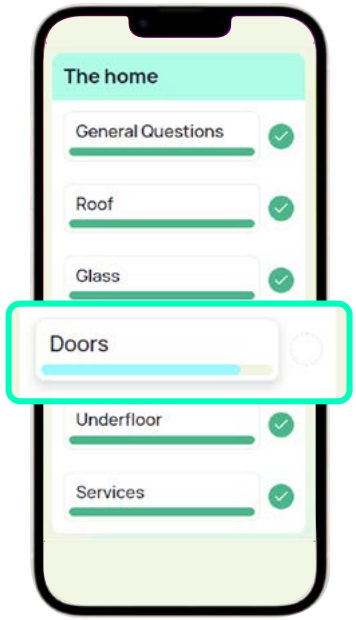
For example, you may have received a recommendation to install a steel kick plate or bushfire rated screen door on your side door. The recommendation reference number in your report is DOR-01

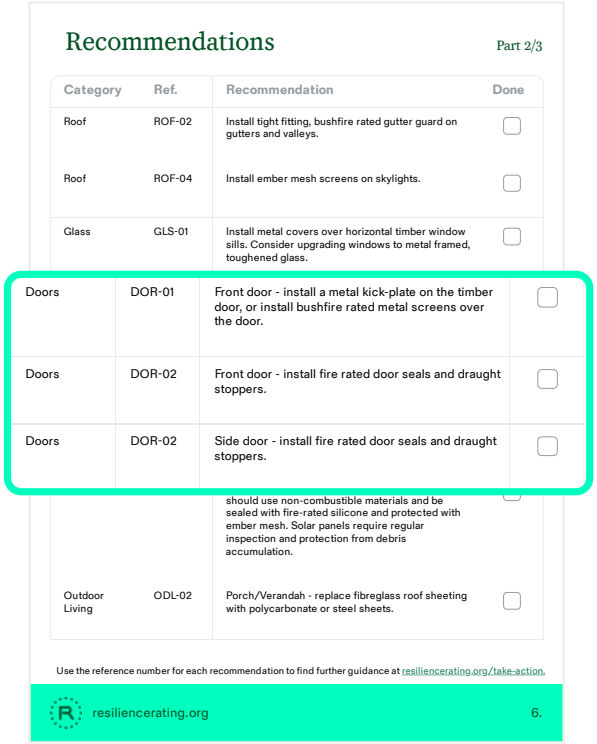
For more information about implementing this recommendation, go to the Door section, DOR-01 in this guide.

Once you have completed recommended actions or if you have made any other changes to your property since your self-assessment, you can update your answers in the app to get a new estimated Resilience Rating.

The link next to each recommendation in this handbook will take you to the relevant section of the app.

In this case, click the app link next to the DOR-1 recommendation in this handbook, then update Front Door with the changes you have made, such as installing a metal kick plate or a bushfire rated screen.



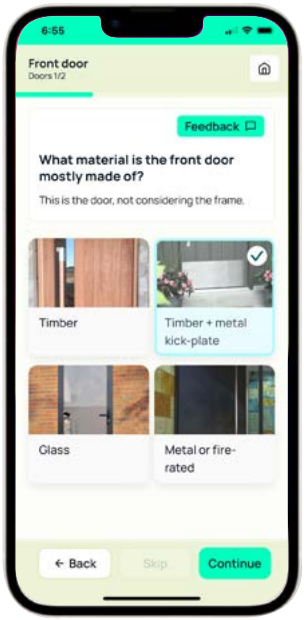
Recommendations

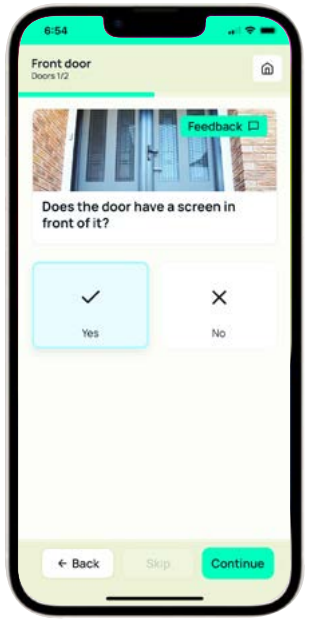
Part 2/3

| Category | Ref. | Recommendation | Done |
|---|---|---|---|
| Roof | ROF-02 | Install tight fitting, bushfire rated gutter guard on gutters and valleys. | |
| Roof | ROF-04 | Install ember mesh screens on skylights. | |
| Glass | GLS-01 | Install metal covers over horizontal timber window sills. Consider upgrading windows to metal framed, toughened glass. | |
| Doors | DOR-01 | Front door - install a metal kick-plate on the timber door, or install bushfire rated metal screens over the door. | |
| Doors | DOR-02 | Front door - install fire rated door seals and draught stoppers. | |
| Doors | DOR-02 | Side door - install fire rated door seals and draught stoppers. | |
| | | should use non-combustible materials and be sealed with fire-rated silicone and protected with ember mesh. Solar panels require regular inspection and protection from debris accumulation. | |
| Outdoor Living | ODL-02 | Porch/Verandah - replace fibreglass roof sheeting with polycarbonate or steel sheets. | |

Use the reference number for each recommendation to find further guidance at resiliencerating.org/take-action.

resiliencerating.org 6.



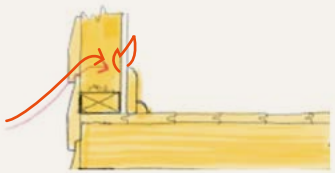



# General Information

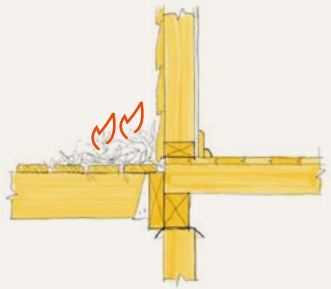
This section of the app considers the type of bushfire risk the home is exposed to, the general condition of the building and the wall systems.

**Wall systems**

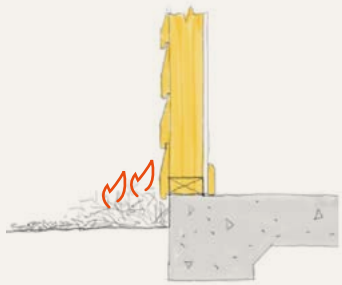
Burning embers may directly pass through gaps and land against frame elements or combustible insulation. High winds can loosen cladding to enable ember entry



Embers can ignite debris at the intersection of cladding and decks



Embers can ignite debris/mulch at the intersection of cladding and the ground



**New building design tips for a high Resilience Rating:**

- Non-combustible, non-toxic, airtight wall systems, including cladding, framing and insulation
- Simple floorplans reduce the number of wall crevices where debris can be caught and ignite
- Well-secured wall materials that can withstand high winds and potential debris impact
- No gaps greater than 2mm
- Minimise wall penetrations to reduce potential points of failure and subsequent ember entry. Use non-combustible materials, secure and seal flashings. Use metal ember mesh screens with holes less than 2mm to screen openings, such as for flues, weepholes and vents
- Avoid or minimise attachments to external walls where embers can gather, use non-combustible materials, for ledges, meter boxes, decks, carports, pergolas, verandahs, gates, trellis
- Create a non-combustible, cleared pathway around the perimeter of the home, use non-combustible materials such as stone or pavers
- Keep plantings and stored materials away from walls and windows

