

# Home upgrades for climate resilience

Making your home ready for extreme weather events

WORKBOOK



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Castlemaine Institute is a research and learning hub focused on creating thriving communities, economies and landscapes.

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## Caveats

Buildings and works may require planning and or building approval including: extensions, changes to materials, alterations, painting, tree removal and earthworks. Before mitigation measures are undertaken it is advised to contact your local Council's planning department to understand if there are any planning approvals required prior to commencing.

## Disclaimer

Although precautions have been taken to ensure the accuracy of the information, the publishers, authors and printers cannot accept responsibility for any claim, loss, damage or liability arising out of the use of the information provided.

This information is general in nature and may not describe your property. Please consider if the information is useful and appropriate for your situation. All effort has been made to ensure this information is correct and up to date.

The Castlemaine Institute acknowledges that we live and work on the unceded lands of the Dja Dja Wurrung and we acknowledge the vital role the local Djaara (Dja Dja Wurrung People) continue to play as custodians of the region.

The Castlemaine Institute commits 1% of total revenue to Pay The Rent.

Always was, always will be, Aboriginal land.

We acknowledge and support Djaara's Climate Change Strategy and Dja Dja Wurrung's vision for a sustainable, resilient and equitable future where past injustices of colonialism, mining and pollution are addressed by empowering Djaara-led responses to climate change on djandak through self-determination, justice and biocultural knowledge.

# How to use this workbook

1



Investigate the flood and fire risk to your property through obtaining professional advice, and contacting your Local Council, Catchment Management Authority and Country Fire Authority. Then work through this book.

3



Explore the PRIORITY UPGRADES table (page 19) to identify priority upgrades for your home that are easy and low cost.

5



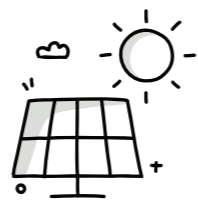
While you are reading, use the MY HOME ASSESSMENT (page 30) to note down characteristics of your home and highlight actions to make your home more climate resilient.

2



Read about HOUSE TYPES on pages 6-17 to learn how your house may perform in climate related events: bushfire, storm, flood and extreme temperatures.

4



Read through RECOMMENDED ACTIONS AND UPGRADES on pages 20-29 to learn more about upgrading any house for each of the climate related weather events.

# Purpose & overview

Many Victorian households have been affected by climate related weather events, including bushfires, extreme heat and cold snaps, storms, and floods. Much of the state's housing stock, particularly that built prior to 1991, has not been made to withstand the projected increase in temperatures and extreme weather events under climate change.

By improving the resilience of your home and property, you will not only reduce negative impacts of climate change on your health and wellbeing, but also save money through reduced future property damage costs, reduced insurance premiums and reduced costs associated with year-round heating and cooling.

This workbook will help you to assess how your house may perform in climate events and enable you to identify priority upgrades that will make your home more resilient when events do occur.

## CLIMATE EVENTS



FIRE



STORM



FLOOD



EXTREME TEMPERATURES

## HOUSE TYPES

Describes typical examples of houses found within the Loddon Mallee region:

Pre-World War II (pre 1900-1945): lightweight

Pre-World War II (pre 1900-1945): heavyweight

Post-World War II (1946-1990): lightweight

Post-World War II (1946-1990): heavyweight / brick veneer

Contemporary (1991-present): lightweight

Contemporary (1991-present): brick veneer

Consider which typology best describes your home. Note, your home may be made up of more than one type, and earlier renovations may mean some of the typical characteristics may no longer apply.

### Performance

Performance issues are identified for each house type. Consider which issues may apply to your property and estimate how your home may perform in each event. The visual scale provides an indicative rating for a typical home: houses rated "worse" are at high risk from an event.

### PERFORMANCE SCALE



## RECOMMENDED ACTIONS & UPGRADES

A scale of recommended actions you can make to homes for the identified events. The scale of minimal, medium and extensive, from no-cost preparation, through to extensive upgrades, is based on the assumed effort, skill, time and cost to undertake home upgrades.

- ✓ **Easy to do yourself**
- 🗨️ **Likely to require a skilled trade person**
- 📅 **Will take time and planning**
- 💰 **Will require mid to high financial investment**

Actions renters are permitted to take under the "Residential Tenancies Act 1997" and 'Residential Tenancies Amendment Regulations 2021' are noted with an 'R'. Consider actions you could undertake to improve the performance of your home in the short, medium and long term. Some upgrades identified in this workbook can be financially supported by government rebates.



Pre 1900-1945

## Lightweight Pre-World War II

OFTEN SINGLE LEVEL and elevated to negotiate the slope of the site. Surviving houses from this era are often elevated to avoid flood. The original structure has high ceilings. Typically, these houses have additions of varying ages and quality to incorporate modern living expectations, such as bathrooms and kitchens, within the home.

These homes were not designed with consideration of passive design principles. They often have poor orientation to capture warmth from the sun, maximise natural light, breezes, or shading. Many have shading such as verandahs on at least one facade, some have hoods over windows.

Original features like chimneys, windows and exterior materials are important to the character of these homes. Consider how these features can be maintained or only subtly changed when upgrading for resilience to retain the integrity of the original house. A good place to start for all risks is to maintain, secure and improve the external envelope of your home. Before you make exterior changes to your home, check with your local council if you require planning permission.

### DESCRIPTION

Single level, pitched roof, sometimes with multiple pitches, typically weatherboard or decorative timber cladding.

### STRUCTURE

Timber wall, floor and roof framing, timber stumps.

### CLADDING

Hardwood weatherboard or timber clad walls, corrugated steel roof.




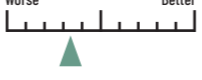

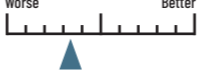

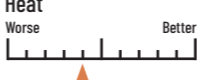
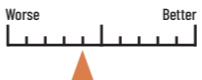
### WINDOWS AND DOORS

Timber framed doors and windows, often double hung with single glazing. These homes typically have one or occasionally two windows per room.

### INSULATION

None originally. Many homes would have had ceilings insulated later. It is less likely that walls and floors are insulated.



PRE-WORLD WAR II – LIGHTWEIGHT			PERFORMANCE	CONSIDERATIONS
<b>FIRE</b>				
		<p>Likely to have gaps over 3mm, exposed joints, roof valleys and spaces for embers to settle.</p> <p>Window glass is thinner and more likely to shatter allowing embers into the house.</p>	<p><b>GARDEN</b></p> <p>Regularly inspect and maintain mature trees.</p> <p>Re-design mature gardens to be fire wise and drought resistant.</p> <p>Manage the release of stormwater from your site by installing rainwater and/or stormwater detention tanks in discrete locations, such as behind or to the side of the house.</p>	
<b>STORM</b>				
		<p>If the original roof is still in place roof sheets may not be secure.</p> <p>Thin window glazing is more likely to shatter.</p> <p>Cladding may be loose.</p>	<p><b>BUILDING</b></p> <p>Old roof sheeting was fixed with nails that can easily come loose in strong winds; a roofer can inspect your roof and fix sheets with roofing screws.</p> <p>Enclose the sub-floor by installing ember mesh behind existing timber or new fibre cement stump lining boards.</p>	
<b>FLOOD</b>				
		<p>If below flood level, frame and stumps are vulnerable to damage.</p> <p>Cavities are prone to mold growth.</p> <p>Original materials are often hardwearing and may not need replacement.</p>	<p>The threshold for later rear additions is often close to ground level. Be aware of areas like this where water can enter the house and design exterior drainage to direct water away from such areas.</p> <p>Retrofitting double glazed units and draught sealing existing windows can be carried out by experts to retain original timber frames.</p>	
<b>EXTREME TEMPERATURES</b>				
	<p><b>Heat</b></p>  <p><b>Cold</b></p> 	<p>Have poor thermal performance. Unlikely to be fully insulated, may have no insulation.</p> <p>Due to the lack of thermal mass, they cool down quickly following a heat wave. In winter the lightweight cladding doesn't hold any warmth from direct sun.</p> <p>Can be draughty letting outside air inside.</p> <p>Smaller windows reduce heat gain, but can make it harder to ventilate. Timber window frames have good thermal properties, however the performance of the original glass is low.</p>	<p>On older style houses ember mesh installed over windows can appear dark and imposing from the outside. Screens may impact on views, ventilation and solar gain.</p> <p>Consider replacing timber decking, fascias and details, with fire resistant alternatives sympathetic to the original look and profile.</p> <p>Prioritise roof/ceiling insulation, then floors, then walls. If you are doing extensive renovations take the opportunity to insulate the walls when external or internal cladding is removed.</p> <p>Seal or remove internal wall vents. Install a chimney draught stopper internally, a roofer can install flashing externally.</p>	



Pre 1900-1945

## Heavyweight Pre-World War II

OFTEN SINGLE LEVEL and elevated to negotiate the slope. The original structure has high ceilings. Typically these houses have additions of varying ages and quality to incorporate modern living expectations such as bathrooms and kitchens into the home.

These homes were not designed with consideration of passive design principles. They often have poor orientation to capture warmth from the sun, maximise natural light, breezes, or shading. Many have shading such as verandahs on at least one facade, some have hoods over windows.

Original features like chimneys, windows and exterior materials are important to the character of these homes. Consider how these features can be maintained or subtly changed to improve resilience while retaining the integrity of the original house. A good place to start for all risks is to maintain, secure and improve the external envelope of your home. Before you make exterior changes to your home, check with your local council if you require planning permission.

### DESCRIPTION

Single level, pitched roof, sometimes with multiple pitches, brick or stone.

### STRUCTURE

Masonry (brick or stone) walls, timber floor and roof framing, timber stumps or brick piers.

### CLADDING

Masonry (brick or stone), corrugated steel, slate or tiled roof.




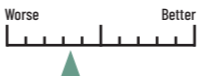

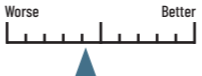



### WINDOWS AND DOORS

Timber doors and windows, often double hung with single glazing. These homes typically have one or occasionally two windows per room.

### INSULATION

None originally. Many homes would have had ceilings insulated later. It is less likely that walls and floors are insulated.



PRE-WORLD WAR II – HEAVYWEIGHT			PERFORMANCE	CONSIDERATIONS
<b>FIRE</b>				
		<p>Likely to have gaps over 3mm, exposed joints, roof valleys and spaces for embers to settle.</p> <p>Window glass is thinner and more likely to shatter allowing embers into the house.</p>	<p><b>GARDEN</b></p> <p>Regularly inspect and maintain mature trees.</p> <p>Re-design mature gardens to be fire wise and drought resistant.</p> <p>Manage the release of stormwater from your site by installing rainwater and/or stormwater detention tanks in discrete locations, such as behind or to the side of the house.</p>	
<b>STORM</b>				
		<p>If the original roof is still in place roof sheets, slates or tiles may not be secure.</p> <p>Thin window glass is more likely to shatter.</p>	<p>Deciduous trees planted on the west can shade brick walls in summer to reduce heat gain.</p>	
<b>FLOOD</b>				
		<p>If below flood level, frame and stumps are vulnerable to damage.</p> <p>Cavities are prone to mold growth.</p> <p>Original materials are often hardwearing and will not need replacement.</p>	<p><b>BUILDING</b></p> <p>Keep gutters, roof valleys, box gutters and rain heads clear of leaves. Fit gutter and valley leaf guards. Houses with flat roofs, box gutters or no eaves are particularly vulnerable to internal water damage if there is a blockage in the roof drainage. Working at heights should be undertaken by people with appropriate safety equipment.</p> <p>Old roof sheeting was fixed with nails that can easily come loose in strong winds, a roofer can inspect your roof and fix sheets with roofing screws. Have roof tiles or slates inspected and repaired.</p>	
<b>EXTREME TEMPERATURES</b>				
	<p><b>Heat</b></p>  <p><b>Cold</b></p> 	<p>Have poor thermal performance. Unlikely to be fully insulated, may have no insulation.</p> <p>Walls experience heat lag and hold heat for longer periods in summer and hold cold for longer periods in winter.</p> <p>Can be draughty letting outside air inside.</p> <p>Smaller windows reduce heat gain, but can make it harder to ventilate. Timber window frames have good thermal properties, however the performance of the original glass is low.</p>	<p>The door threshold is often close to ground level in houses that have been added to. Be aware of areas like this where water can enter the house and design exterior drainage to direct water away from such areas.</p> <p>Retrofitting double glazed units and draught sealing existing windows can be carried out by experts to retain original timber frames.</p> <p>On older style houses ember mesh installed over windows can appear dark and imposing from the outside. Screens may impact on views, ventilation and solar gain.</p> <p>Maintain timber fascias and verandahs.</p> <p>Prioritise roof/ceiling insulation, then floors. Insulation cannot be retrofitted to double brick walls. Floor to ceiling curtains or joinery on the inside of external walls can provide a thermal buffer.</p> <p>Seal or remove internal wall vents. Install a chimney draught stopper internally, a roofer can install flashing externally.</p>	



1946-1990

## Lightweight Post-World War II

USUALLY SINGLE LEVEL and raised to negotiate the slope of the site. The original portion of the structure has medium height ceilings. Often simple additions have been added to the rear.

These homes were not designed with consideration of passive design principles. They often have poor orientation to capture warmth from the sun, maximise natural light, breezes, or shading. They tend to have covered entrances but no verandahs. Eaves are typical. External blinds are often used to externally shade windows.