# General Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| LIF-01 | Life Safety | Leaving early is the only safe option in a bushfire.<br><br>Your Bushfire Survival Plan should include multiple back-up shelter options, should early evacuation fail, including a well-prepared resilient home.<br><br>Additional options include accredited private shelters and access to designated safer places in your community.<br><br>Ensure that exit pathways from your home are non-combustible, including steps and decks, and lead to cleared areas around your home. Your planned exit pathways should be away from other structures.<br><br>See the landscaping section of this handbook. |  <br>Create your Bushfire Survival Plan.<br><br>  <br>Accredited Private Shelter<br>- Image courtesy of Wildfire Safety Bunkers | Life Safety<br>– see Sections 2-3 of this handbook |

# General Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GNQ-01 | General condition of the building | A professional building inspection is recommended.<br><br>Repairs may be required to the building envelope to ensure it is well sealed and secure. |  <br>Professional building inspection | General condition of the home |
| GNQ-02 | Home could be at risk from radiant heat or flame contact generated by a bushfire front | It is recommended that you get a professional site assessment to determine your BAL and any additional building protection and landscaping actions.<br><br>See Fire Protection Association BPAD Assessors, and CSIRO's BAL calculator |  <br>BPAD Assessor | BAL construction level |

# General Retrofit Recommendations (Cont.)

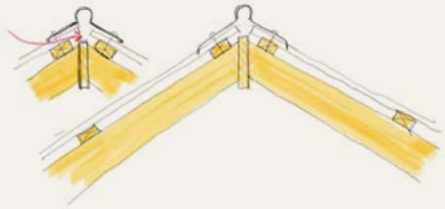
| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GNQ-03 | Home is at risk of grassfire | Maintain unmanaged grassland by slashing and mowing grass within 20m of the home and fences.<br><br>Replace timber fencing with non-combustible solid or sheet fencing, such as metal or masonry. |  <br>Manage grassland<br><br>  <br>Non-combustible sheet fencing | Fence materials |

# General Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GNQ-04 | Wall cladding | Replace EPS and PVC cladding with non-combustible cladding such as steel or fibre cement sheeting.<br><br>When replacing cladding, install flame resistant sarking and non-combustible insulation such as mineral wool. |  <br>Non-combustible cladding example | Wall materials |
| GNQ-04 | Wall cladding | Replace timber cladding with non-combustible cladding such as steel or fibre cement sheeting or replace the lower portion of the wall to a height of at least 40cm from the ground, with steel or fibre cement sheeting.<br><br>When replacing cladding, install flame resistant sarking and non-combustible insulation such as mineral wool. |   <br>Non-combustible cladding examples | Wall materials |

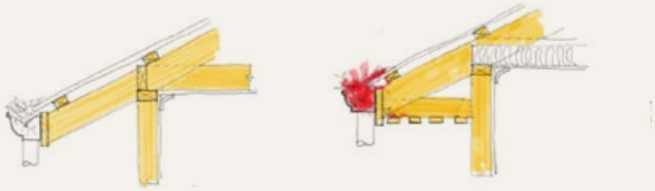
# Roof

Burning embers can directly pass through gaps greater than 2mm and land on combustible surfaces.



A loose tiled roof is likely to have significant air gaps. Once embers get into the roof cavity, stored items, debris, and combustible air-conditioning duct insulation, can ignite.

Embers can enter the roof edge for all roof types. The accumulation of debris on the roof, in roof valleys and gutters is influenced by the presence of overhanging and adjacent trees.

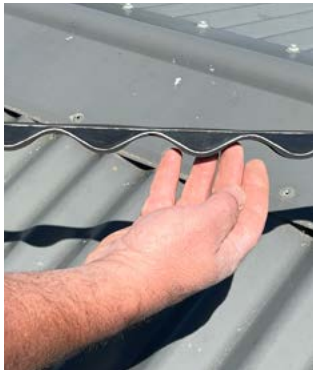


Embers can ignite accumulated debris on attached structures such as carports, pergolas and verandas. Fire spread in roofs is encouraged by the upwards slope of the roof. Once the roof starts to be affected by fire, gaps will begin to open, and ember penetration will be increased.

**New building design tips for a high Resilience Rating:**

- Simple, aerodynamic roof shapes, with no valleys
- Avoid or minimise roof penetrations and fixtures
- Non-combustible roof systems, including roof material, structure, linings, insulation, eaves, gutters
- Consider construction to a higher wind rating than required
- No gaps greater than 2mm
- Tight fitting, bushfire rated metal gutter guard with holes less than 2mm for gutters and valleys
- Profile cut inserts between roofing and ridges, hips and eaves
- Avoid skylights

# Roof Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ROF-01 | Ridge & hip | Seal the roof ridges and hips to protect them from ember entry whilst allowing ventilation, such as inserting compressed mineral wool.<br><br>For metal roofs install bushfire rated ridge cap inserts, if choosing perforated ridge cap inserts, ensure holes are 2mm or less. Seal around inserts with fire rated silicone. |  Profile cut ridge insert<br>  Profile cut ridge insert installation | Roof condition |
| ROF-01 | Fascia boards | Install steel fascia board covers over timber fascia boards, or replace timber fascia boards with steel fascia boards. |  Steel fascia board cover | Fascia |

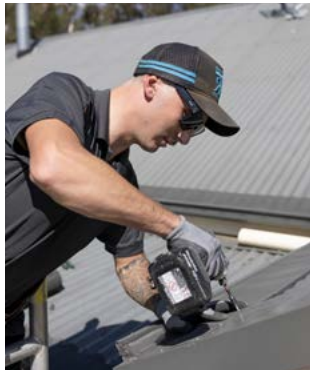
# Roof Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ROF-01 | Roof Condition | Get a professional roof inspection to check and repair roof to ensure materials are well secured and there are no gaps greater than 2mm.<br><br>Check flashings around roof penetrations are well secured and seal with fire rated silicone.<br><br>Replace combustible soffits (eave lining) with non-combustible materials such as steel or fibre cement sheeting.<br><br>If undertaking major roof repairs or a roof replacement, replace insulation with non-combustible insulation such as mineral wool and flame resisting sarking.<br><br>While improving the bushfire resilience of your roof, consider upgrading the roof's wind resilience, such as constructing to a higher wind load than required by minimum standards. Minimise roof penetrations, openings and fixtures. |  <br>Roof inspection & repairs<br><br>  <br>Non-combustible eaves, including soffits (eave lining) | Roof condition |

# Roof Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | App page link |
|---|---|---|---|
| ROF-02 | Gutters and valleys | Install tight fitting, metal bushfire rated gutter guard on gutters and valleys. The mesh should have holes no greater than 2mm.<br><br>Install mineral wool inserts along valleys and the roof edges (behind gutters).<br><br>For metal roofs, an addition or alternative to gutter guard is to install bushfire rated profile cut infill strips along valleys and at roof edges (behind gutters).<br><br>Perforated or mesh infill strips enable ventilation. Ensure holes are less than 2mm | Gutter & valley guards |

Bushfire rated steel gutter guard with holes less than 2mm



Professional installation of gutter guard

Profile cut roof edge insert

# Roof Retrofit Recommendations (Cont.)

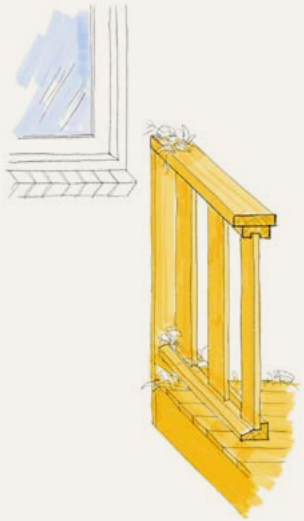
| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ROF-03 | Fascia boards - attached structures | Install steel fascia covers or replace with steel fascia boards on the roof eaves intersecting with attached structures. |  Steel fascia board cover | Fascia |
| ROF-04 | Skylights | Install ember mesh screens on skylights to prevent ember entry if the skylight fails.<br>Ember mesh screen should be metal and with holes less than 2mm.<br>Ember mesh is available in rolls and can be cut to size to fix over the skylight frame.<br>Ensure there are no gaps on or around the skylight greater than 2mm.<br>Remove overhanging tree branches to reduce debris accumulation on the roof and skylights. |  Steel ember mesh roll | Skylights |

# Roof Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ROF-04 | Skylight | Replace plastic or fibreglass skylights with bushfire rated skylights and an ember mesh screen. |  Bushfire rated skylight | Skylights |

# Glass

Glass is vulnerable near where embers ignite debris on the ground, windowsills, balustrades, decks, shrubs and garden beds.



Glass is also vulnerable to radiant heat generated by the bushfire flame front and from nearby combustible materials such as cars, boats, caravans, timber fencing, plastic bins, neighbouring structures including homes and sheds, for example.

**New building design tips for a high Resilience Rating:**

- Non-combustible external window frames
- 6mm+ toughened glass
- No gaps between window frames and walls
- Bushfire rated metal screens with holes less than 2mm
- Bushfire shutters
- Non-combustible building features near windows, such as balustrades, fences
- No stored items near windows

# Glass Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GLS-01 | Windowsills | Install metal covers over horizontal timber windowsills and other horizontal timber surfaces, such as meter boxes and ledges.<br><br>Consider upgrading windows to bushfire rated windows and/or install bushfire shutters. |  <br>Steel windowsill and ledge cover<br><br>  <br>Bushfire rated shutters | Window frames<br>Window shutters<br>Toughened glass<br>Windowsills & ledges |
| GLS-01 | Vegetation and stored materials near glazing | Remove vegetation and move stored items away from the walls of the home. |  <br>Remove combustible mulch | Vegetation near glass |

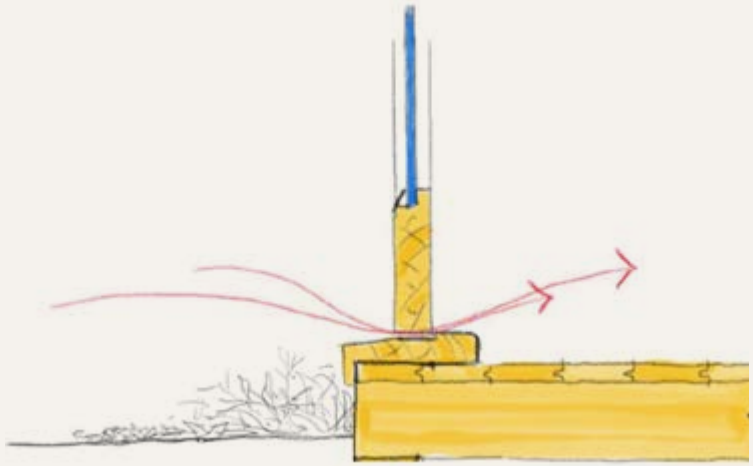
# Glass Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GLS-02 | Timber balustrades near windows | Replace vertical timber elements of balustrades that are within 40cm of the home's glass doors and windows, with non-combustible materials such as steel or glass. |  Glass and steel balustrade | Balustrades |
| GLS-03 | Gaps around window frames | Seal gaps with fire rated silicone. |  Sealing gaps | Gaps |

# Doors

Accumulation of burning embers at the corner of the door, door frame and the threshold, can cause burning of the door system, depending on the construction materials.

Gaps around doors enable ember entry into the home.



**New building design tips for a high Resilience Rating:**

- Non-combustible door frames
- Fire rated doors
- No gaps between door frames and walls
- Bushfire rated metal screen doors with holes less than 2mm
- Fire rated door seals and draught stoppers

# Doors Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| DOR-01 | Door systems | Install a metal kick-plate on the timber door, or install bushfire rated metal screens over the door, or install a fire rated door system. |  Installing metal kick plate on door | Door frames<br>Door materials<br>Screens |
| DOR-02 | Door seals | Install fire rated door seals and draught stoppers. |  Draught stopper | Seals |
| DOR-02 | Gaps around door frames | Seal gaps with fire rated silicone. |  Sealing gaps | Gaps |

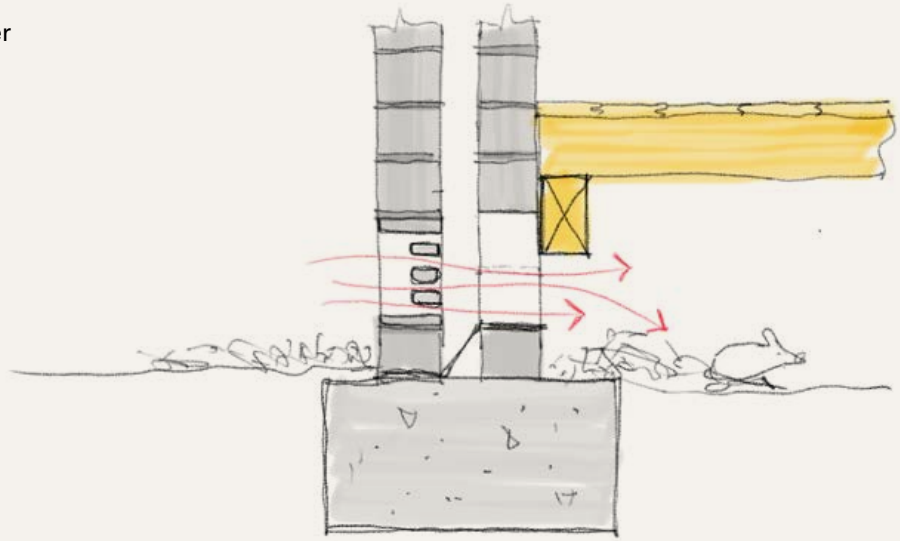
# Underfloor Space

The underfloor space is vulnerable for suspended combustible flooring components and where there are openings that will allow the entry of wind-blown embers.