Original features like chimneys, windows and exterior materials are important to the character of these homes. Consider how these features can be maintained or subtly changed to improve resilience while retaining the integrity of the original house. A good place to start for all risks is to maintain, secure and improve the external envelope of your home. Before you make exterior changes to your home, check with your local council if you require planning permission.

### DESCRIPTION

Single level, pitched roof.

### STRUCTURE

Timber wall, floor and roof framing, timber stumps.

### CLADDING

Timber weatherboards or sheet, corrugated steel or tiled roof.




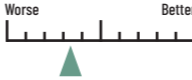

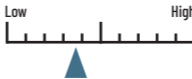

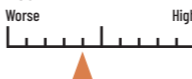
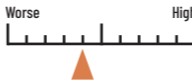
### WINDOWS AND DOORS

Timber, steel or aluminium doors and windows, with single glazing. These homes often have square proportioned window openings.

### INSULATION

None originally. Many homes would have had ceilings insulated later. It is less likely that walls and floors are insulated.



POST-WORLD WAR II – LIGHTWEIGHT		PERFORMANCE	CONSIDERATIONS
<b>FIRE</b>			
		<p>Likely to have gaps over 3mm, exposed joints, roof valleys and spaces for embers to settle.</p> <p>Window glass is thinner and more likely to shatter allowing embers into the house.</p>	<p><b>GARDEN</b></p> <p>Regularly inspect and maintain trees.</p> <p>Re-design mature gardens to be fire wise and drought resistant.</p> <p>Manage the release of stormwater from your site by installing rainwater and/or stormwater detention tanks in discrete locations, such as behind or to the side of the house.</p>
<b>STORM</b>			
		<p>If the original roof is still in place roof sheets may not be secure.</p> <p>Thin glass in windows is more likely to shatter.</p> <p>Cladding may be loose.</p>	<p><b>BUILDING</b></p> <p>Keep gutters, roof valleys, box gutters and rain heads clear of leaves. Fit gutter and valley leaf guards. Houses with flat roofs, box gutters or no eaves are particularly vulnerable to internal water damage if there is a blockage in the roof drainage. Working at heights should be undertaken by people with appropriate safety equipment.</p>
<b>FLOOD</b>			
		<p>If below flood level, frame and stumps are vulnerable to damage.</p> <p>Cavities are prone to mold growth.</p> <p>Original materials are often hardwearing and will not need replacement.</p>	<p>Old roof sheeting can come loose in strong winds. A roofer can inspect your roof and fix sheets with roofing screws. Have roof tiles or slates inspected and repaired.</p> <p>Enclose the sub-floor by installing ember mesh behind existing timber or new fibre cement stump lining boards.</p> <p>The door threshold is often close to ground level in houses that have been added to. Be aware where water can enter the house and design exterior drainage to direct water away from such areas.</p>
<b>EXTREME TEMPERATURES</b>			
	<p><b>Heat</b></p>  <p><b>Cold</b></p> 	<p>Have poor thermal performance. Unlikely to be fully insulated, may have no insulation.</p> <p>Due to the lack of thermal mass, they cool down quickly following a heat wave. In winter the lightweight cladding doesn't hold any warmth from direct sun.</p> <p>Can be draughty letting outside air inside.</p> <p>Old steel or aluminium window frames have poor thermal performance.</p>	<p>Older aluminium or steel windows frames transfer heat and cold. Consider replacing windows with a sympathetic frame profile and colour. For existing timber windows, retrofitting double glazed units and draught sealing can be carried out by experts to retain original frames.</p> <p>On older style houses ember mesh installed over windows can appear dark and imposing from the outside. Screens may impact on views, ventilation and solar gain.</p> <p>Maintain timber fascias and verandahs.</p> <p>Add external shading appropriate to the era of the home. Shading that controls direct sun include verandahs, pergolas, window hoods, awning blinds, external blinds or shutters.</p> <p>Prioritise roof/ceiling insulation, then floors (if the house has an elevated timber floor), then walls. If you are doing extensive renovations take the opportunity to insulate the walls when external or internal cladding is removed.</p> <p>Seal or remove internal wall vents. Install a chimney draught stopper internally, a roofer can install flashing externally.</p> <p>Replace non water-resistant materials that are below predicted flood level. Particle board, hard board and MDF swell and deteriorate when wet. These materials were increasingly used in cabinetry, under floors and for details like skirtings and architraves.</p>



1946-1990

## Heavyweight / brick veneer Post-World War II

USUALLY SINGLE LEVEL and raised to negotiate the slope of the site. The original portion of the structure has medium height ceilings.

These homes were not designed with consideration of passive design principles. They often have poor orientation to capture warmth from the sun, maximise natural light, breezes, or shading. They tend to have covered entrances but not full verandahs. Eaves are typical. External blinds are often used to externally shade windows.

Original features like chimneys, windows and exterior materials are important to the character of these homes. Consider how these features can be maintained or subtly changed to improve resilience while retaining the integrity of the original house. A good place to start for all risks is to maintain, secure and improve the external envelope of your home. Before you make exterior changes to your home, check with your local council if you require planning permission.

### DESCRIPTION

Single level, pitched roof, often with projected sections.

### STRUCTURE

Brick walls, timber floor and roof framing, brick piers.

### CLADDING

Brick, tiled roof cladding.

### WINDOWS AND DOORS








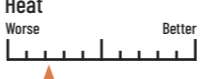

Timber, steel or aluminium doors and windows, with single glazing. These homes often have windows that are square or wider than they are high.

### INSULATION

None originally. Many homes would have had ceilings insulated later. It is less likely that walls and floors are insulated.