Ventilation to the space below the floor is important to prevent moisture build-up, rot and termites. Ember mesh screens can prevent ember entry while enabling ventilation.

Stored goods in underfloor spaces are likely to be combustible and will be vulnerable to ember attack should there be sufficient openings into the underfloor space.

The development of a fire in the underfloor space will directly impact the floor above and also enter the wall cavities and any other openings through the floor such as heating ducts.



**New building design tips for a high Resilience Rating:**

- No underfloor space – slab on ground
- If underfloor space - suspended slab or other non-combustible floor structure, ember mesh screens over openings
- Non-combustible underfloor insulation

# Underfloor Space
# Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| UND-01 | Underfloor space | Enclose the home's underfloor space with ember mesh and an access panel. Ember mesh enables ventilation to help prevent rising damp, rot and termites.<br><br>If the floor is too high from the ground to enclose with ember mesh, wrap the base of posts with metal covers, line the subfloor with non-combustible materials, install non-combustible insulation.<br><br>Remove any stored items and debris from the underfloor space. |  <br>Ember mesh screen panels to enclose underfloor space | Underfloor |

# Services

Embers can ignite the combustible filters in evaporative coolers leading to ignition of the ceiling space. High winds can dislodge attached services and fixtures on the home, creating large ember entry points.

Flues, chimneys and other openings into the building can allow embers to enter the home.

**New building design tips for a high Resilience Rating:**

- Metal fire dampers and ember mesh screens on openings to building, such as exhausts, vents
- Underground plastic plumbing, metal exposed plumbing
- Non-combustible duct insulation for heating and cooling systems
- Minimise building penetrations. Ensure flashings are well secured and sealed.

# Services Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| SRV-01 | Evaporative Cooler | Install metal ember guards on the evaporative cooler to prevent ember ignition of filters. Ensure ember guards have holes less than 2mm and the unit, guards and flashings have no gaps more than 2mm.<br><br>DFES WA have a factsheet on protecting evaporative coolers.<br><br>Contact your evaporative cooler manufacturer or installer to find out if they supply ember guards for your existing unit, or get a trade to custom make the guards for you. |  <br>Evaporative cooler ember guards | Evaporative cooler |
| SRV-02 | Building Services | Install steel ember mesh screens on building opening such as vents, chimneys, flues and weepholes. |   <br>Ember mesh screens | Services |

# Services Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| SRV-02 | Building Openings | Install metal fire dampers and ember mesh screens on building openings, such as exhausts, vents, and ducts. |  Ember mesh screens | Services |
| SRV-02 | Building penetrations | Ensure flashings around building penetrations are well secured and sealed with fire rated silicone. |  Typical roof penetration | Services |

# Services Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| SRV-02 | Lighting | Outdoor mounted lights should be made from non-combustible materials, with metal backing plates, and sealed with fire rated silicone. Avoid recessed lights, ensure all components are non-combustible. |  | Services |
| SRV-02 | Pipes | Exposed plumbing should be metal. Run plumbing underground where possible. Protect and seal risers with fire rated sealants. |  | Services |

# Services Retrofit Recommendations (Cont.)

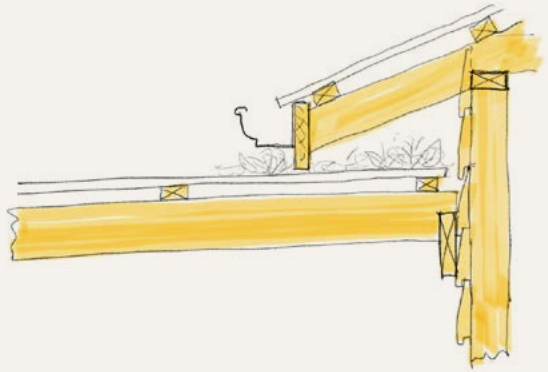
| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| SRV-02 | Rooftop solar | The installer should minimise the number of roof penetrations and ensure flashings around penetrations and fixings are well secured and sealed with fire rated silicone. The frame should be designed for high wind loads.<br><br>Rooftop solar systems can accumulate debris around the frame. If cables are well protected, ember ignition of debris should not pose a major risk. Cables should be protected by rigid conduit, preferably metal ducts.<br><br>Do not clean out debris yourself, even with mains/inverters turned off, in daylight solar panels are generating hundreds of volts of live direct current.<br><br>Solar panels require regular inspection, including electrical safety checks.<br><br>Ask your solar installer or inspector to arrange the safe removal of debris. |  <br>Leaf litter accumulation under roof solar panels<br><br>  | Services |

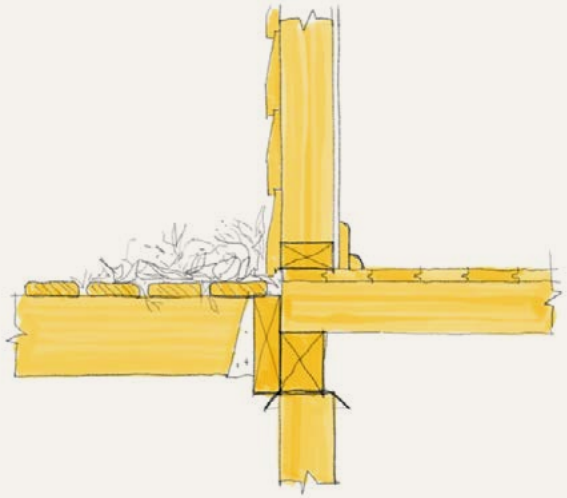
# Services Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| SRV-02 | Gas supply | Secure gas bottles as per local and state regulations and fire agency advice.<br><br>Ensure gas bottles are secured so they cannot fall over, and pressure release valves face away from the home and other buildings.<br><br>Avoid any potential heat sources by removing any combustible items near the gas bottles, such as treated pine retaining walls, vegetation and stored items.<br><br>Shield gas bottles from heat with a non-combustible, open air barrier, on one side only. Three sides must be open for ventilation. Seek advice from a licensed gas fitter. |  <br>Gas bottle storage | Services |

# Outdoor Living

Horizontal elements of attached structures can accumulate debris for embers to ignite.





Timber support posts of attached structures are also vulnerable to debris accumulation and ember ignition.

**New building design tips for a high Resilience Rating:**

- Avoid attaching structures to the home where possible.
- Use non-combustible materials for attached structures
- Use non-combustible decking structures and decking boards, build in the space beneath the deck, or install ember mesh screens.

# Outdoor Living Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ODL-01 | Porches, verandahs, pergolas | Keep the area around vertical posts clear of materials, including plants and stored items |  Keep area around timber posts clear | Outdoor Living |
| ODL-01 | Porches, verandahs, pergolas | Install steel guards around the base of the vertical posts. |   Installing steel post guards | Outdoor Living |

# Outdoor Living Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ODL-02 | Porches, verandahs, pergolas | Replace fibreglass roof sheeting with steel sheeting, or remove roof sheeting. |  Metal pergola roof | Outdoor Living |
| ODL-03 | Decks | Replace decking boards with non-combustible materials, such as bushfire rated fibre cement boards.<br><br>Install steel guards around the base of the timber vertical deck posts, or replace posts and support structure with non-combustible structure such as steel or masonry. |  Non-combustible fibre cement decking boards<br>  Steel deck posts | Outdoor Living |

# Outdoor Living Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| ODL-03 | Decks | Clear debris from under the deck.<br><br>Enclose the area from the deck to the ground with steel ember mesh panels. Install screens on a steel frame and concrete footings. |  <br>Construction of deck ember mesh screening<br><br>  <br>Ember mesh screen - deck | Outdoor Living |

# Garage

Embers can enter gaps around garage doors and other openings, and ignite combustible stored materials such as fuels, paints, dry cardboard boxes and chemicals, which can lead to loss of the home.

**New building design tips for a high Resilience Rating:**

- Design carports to be vertically supported independently of the house
- Store flammable materials such as chemicals and fuels in a safety cabinet within the garage
- The home should have a fire wall between an integrated garage and the home
- The home should have a fire wall and fire rated windows facing an adjacent garage or carport
- Ensure garages and carports are resilient, made from non-combustible materials with no gaps greater than 2mm

# Garage Retrofit Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GRG-01 | Carport posts | Carport - install steel guards around the base of the vertical posts. |  Steel guards | Garage |
| GRG-01 | Carport roof | Carport - replace fibreglass roof sheeting with polycarbonate or steel sheets. |  Metal carport roof | Garage |

# Garage Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GRG-01 | Carport posts | Carport - keep the area around vertical posts clear of materials, including plants and stored items |  Around carport posts | Garage |
| GRG-02 | Garage door | Install a steel panel garage door, with fire rated seals. |  Steel panel garage door | Garage |

# Garage Retrofit Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | App page link |
|---|---|---|---|
| GRG-02 | Garage door seals | Install fire rated seals around garage doors. Use steel ember mesh to screen any vents or openings. Seal gaps with fire rated silicone.  Gaps around garage door  Fire rated brush seals around garage doors | Garage |
| GRG-03 | Garage – flammable items | Flammable items such as fuels, paints and chemicals should be stored in a safety cabinet within the garage.  Safety cabinet | Garage |

# Storage

Combustible stored items can be ignited by embers, leading to ignition of cladding and failure of windows, resulting in loss of the home.

**New building design tips for a high Resilience Rating:**

- Install non-combustible water tanks, such as steel or concrete
- Install resilient storage sheds, located at least 6m from the home to safely store combustible items

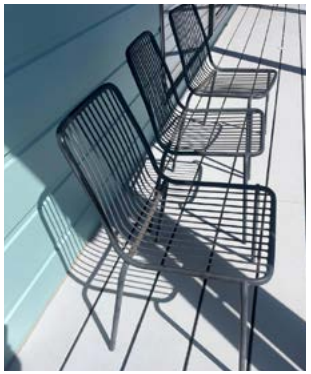
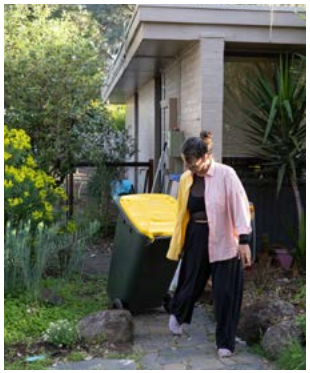
# Storage Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| STR-01 | Roof space | Remove any stored items in the roof space. |  Roof space access | Storage spaces |
| STR-01 | Under deck | Remove stored materials from under the deck. |  Under deck storage | Storage spaces |

# Storage Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| STR-01 | Underfloor | Remove combustible items from the underfloor space. |  Underfloor space | Storage spaces |
| STR-02 | Canoes/kayaks | Move any canoes/kayaks more than 5 metres away from the home or any other structure. |  Under deck storage | Items within 5m |

# Storage Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| STR-02 | Plastic furniture | Move any plastic furniture more than 5 metres away from the home or any other structure.<br><br>Consider metal outdoor furniture with removable cushions. |  Plastic outdoor furniture  Steel outdoor furniture | Items within 5m |
| STR-02 | Wheelie Bins | Move any wheelie bins more than 5 metres away from the home or any other structure. |  Wheelie bins | Items within 5m |

# Storage Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| STR-02 | Cars | Move any cars (not including cars you regularly use) more than 10 metres away from the home or any other structure. |  Stored cars | Items within 10m |
| STR-02 | Plastic water tanks | Move any plastic water tanks more than 10 metres away from the home or any other structure.<br><br>Or replace plastic water tanks with non-combustible tanks. |  Move or replace plastic water tanks | Items within 10m |

# Storage Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| STR-02 | Woodpiles | Move any woodpiles more than 10 metres away from the home or any other structure. |  Move woodpiles | Items within 10m |
| STR-02 | Caravans | Move any caravans more than 20 metres away from the home or any other structure. |  Move stored caravan | Items within 20m |

# Storage Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| STR-02 | Trailer boats | Move any trailer boats more than 20 metres away from the home or any other structure. |   Move stored boats | Items within 20m |

# Garden

Combustible materials in the garden can be ignited by embers, leading to ignition of cladding and failure of windows, resulting in loss of the home.

**New building design tips for a high Resilience Rating:**

- Use non-combustible retaining walls such as stone, hardwood, concrete
- Use non-combustible gates and fences, such as wire, steel sheet, masonry
- Follow bushfire resilient landscape design, including bushfire resilient plantings, see the CFA's plant selector tool
- Create and maintain a non-combustible pathway around the home, managed defendable space and on larger properties, managed outer-zones. See the landscaping guide below.

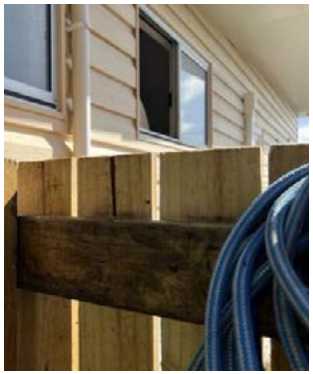
# Garden Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GDN-01 | Overhanging branches | Remove overhanging tree branches to prevent debris accumulation in gutters and on roofs. |   Remove overhanging branches | Overhanging trees |
| GDN-01 | Tree strike | Remove trees that could impact the home if fallen. |  Remove trees that could strike the home | Trees that could impact |