## POST-WORLD WAR II – HEAVYWEIGHT / BRICK VENEER

		PERFORMANCE	CONSIDERATIONS
<b>FIRE</b>			
		<p>Likely to have gaps over 3mm, exposed joints, roof valleys and spaces for embers to settle.</p> <p>Window glazing is thinner and more likely to shatter allowing embers into the house.</p>	<p><b>GARDEN</b></p> <p>Regularly inspect and maintain trees.</p> <p>Re-design mature gardens to be fire wise and drought resistant.</p> <p>Manage the release of stormwater from your site by installing rainwater and/or stormwater detention tanks in discrete locations, such as behind or to the side of the house.</p>
<b>STORM</b>			
		<p>Robust roof and wall materials perform well in storms.</p> <p>Thin glass in windows is more likely to shatter.</p>	<p><b>BUILDING</b></p> <p>Keep gutters, roof valleys, box gutters and rain heads clear of leaves. Fit gutter and valley leaf guards. Houses with flat roofs, box gutters or no eaves are particularly vulnerable to internal water damage if there is a blockage in the roof drainage. Working at heights should be undertaken by people with appropriate safety equipment.</p>
<b>FLOOD</b>			
		<p>If below flood level, floors are vulnerable to damage.</p> <p>Original materials are often hardwearing and will not need replacement.</p>	<p>Old roof sheeting was fixed with nails that can easily come loose in strong winds, a roofer can inspect your roof and fix sheets with roofing screws. Have roof tiles or slates inspected and repaired.</p> <p>The door threshold is often close to ground level in houses that have been added to. Be aware where water can enter the house and design exterior drainage to direct water away from such areas.</p>
<b>EXTREME TEMPERATURES</b>			
	<p><b>Heat</b></p>  <p><b>Cold</b></p> 	<p>Have poor thermal performance.</p> <p>Are rarely fully insulated.</p> <p>Double brick walls experience heat lag and hold heat for longer periods in summer and hold cold for longer periods in winter.</p> <p>Can be draughty letting outside air inside.</p> <p>Steel and older aluminium window frames have poor thermal performance.</p>	<p>Older aluminium or steel windows frames transfer heat and cold. Consider replacing windows with a sympathetic frame profile and colour. For existing timber windows, retrofitting double glazed units and draught sealing can be carried out by experts to retain original frames.</p> <p>On older style houses ember mesh installed over windows can appear dark and imposing from the outside. Screens may impact on views, ventilation, and solar gain.</p> <p>Maintain timber fascias and verandahs.</p> <p>Add external shading appropriate to the era of the home. Shading devices that control direct sun include verandahs, pergolas, window hoods, awning blinds, external blinds or shutters.</p> <p>Prioritise roof/ceiling insulation, then floors (if the house has an elevated timber floor). Insulation cannot be retrofitted in to double brick walls. Floor to ceiling curtains or joinery on the inside of external walls can provide a thermal buffer.</p> <p>Seal or remove internal wall vents. Install a chimney draught stopper internally, a roofer can install flashing externally.</p> <p>Replace non water-resistant materials that are below predicted flood level. Particle board, hard board and MDF swell and deteriorate when wet. These materials were increasingly used in cabinetry, under floors and for details like skirtings and architraves.</p>



1991-present

## Lightweight Contemporary

USUALLY SINGLE LEVEL and constructed on heavily excavated sites to minimise slope. Low to medium height ceilings.

Contemporary homes are only sometimes designed with consideration of passive design principles. They often have poor orientation to capture warmth from the sun, maximise natural light, breezes, or shading.

They may have narrow or no eaves and tend to have covered entrances and covered patios to the rear. Windows are often unshaded.

A good place to start for all risks is to maintain, secure and improve the external envelope of your home. Before you make exterior changes to your home, check with your local council if you require planning permission.

### DESCRIPTION

Single level, pitched, skillion or flat roof.

### STRUCTURE

Timber stud frame, timber or concrete floor, timber roof framing.

### CLADDING

Wall cladding such as engineered timber panels, steel, compressed fiber cement, and steel roof cladding.






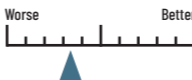

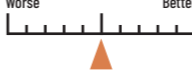
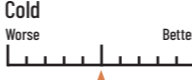
### WINDOWS AND DOORS

Aluminium doors and windows, with single or double glazing. These homes often have windows proportioned to suit a particular room, tall narrow bedroom windows, large full height glazing for living rooms. Garages are often incorporated into the building envelope.

### INSULATION

Wall, ceiling, some houses may have floor insulation.



CONTEMPORARY – LIGHTWEIGHT			PERFORMANCE	CONSIDERATIONS
<b>FIRE</b>				
		<p>Likely to have roof valleys and spaces for embers to settle.</p> <p>If designed and constructed to a bushfire attack level (BAL), it would be constructed to a better standard.</p>	<p><b>GARDEN</b></p> <p>Plant fire wise and drought resistant plants.</p> <p>Manage the release of stormwater from your site by installing rainwater and/or stormwater detention tanks in discrete locations, such as behind or to the side of the house.</p>	
<b>STORM</b>				
		<p>Robust exterior materials perform well in storms.</p> <p>Constructed to more recent standards to withstand wind forces.</p>	<p>Pay attention to water flows from neighbouring properties and work together to keep drainage away from your house.</p> <p>Use fire resistant fencing materials particularly when it is close to your house or other structures.</p>	
<b>FLOOD</b>				
		<p>Often constructed at grade with low window sills which can make them vulnerable to inundation.</p> <p>Cavities are prone to mold growth.</p> <p>Materials can be of poor quality and may require replacement.</p>	<p><b>BUILDING</b></p> <p>Keep gutters, roof valleys, box gutters and rain heads clear of leaves. Fit gutter and valley leaf guards. Houses with flat roofs, box gutters or no eaves are particularly vulnerable to internal water damage if there is a blockage in the roof drainage. Working at heights should be undertaken by people with appropriate safety equipment.</p> <p>Inspect, fill gaps and regularly maintain cladding.</p>	
<b>EXTREME TEMPERATURES</b>				
	<p><b>Heat</b></p>  <p><b>Cold</b></p> 	<p>Have fair thermal performance being constructed to more recent standards.</p> <p>Houses constructed after 1991 were required to have some insulation. Since 2004 star ratings have been introduced and improved from 4 to 7 stars. The newer the house, the better the performance is likely to be.</p> <p>Window performance has improved with thermal breaks, thicker glazing, and sometimes double glazing in newer aluminium window frames.</p>	<p>Door thresholds are often close to ground level. Be aware of areas like this where water can enter the house and design exterior drainage to direct water away from such areas.</p> <p>Single glazed aluminium windows and typical frames transfer heat and cold. Consider installing curtains with a pelmet. Alternatively, install toughened glass (fire/storm) or double glazed windows with a thermally broken aluminium frame.</p> <p>Add external shading that can control direct sun such as verandahs, pergolas, window hoods, awning blinds, external blinds or shutters.</p> <p>Check for gaps and reinstate roof/ceiling insulation.</p>	





1991-present

## Brick veneer Contemporary

USUALLY SINGLE LEVEL, and constructed on heavily excavated sites to minimise slope. Low to medium height ceilings.

Contemporary homes are only sometimes designed with consideration of passive design principles. They often have poor orientation to capture warmth from the sun, maximise natural light, breezes, or shading.

They may have narrow or no eaves and tend to have covered entrances and covered patios to the rear. Windows are often unshaded.

A good place to start for all risks is to maintain, secure and improve the external envelope of your home. Before you make exterior changes to your home, check with your local council if you require planning permission.

### DESCRIPTION

Single level, pitched roof, often with multiple pitches and garages incorporated into the building envelope.

### STRUCTURE

Timber stud frame walls, timber floor and roof framing, slab on ground.

### CLADDING

Brick and lightweight wall cladding, steel or tile roof cladding.






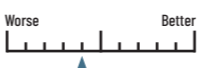



### WINDOWS AND DOORS

Aluminium doors and windows, single or double glazed. Openings are often proportioned to suit a particular room, large windows and doors in living rooms.

### INSULATION

Wall and ceiling, more recent houses may have floor insulation.



CONTEMPORARY - BRICK VENEER		PERFORMANCE	CONSIDERATIONS
<b>FIRE</b>			
		<p>Likely to have roof valleys and spaces for embers to settle.</p> <p>If designed and constructed to a bushfire attack level (BAL), it would be constructed to a better standard.</p>	<p><b>GARDEN</b></p> <p>Plant fire wise and drought resistant plants.</p> <p>Manage the release of stormwater from your site by installing rainwater and/or stormwater detention tanks in discrete locations, such as behind or to the side of the house.</p>
<b>STORM</b>			
		<p>Robust exterior materials perform well in storms.</p> <p>Constructed to more recent standards to withstand wind forces.</p>	<p>Pay attention to water flows from neighbouring properties and work together to keep drainage away from your house</p> <p>Use fire resistant fencing materials particularly when it is close to your house or other structures.</p>
<b>FLOOD</b>			
		<p>Often constructed at grade with low window sills which can make them vulnerable to inundation.</p> <p>Cavities are prone to mold growth. Materials can be of poor quality and may require replacement.</p>	<p><b>BUILDING</b></p> <p>Keep gutters, roof valleys, box gutters and rain heads clear of leaves. Fit gutter and valley leaf guards. Houses with flat roofs, box gutters or no eaves are particularly vulnerable to internal water damage if there is a blockage in the roof drainage. Working at heights should be undertaken by people with appropriate safety equipment.</p> <p>Door thresholds are often close to ground level. Be aware of areas like this where water can enter the house and design exterior drainage to direct water away from such areas.</p>
<b>EXTREME TEMPERATURES</b>			
	<p><b>Heat</b></p>  <p><b>Cold</b></p> 	<p>Have fair thermal performance being constructed to more recent standards, although this relies on the performance of the building envelope with less regard to the siting of the building.</p> <p>Houses constructed after 1991 were required to have some insulation. Since 2004 star ratings have been introduced and improved from 4 to 7 stars. The newer the house, the better the performance is likely to be.</p> <p>Window performance has improved with thermal breaks, thicker glazing, and sometimes double glazing in newer aluminium window frames.</p>	<p>Single glazed aluminium windows and typical frames transfer heat and cold. Consider installing curtains with a pelmet. Alternatively, install toughened glass (fire/storm) or double glazed windows with a thermally broken aluminium frame.</p> <p>Add external shading that can control direct sun such as verandahs, pergolas, window hoods, awning blinds, external blinds or shutters.</p> <p>Check for gaps and reinstate roof/ceiling insulation.</p>

Pre 1900-1945 Pre-World War II **Lightweight**



Pre 1900-1945 Pre-World War II **Heavyweight**



Post 1946-1990 Post-World War II **Lightweight**



Post 1946-1990 Post-World War II **Heavyweight**



1990-present Contemporary **Brick veneer**



1990-present Contemporary **Lightweight**










PRIORITY UPGRADES








	Free and/or low cost	Fire	Storm	Flood	Heat	Cold
Decks & external structures	Inspect & maintain timber; apply fire resistant products to external structures	✓				
Decks & external structures	Secure gas bottles away from house	✓				
Decks & external structures	Keep verandahs & decks tidy	✓	✓	✓		
Doors & windows	Seal draughts & gaps around windows, external doors, exhaust fans Use a fire resistant sealant in a fire risk area	✓			✓	✓
Doors & windows	Protect windows with ember mesh screens	✓				
Doors & windows	Upgrade window glazing with double or laminated glass; specify thickness of glass based on hazard exposure	✓	✓		✓	✓
Doors & windows	Keep windows & doors closed during the day; use door snakes (draught stoppers) for internal & external doors				✓	✓
Doors & windows	Install thermally backed curtains or blinds with pelmets; close on hot days & cold nights				✓	✓
Doors & windows	Externally shade windows & doors				✓	
Floors	Screen subfloor cavity with ember mesh or enclose with non-combustible materials	✓				
Floors	If subfloor cavity is open, remove all flammable materials and rake out leaves or debris from under house	✓				
Floors	Raise appliances above flood level, including washing machine & dryer			✓		
Floor	Inspect under floor insulation, fill any gaps & replace where needed	✓			✓	✓
Floors/services	Raise external hot water units, air conditioners and electrical switchboards above flood level			✓		
Garden	Remove dead vegetation, greenwaste & woodpiles	✓	✓			
Garden	Keep garden lush & plant low fire-risk species	✓			✓	
Garden	Plant deciduous trees to provide summer shade, protect from ember attack and allow direct light to windows in winter; manage fallen leaves, branches and prune back from roof	✓			✓	✓
Garden	Keep yard tidy & remove loose items	✓	✓	✓		
Garden	Maximise permeable surfaces in the garden to help heavy rain soak into the ground			✓	✓	
Fencing	Inspect & repair fences	✓	✓			
Fencing	Consider appropriate fencing for your risk area. Use non-combustible materials close to the house, or other structures in bushfire risk areas, and permeable fencing in a flood risk areas	✓	✓	✓		
Interior	Install reverse cycle air conditioning				✓	✓
Interior	Install ceiling fans & turn to appropriate winter or summer setting				✓	✓
Interior	Make a cool room that is zoned off & can be cooled during hottest part of day; south-facing if possible.				✓	
Interior	Make a warm room that is zoned off & that can be heated during coldest times; room captures sunlight if possible					✓
Interior	Keep your body warm with clothes, blankets, electric blankets, hot water bottles					✓
Interior	Turn heaters on & keep living room/s warm					✓
Roof	Clear gutters & roof valleys of leaves & debris	✓	✓	✓		
Roof	Clean spouting & downpipes		✓			
Roof	Add leaf guards to gutters & roof valleys. Ensure guards are fire resistant if in a fire risk area	✓	✓	✓		
Roof	Secure any loose roof sheets, tiles & flashings	✓	✓			
Roof	Check inside roof space for daylight points or leaves: both indicate points where embers will get in Plug gaps with mineral wool	✓				
Roof	Inspect roof insulation and fill any gaps & replace where needed				✓	✓
Roof	Ventillate roof cavity				✓	
Walls	Seal all gaps over 3mm with non-combustible material	✓	✓		✓	✓
Walls	Seal vents & holes with ember mesh	✓				
Walls	Seal unused chimneys where possible	✓			✓	✓
Walls	Inspect & secure wall cladding	✓	✓			
Walls	Protect at risk walls with steel ember mesh screens	✓				
Walls	Inspect wall insulation, fill any gaps & replace where needed				✓	✓