# Garden Recommendations (Cont.)

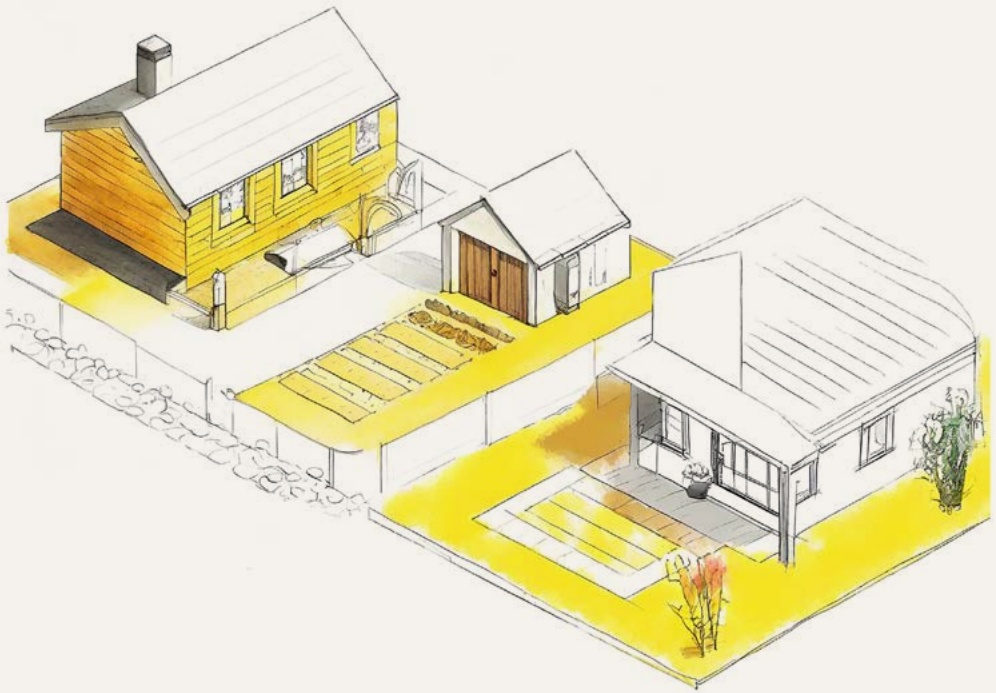
| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| GDN-01 | Landscaping | Create a fire resilient, managed landscape around the home.<br><br>Select fire resistant landscaping and plantings to help retain soil moisture, provide wind, radiant heat, debris and ember protection. |  <br>Managed defendable space<br>  <br>Managed outer-zone understory | Shrubs<br>Tall trees |
| GDN-02 | Garden beds | Remove garden beds and combustible mulch around the home, replace with non-combustible materials such as gravel, stones or pavers. |  <br>Stone pathway | Garden beds |

# Garden Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | App page link |
|---|---|---|---|
| GDN-03 | Fences, gates, trellis | Remove timber fencing, gates, trellis and lattice that are connected to your home, or within 5 metres of the home. Replace with non-combustible materials.  Replace timber gate  Metal gate | Fences, gates, trellis |
| GDN-03 | Retaining walls | Replace timber retaining walls within 2.5m of the home with non-combustible materials such as stone, concrete or masonry.  Non-combustible retaining wall | Retaining walls |

# Other Buildings

If bushfire attack ignites neighbouring houses, sheds and other buildings, those burning buildings will emit significant radiation and flame, which can lead to loss of adjacent homes.



**New building design tips for a high Resilience Rating:**

- If possible, site your home at least 12m from other homes, and other large structures
- Where 12m separation distances aren't possible, protect windows of your home facing other homes and structures with bushfire shutters
- Other buildings on your property such as sheds and studio's should be built to be as resilient as your home

# Other Building Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| OTB-01 | Ember protection other buildings | Install ember protection measures on other buildings, including steel ember mesh screens on openings, and seal gaps with fire rated silicone.<br><br>Protect windows of the home facing other buildings located within 10m, including buildings on neighbouring property. |  <br>Resilient shed | Other building types |
| OTB-01 | Window protection from other buildings | Upgrade windows to metal frame, toughened glass.<br><br>Or install fire rated shutters on windows adjacent to any neighbouring homes. |  <br>Bushfire Shutters | Windows |

# Water Supply

A reliable, dedicated firefighting water supply enables you and firefighters to put out ember ignitions and spot fires. Ensure you use non-combustible materials for tanks, pipes, pumps and fittings.

# Water Supply Recommendations

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| WAT-01 | Tanks, pumps, hoses, sprinklers | Use non-combustible tanks such as steel and concrete. Dams are also a good water supply, drought conditions typical at the time of bushfires may deplete dam storage.<br><br>Use non-combustible fire hoses, plumbing and fittings.<br><br>Keep areas around tanks and firefighting equipment clear of vegetation and debris.<br><br>Pumps need to be kept as cool and protected as possible. Shield pumps with non-combustible barriers, such as brick or fibre cement sheet.<br><br>Install a dedicated firefighting water supply with a separate tank from the household supply or install a second outlet on your existing tank.<br><br>The lower outlet is for firefighting purposes and should have suitable fittings for your State or Territory emergency services. |  <br>  <br>Sprinkler nozzles targeting deck and windows | Water supply |

# Water Supply Recommendations (Cont.)

| Reference | Description | Retrofit Recommendations | | App page link |
|---|---|---|---|---|
| WAT-01 | Tanks, pumps, hoses, sprinklers | Consider lined tanks, underground tanks or dual skin tanks for extra protection of your water supply.<br><br>Gravity fed water supply negates the need for pumps and power, if you can get enough tank height to provide adequate pressure.<br><br>Consider the vulnerabilities of the home you want to protect from flame and radiation and design an external sprinkler system to spray water as close as possible to those elements.<br><br>Your home should have no gaps greater than 2mm to prevent ember entry.<br><br>Ensure water pumps and sprinklers are well maintained and regularly tested. |  <br>Copper pipes<br><br>  <br><br>Firefighting hose | Water supply |

# 8. Landscaping Guide

# Landscaping Guide

First Nations knowledge, your local council, State and Territory fire agencies, Landcare, the CFA's plant selector tool and other resources can provide advice on fire resilient, water efficient garden design and plant selection to suit your particular property, climate and environment.

**Step 1**
Determine your property type

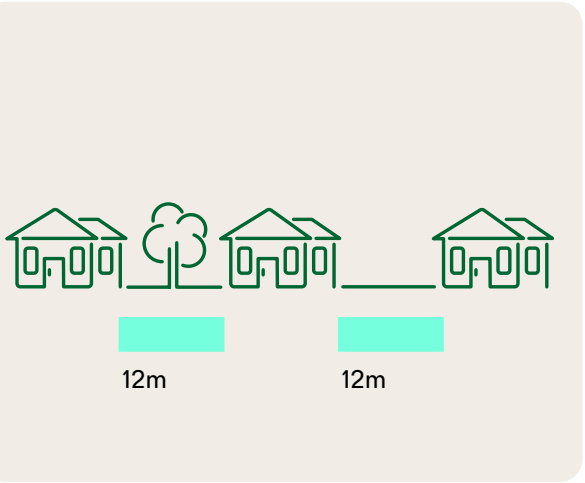
**Step 2**
Plan your fire resilient landscape considering your site-specific risks

**Step 3**
Use non-combustible landscaping materials for retaining walls, pathways, and pergolas

**Step 4**
Work with neighbours and your community to manage bushfire risk together

**Step 5**
Maintain your landscaping for ongoing resilience

# Bushfire Landscape Examples




**Suburban Living**

Typical features

- Homes are within 12m of each other
- Leafy outer suburbs of cities
- Regional townships
- Land may be sloping or flat
- High risk of house-to-house fire spread