RECOMMENDED ACTIONS AND UPGRADES

# FIRE

- ✓ Easy to do yourself
- 🗨️ Likely to require a skilled trade person
- 📅 Will take time and planning
- 💰 Will require mid to high financial investment
- R Actions renters can take

		PREPARATION ✓		MINIMAL ✓ \$
<b>GARDEN</b> 	<input type="checkbox"/> R	During fire season, keep gardens neat, free of loose bark and dead vegetation. Regularly water to keep the garden 'green'. Mow lawns. Remove or cover green waste. Move wood piles away from house. Do not use flammable mulch within 2m of house.	<input type="checkbox"/>	Separate shrubs from trees and structures. Plant fire wise plants. Remove branches overhanging house and timber fences, but never work near powerlines. Cover woodpile with fire resistant material. Remove or closely manage vegetation around the perimeter of the house.
<b>FLOORS</b> 	<input type="checkbox"/> R	If the subfloor cavity is open, rake out leaves and remove all flammable materials from under the house.	<input type="checkbox"/>	Seal subfloor cavity and vents with strips of ember mesh.
<b>WALLS</b> 	<input type="checkbox"/>	Seal all small gaps around the house with appropriate fire rated infill strips or fire rated sealant.	<input type="checkbox"/>	Seal vents and holes with ember mesh. Apply product to timber to increase its resistance to fire.
<b>ROOF</b> 	<input type="checkbox"/> R	Clean leaves and debris from roof valleys, box gutters. Warning: cleaning roofs and gutters should be undertaken by people with appropriate safety equipment.	<input type="checkbox"/>	Secure roof sheets, tiles and flashings. Check inside roof space for daylight points or leaves: both indicate points where embers will get in. Plug gaps with mineral wool.
<b>EAVES &amp; DOWNPIPES</b> 	<input type="checkbox"/> R	Clean leaves and debris from gutters at start of the fire season and check regularly until end of season. Check gutter guards at start of season. Make sure to prioritise your safety and practice caution on ladders and with old and weak gutters. Consider a professional service if concerned.		
<b>DOORS &amp; WINDOWS</b> 			<input type="checkbox"/>	Maintain window sills and door frames so there is no rot or flaking paint. Apply fire-retardant coating to timber. Check for gaps around frames using incense stick inside on a windy day. Treat gaps with a fire rated sealant. Add non-combustible kick plates to hollow core doors for 400mm above threshold of door.
<b>DECKS &amp; EXTERNAL STRUCTURES</b> 	<input type="checkbox"/> R	Remove loose items like outdoor furniture, door mats, pot plants. Store small gas bottles (<45 kg) away from the house, secured vertically with relieve valve pointing away from car and buildings. Note where leaves naturally gather, as this will probably be where embers land.	<input type="checkbox"/> R	Maintain timber structures, ensuring no flaking, peeling paint or rotting wood. Apply product to timber to increase its resistance to fire. Separate vegetation from decks.








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<b>GARDEN</b> 	<input type="checkbox"/>	Locate open areas such as lawns between the house and fire hazards. Locate trees and shrubs down wind from the direction of fire. Arrange garden beds in discrete patches separated by gravel, paving or mown lawn. Replace flammable treated pine retaining-walls with non-combustible materials like concrete, gravel and rocks for walls, edging and paths.	<input type="checkbox"/>	Install low walls between the house and most likely fire hazard. Replace treated pine & brush fencing that is situated near windows, doors, decks and eaves, with non-combustible materials such as brick, stone, concrete or galvanised iron.
<b>FLOORS</b> 	<input type="checkbox"/>	Line unenclosed subfloors with ember mesh.	<input type="checkbox"/>	Enclose subfloors with non-combustible materials (concrete, brick, bushfire resisting timber or fibre cement sheet).
<b>WALLS</b> 	<input type="checkbox"/>	Fit cooling units with non-combustible covers.	<input type="checkbox"/>	Replace or cover external walls with non-combustible surface materials such as masonry, brick veneer, concrete, fibre cement, steel sheet etc. Install non-combustible sarking behind weatherboards, external cladding and roofs.
<b>ROOF</b> 	<input type="checkbox"/>	Insulate roof with compressed mineral wool insulation. Provide good roof access for inspection. Seal roof gaps, roof lights, ventilators, cooling units, aerials and solar connections with no gaps greater than 3mm and fit ember guards.	<input type="checkbox"/>	Install a sprinkler system to extinguish embers that land on the roof or other structures. Ensure that piping is non-combustible, the system will run in event of mains power failure and that there is adequate water supply. Consider impact of wind on delivery of water on the structure.
<b>EAVES &amp; DOWNPIPES</b> 	<input type="checkbox"/>	Install metal or PVC-U gutters with gutter and valley leaf guards. Above ground piping should be constructed of metal where practical.	<input type="checkbox"/>	Line eaves with fiber cement sheet or fire resistant timber.
<b>DOORS &amp; WINDOWS</b> 	<input type="checkbox"/>	Install external bushfire screens. Replace external doors with non-combustible materials. Seal with weather strips. Ensure no gaps wider than 3mm. Replace glass with toughened or laminated glass >5mm.	<input type="checkbox"/>	Construct joinery and frames on new builds from fire resisting timber, metal, metal-reinforced PVC-U and with metal external hardware.
<b>DECKS &amp; EXTERNAL STRUCTURES</b> 	<input type="checkbox"/>	Fit garage door guide tracks with a nylon brush and remove or seal ventilation slots. Large gas bottles (>45 kg) must be on a concrete pad, secured vertically, with relief valve facing away from house.	<input type="checkbox"/>	Use non-combustible surface materials within 400mm of glazed windows or doors. Separate external structures within six metres of the house with a fire-resistant wall.








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RECOMMENDED ACTIONS AND UPGRADES

# STORM

- ✓ Easy to do yourself
- 🗨️ Likely to require a skilled trade person
- 📅 Will take time and planning
- 💰 Will require mid to high financial investment
- R Actions renters can take

	PREPARATION ✓	MINIMAL ✓ \$
<b>GARDEN</b> 	<input type="checkbox"/> R Keep your yard and verandahs free of clutter. Safely secure loose items such as outdoor furniture, umbrellas and trampolines.	<input type="checkbox"/> Trim or remove trees or branches overhanging your home, or powerlines on your property. Make sure to prioritise your safety and practice caution on ladders and with old and weak gutters. Never work near powerlines. Engage a professional service if concerned.
<b>FLOORS</b> 		
<b>WALLS</b> 	<input type="checkbox"/> R Regularly check wall cladding for loose boards or panels.	<input type="checkbox"/> Check fuses and upgrade to RCD switches to protect from lightning strike.
<b>ROOF</b> 	<input type="checkbox"/> Regularly check your roof area for loose tiles or metal sheets (this can be done safely from the ground in some cases).	<input type="checkbox"/> Replace roofing nails with screws. Keep the roof in good repair. Fix loose tiles, roofing sheets and ridge capping. Working on roofs can be dangerous, and should be done by a suitably skilled tradesperson.
<b>EAVES &amp; DOWNPIPES</b> 	<input type="checkbox"/> R Clean gutters, spouting and downpipes regularly; make sure to prioritise your safety and practice caution on ladders and with old and weak gutters. Consider a professional service if concerned. Warning: cleaning roofs and gutters should be undertaken by people with appropriate safety equipment.	
<b>DOORS &amp; WINDOWS</b> 		
<b>DECKS &amp; EXTERNAL STRUCTURES</b> 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">Damage and injury during a storm is often the result of materials that have flown off buildings or out of yards.</div>	<input type="checkbox"/> Inspect and repair loose palings on fences.








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<b>GARDEN</b> 	<input type="checkbox"/> Construct windbreaks around the building to reduce wind force. Increase permeable surfaces like soft landscaping, gravel and stone to allow rain to infiltrate groundwater. Make fences permeable. Grade slope away from the house, to a distance of 2m, for drainage.	<input type="checkbox"/> Construct floors from water resistant material (concrete, durable floorboards, clay tiles, rather than MDF, plywood or ceramic tile). Install a cavity drainage solution beneath the floor to remove floodwaters. This requires a sump and pump system.
<b>FLOORS</b> 		
<b>WALLS</b> 		<input type="checkbox"/> Have a builder check the structural integrity of your house and make recommendations for tie-downs or fasteners to resist uplifting forces (wind). Replace your roof cladding with hail resistant roofing materials.
<b>ROOF</b> 	<input type="checkbox"/> Ensure all roof fasteners are in good condition and free of rust.	<input type="checkbox"/> Upgrade gutters and spouting to move water away from the building faster. Install an engineered stormwater retention and detention system to control the flow of water off your property.
<b>EAVES &amp; DOWNPIPES</b> 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">Permeable surfaces allow water to penetrate to the natural ground below. They include materials such as soil, lawn, stone or wood mulch, gravel, specialist paving products.</div>	
<b>DOORS &amp; WINDOWS</b> 	<input type="checkbox"/> Install debris screens or shutters on windows.	<input type="checkbox"/> Doors should have additional support such as barrel bolts or dead locks and sturdy plates in the door jamb.
<b>DECKS &amp; EXTERNAL STRUCTURES</b> 	<input type="checkbox"/> Ensure garage doors lock correctly and can withstand wind speed. New doors may have wind locks or other braces to resist wind loads. These loads transfer additional stress to ends of roller doors, walls must also be strengthened.	<input type="checkbox"/> Build structures that are attached to the house, such as carports and verandahs, to the same standards as the main building. Install a solar system and battery for energy storage. Install a suppression or surge protection system for your entire house.

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RECOMMENDED ACTIONS AND UPGRADES








# FLOOD

- ✓ Easy to do yourself
- 🗨️ Likely to require a skilled trade person
- 📅 Will take time and planning
- 💰 Will require mid to high financial investment
- R Actions renters can take

	PREPARATION ✓	MINIMAL ✓ \$
<b>GARDEN</b> 	<input type="checkbox"/> Avoid removal of vegetation that holds soil layers together and earthworks that cut into unstable soils. Keep your yard and verandahs free of clutter. Safely store outdoor furniture, umbrellas, gardening equipment and toys.	<input type="checkbox"/> Install a dry well (hole filled with gravel or stones) to reduce flow of water to the house and collect and retain stormwater, before it filters into the soil.
<b>FLOORS</b> 	<input type="checkbox"/> R Raise valuables, furniture, poisons, oils and chemicals above flood level, onto benches or tables or move them off-site. Tie down objects likely to float and cause damage.	<input type="checkbox"/> Seal existing tiled areas to minimise the chance of mold. Raise powerpoints & appliances above flood level, including washing machine & dryer
<b>WALLS</b> 		<input type="checkbox"/> Seal cracks and service inlets (such as washing machine or telephone lines) with water-resistant products.
<b>ROOF</b> 		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">                     Riverine flooding is where rivers break their banks and water covers the surrounding land. Flash flooding occurs within six hours of heavy rain. Flash floods can occur in urban areas if drainage systems can't cope.                 </div>
<b>EAVES &amp; DOWNPIPES</b> 	<input type="checkbox"/> R Clean gutters, spouting and downpipes regularly; make sure to prioritise your safety and practice caution on ladders and with old and weak gutters. Consider a professional service if concerned. Warning: cleaning roofs and gutters should be undertaken by people with appropriate safety equipment.	
<b>DOORS &amp; WINDOWS</b> 		<input type="checkbox"/> Install waterproof seals on doors and windows. Seal gaps in frames with water resistant products such as silicone. Add barrel bolts or dead locks to doors. Add sturdy plates in the door jamb.
<b>DECKS &amp; EXTERNAL STRUCTURES</b> 		

In Victoria, for most types of development, the 1% AEP flood level is used to define a flood zone.

An 1% AEP flood is a large flood having a 1% chance of occurring in any given year.







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<b>GARDEN</b> 	<input type="checkbox"/> Provide adequate drainage and soil cover near potentially unstable land. Increase permeable surfaces like soft landscaping, with deep friable soils, gravel and stone to allow rain to infiltrate groundwater. Make fences permeable.	<input type="checkbox"/> Create a rain garden with plants that cope with water inundation, to help slow, filter and collect flood water. Add solid walls or raise ground level above known historic flood levels. Consider the impact this may have on neighbours. Grade slope away from the house to a distance of 2m, for drainage.
<b>FLOORS</b> 	<input type="checkbox"/> Install flood resilient flooring such as hardwood, vinyl or tiles over a flood resilient substrate to minimise damage. Use water resistant insulation material below the predicted flood level. Ensure insulation can be dried out after a flood event through adequate ventilation. Install perimeter drainage to prevent dampness in basements and cellars. Install flood resilient cabinetry, and stainless steel framed benches.	<input type="checkbox"/> Raise the house above the historic flood level. Construct floors from water resistant material (concrete, durable floorboards, clay tiles, rather than MDF, plywood or ceramic tile). Install a cavity drainage solution beneath the floor to remove flood waters. Requires a sump and pump system. Ensure backup power is available in case of power failure.
<b>WALLS</b> 	<input type="checkbox"/> Seal external walls under existing cladding to minimise the chance of water entry.	<input type="checkbox"/> Eliminate wall cavities by replacing loose-fill insulation with rigid insulation. Ensure insulation can be dried out after a flood event through adequate ventilation.
<b>ROOF</b> 	<input type="checkbox"/> Provide access to roofs for maintenance and inspection. Use water resistant insulation material below the predicted flood level. Ensure insulation can be dried out after a flood event through adequate ventilation.	
<b>EAVES &amp; DOWNPIPES</b> 		<input type="checkbox"/> Upgrade gutters and spouting to move water away from the building faster. Install an engineered stormwater retention and detention system to control the flow of water off your property.
<b>DOORS &amp; WINDOWS</b> 	<input type="checkbox"/> Replace external doors with flood doors to minimise the chance of water entry. Install strengthened glass and frames to withstand water pressure/ entry and collision from floating debris.	<input type="checkbox"/> Ensure window sills are above flood level to minimise the chance of water entry.
<b>DECKS &amp; EXTERNAL STRUCTURES</b> 	<input type="checkbox"/> Raise hot water units and electrical switchboards above flood level. Make outbuildings permeable to allow water to flow through them.	<input type="checkbox"/> Structures that are attached to the house, such as carports and verandahs, are to be built to the same standards as the main building. Install solar system and battery for energy storage. Install a surge protection system for your entire house.