**Bush Communities**

Typical features

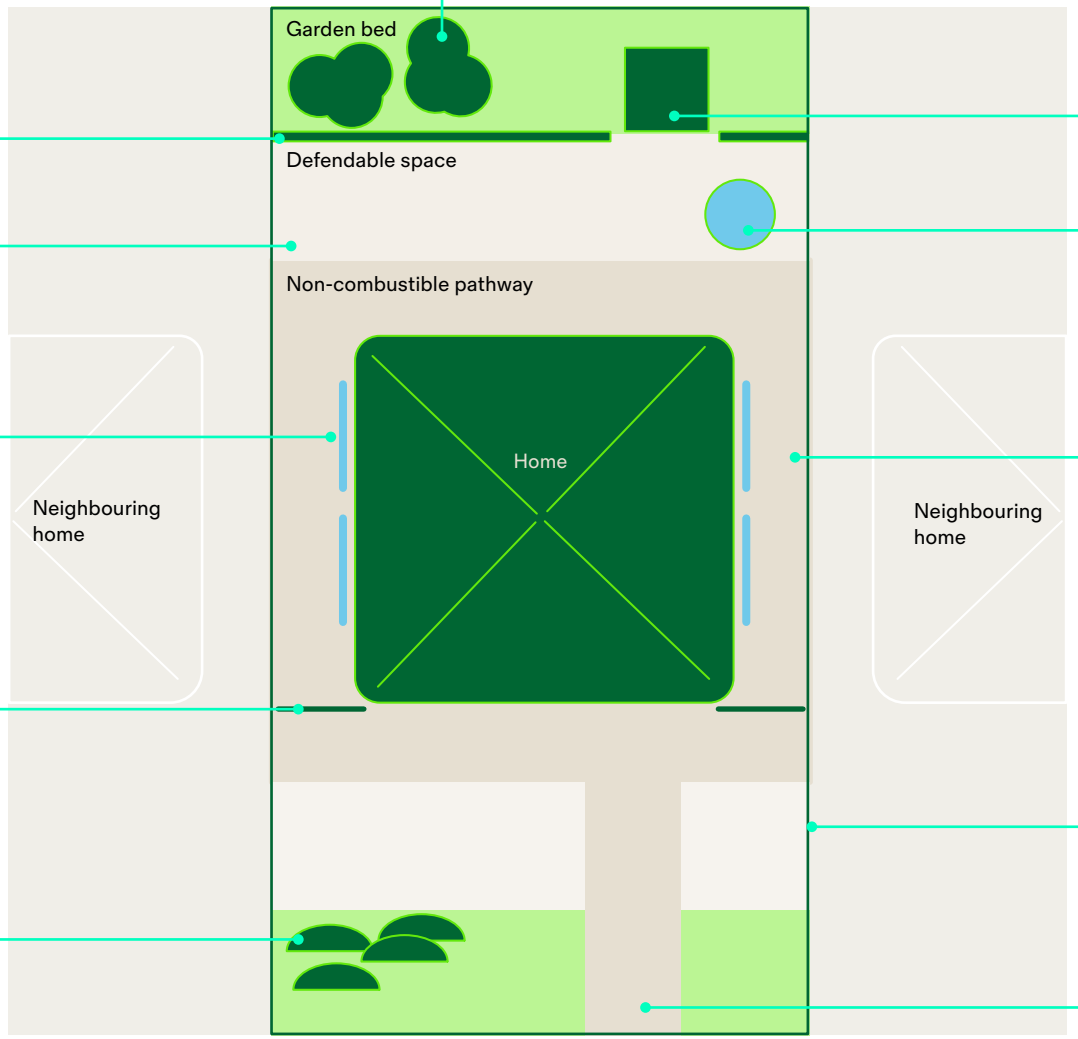
- Homes may be within 12m of each other
- Within or close to bushfire hazards
- Can include coastal, alpine
- Land may have steep slopes
- High risk of house-to-house fire spread

**Large Property**

Typical features

- Regional & rural areas
- No other homes within 20m
- Land may be sloping or flat
- Can include farms & acreage

# Suburban Living




**Non-combustible retaining walls**

**Defendable space**
Ideally 10m but may not be achievable on fenced, small lots. Keep free of combustible objects and vegetation

**Protect windows**
Protect windows facing neighbouring homes and other structures within 12m. Use bushfire shutters or upgrade windows to 6mm+ toughened glass, non-combustible frames

**Non-combustible gates**

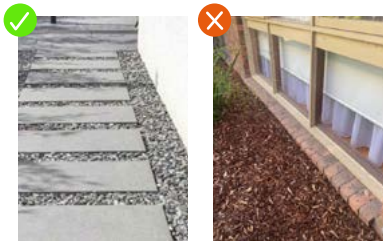
**Manicured garden**
Manicured garden, fire resilient plantings

**Fire resilient planting**
Plant fire resilient trees, shrubs & hedges to help screen from heat, embers, wind & debris

**Non-combustible shed**
Keep sheds at least 6m from homes & other buildings

**Non-combustible water tanks**

**Non-combustible pathway**
Around home



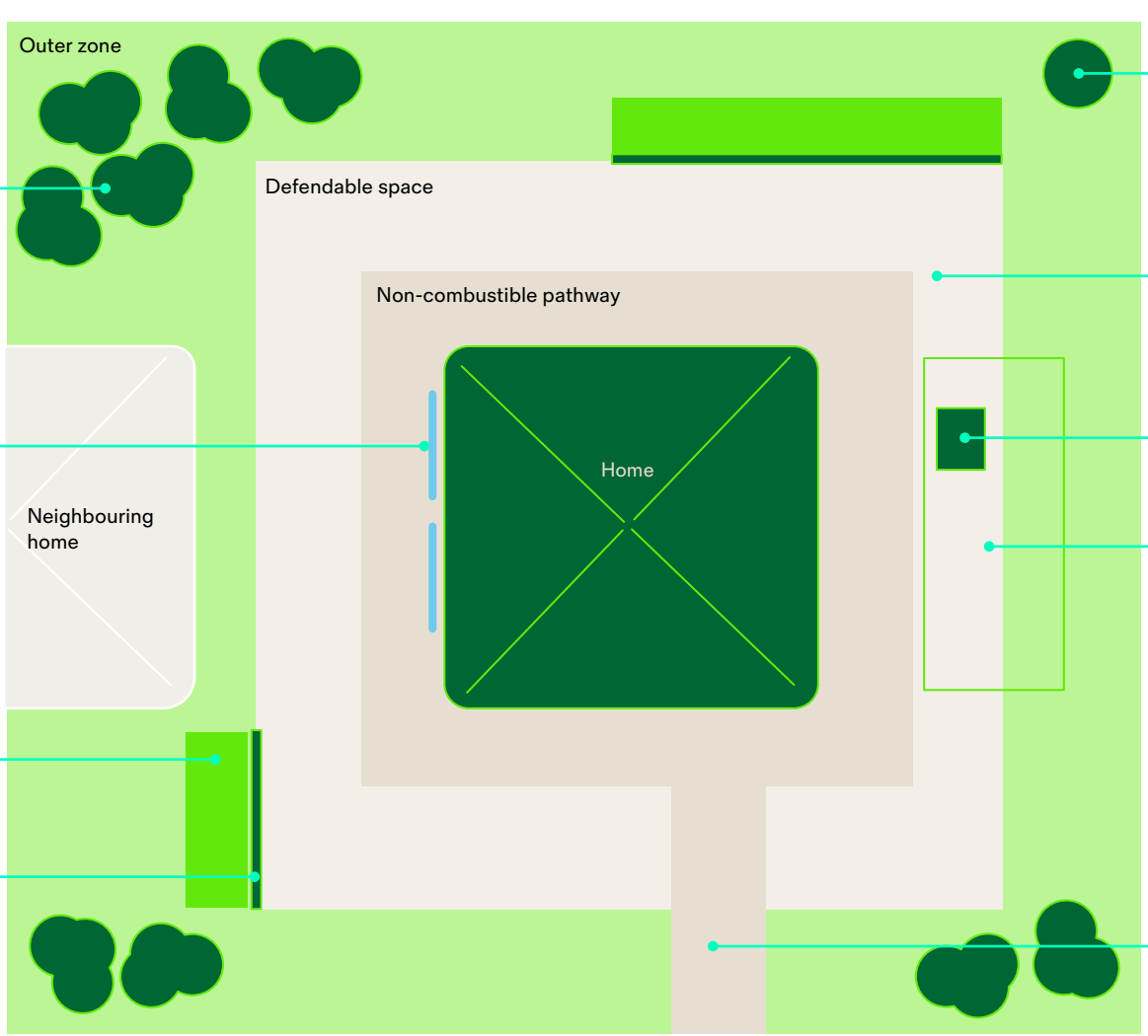
**Non-combustible fence**
Solid, non-combustible fences provides radiant heat shield from neighbouring property, should it ignite

**Driveway**
Keep driveway clear of trees and overhanging branches

# Bush Communities

**Managed outer zone**

**Likely direction of bushfire threat example**




**Fire resilient planting**
Plant fire resilient trees, shrubs & hedges to help screen from heat, embers, wind & debris

**Protect windows**
Protect windows facing neighbouring homes and other structures within 12m. Use bushfire shutters or upgrade windows to 6mm+ toughened glass, non-combustible frames

**Garden beds**
Manicured garden, fire resilient plantings

**Non-combustible retaining walls**

**Fuel management**
Share outer zone fuel management across boundaries, with neighbours

**Defendable space**
Defendable space – ideally at least 10m but may not be achievable on smaller lots

**Bushfire shelter**
Consider installing an accredited private bushfire shelter

**Clear area**
Cleared area for emergencies, close to main escape routes from house

**Driveway**
Keep driveway clear of trees and overhanging branches

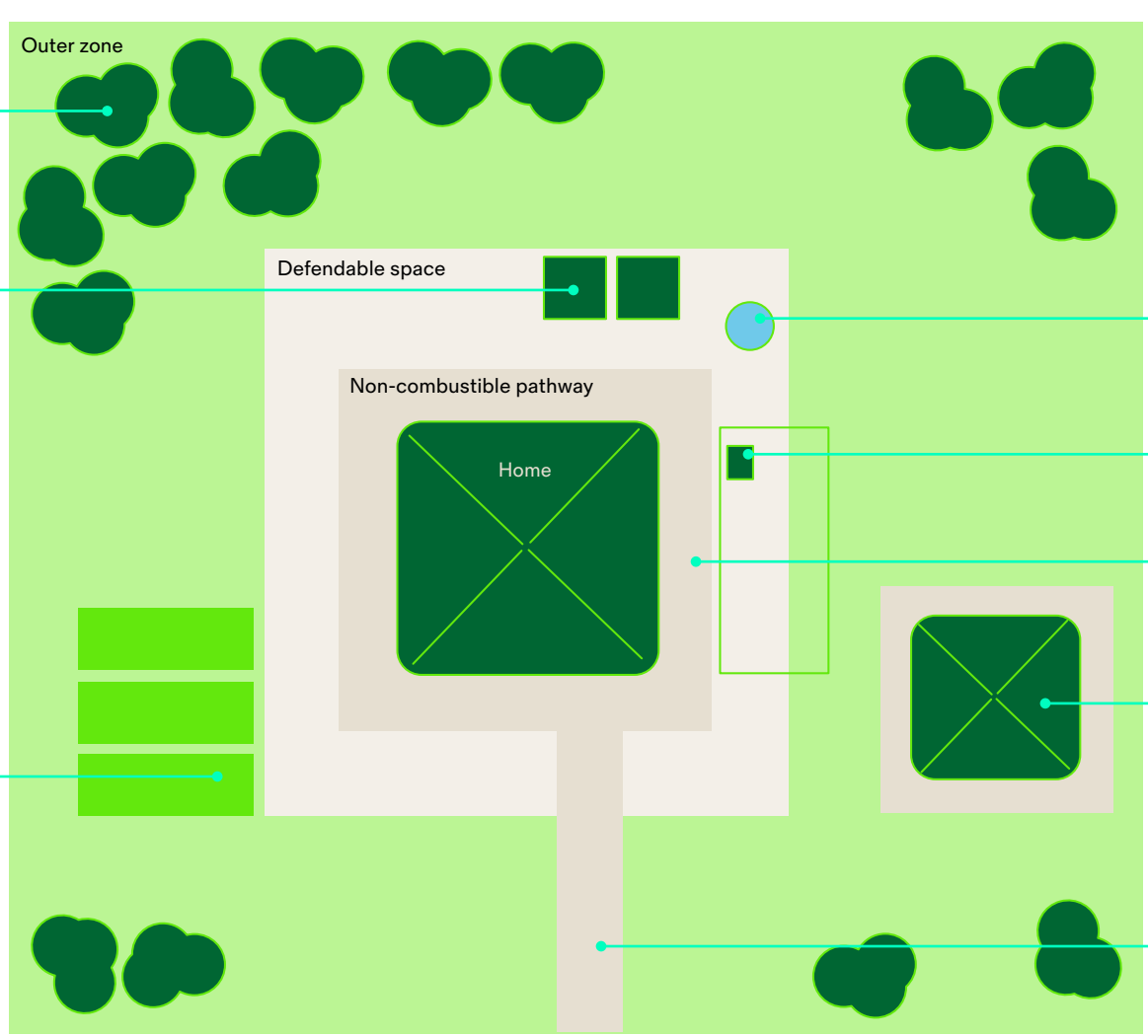
# Large Property

**Likely direction of bushfire threat example**

**Fire resilient planting**
Plant fire resilient trees, shrubs & hedges to help screen from heat, embers, wind & debris

**Smaller structures**
Smaller sheds and outbuildings should be at least 6m from the home

**Garden beds**
Manicured garden, fire resilient plantings




**Managed outer zone**

**Water supply**
Locate water tanks, dams in cleared, accessible areas

**Bushfire shelter**
Consider installing accredited private bushfire shelter

**Clear area**
Cleared area for emergencies, close to main escape routes from house

**Secondary structures**
Keep other dwellings, large outbuildings including garages, workshops and sheds at least 12m from the home

**Driveway**
Keep driveway clear of trees and overhanging branches

Resilient Building Council