Water-resistant insulation includes: rigid insulation, closed-cell foam, fibreglass, mineral wool or wool.







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RECOMMENDED ACTIONS AND UPGRADES

# EXTREME HEAT

	PREPARATION ✓	MINIMAL ✓ \$
<b>GARDEN</b> 	<input type="checkbox"/> R Keep garden lush, particularly in areas close to the house.	<input type="checkbox"/> Plant drought tolerant species.
<b>FLOORS</b> 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">                         The R-value indicates how well an insulation product resists heat flow. The higher the R value, the higher the level of insulation. The appropriate degree of insulation depends on your climate, building construction type, and whether auxiliary heating and/or cooling is to be used.                     </div>	<input type="checkbox"/> Inspect your insulation and fill any gaps.
<b>WALLS</b> 		<input type="checkbox"/> Inspect your insulation and fill any gaps.
<b>ROOF</b> 		<input type="checkbox"/> Inspect your insulation and fill any gaps. Mechanically ventilate the roof cavity. Install a draught stopper to seal ceiling exhaust fans.
<b>DOORS &amp; WINDOWS</b> 		<input type="checkbox"/> R Close and seal off external doors with door snakes. Open doors and windows at night to let in cooling breezes. Draw external blinds early in the morning before the sun hits the windows.
<b>INTERIOR</b> 	<input type="checkbox"/> R Use ceiling and pedestal fans when you are in a room. Use air conditioners to keep cool. Avoid running the oven and other appliances that produce heat. Zone off a space that can be cooled and where you can spend time during the hottest times of the day. South facing rooms and downstairs areas tend to be the coolest rooms in a house.	<input type="checkbox"/> Install thermally backed curtains/ blinds or honeycomb blinds; use pelmets and seal curtains/blinds down to the floor or to window sill to prevent convection currents of air. Seal all gaps with suitable draught proofing products.

- ✓ Easy to do yourself
- 🗨️ Likely to require a skilled trade person
- 📅 Will take time and planning
- 💰 Will require mid to high financial investment
- R Actions renters can take







	MEDIUM 🗨️ 📅 💰	EXTENSIVE 🗨️ 📅 📅 💰 💰
<b>GARDEN</b> 	<input type="checkbox"/> Install an irrigation system for efficient water use. Landscape gardens with species providing high shade cover.	<input type="checkbox"/> Reduce the area of water resistant surfaces which have high thermal mass, such as concrete or pavers. Use permeable surfaces or lighter coloured or reflective paving to reduce heat absorption.
<b>FLOORS</b> 	<input type="checkbox"/> Install under floor insulation under raised timber floors. Select insulation with a high R-value. Enclose subfloor cavity.	<input type="checkbox"/> Strengthen foundations to avoid movement caused by changes in soil moisture due to heat/dry.
<b>WALLS</b> 	<input type="checkbox"/> Install wall insulation. Select insulation with a high R-value. Seal external surfaces with weather protecting sealants and paints to protect against thermal movement as the temperature fluctuates.	<input type="checkbox"/> Install a sprinkler system along the eaves to spray the home with water and keep it cool; this also makes it more resistant to bushfire attack.
<b>ROOF</b> 	<input type="checkbox"/> Install bulk insulation in the ceiling and reflective insulation under the roof. Select insulation with a high R-value.	<input type="checkbox"/> Install a mechanical ventilation heat recovery system in the ceiling space. Ensure high-level flows of cooler air in summer and a complete seal in winter. Install reflective or light coloured roof cladding. Avoid dark colours.
<b>DOORS &amp; WINDOWS</b> 	<input type="checkbox"/> Add external shade to north facing glass with eaves, verandahs and awnings. The width of the projection relates to the height of the glass, and must be calculated before construction. Externally shade all east and west glass in summer with adjustable blinds, screens or planting (depending on bushfire risk).	<input type="checkbox"/> Install timber, UPVC or thermally improved window and door frames. Replace window glazing with low U-value double glazing. Different glazing may be selected for each façade. Seek advice for your situation.
<b>INTERIOR</b> 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">                         Thermal mass is the ability of a material to absorb, store and release heat. Thermal lag is the rate at which a material releases stored heat. For most common building materials, the higher the thermal mass, the longer the thermal lag. Materials with a high thermal mass include stone, concrete, brick.                     </div>	<input type="checkbox"/> Make the home air-tight using a heat exchange ventilation system. Add shaded internal thermal mass to help regulate internal temperature.







This information is general in nature and may not describe your property, please consider if the information is useful and appropriate for your situation. All efforts have been made to ensure this information is correct and up to date.

RECOMMENDED ACTIONS AND UPGRADES

# EXTREME COLD

- ✓ Easy to do yourself
- 🗨️ Likely to require a skilled trade person
- 📅 Will take time and planning
- 💰 Will require mid to high financial investment
- R Actions renters can take

	PREPARATION ✓	MINIMAL ✓ \$
<b>GARDEN</b> 	<input type="checkbox"/> Prune shrubs to allow direct light to windows in winter.	<input type="checkbox"/> Prune trees to allow direct light to windows in winter. Make sure to prioritise your safety and practice caution on ladders. Consider a professional service if concerned.
<b>FLOORS</b> 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p>The R-Value indicates how well an insulation product resists heat flow. The higher the R value, the higher the level of insulation. The appropriate degree of insulation depends on your climate, building construction type, and whether internal heating and/or cooling is used.</p> </div>	<input type="checkbox"/> Inspect your insulation and fill any gaps.
<b>WALLS</b> 		<input type="checkbox"/> Seal unused chimneys where possible. R
<b>ROOF</b> 		<input type="checkbox"/> Inspect your insulation and fill any gaps. Install a draught stopper to seal ceiling exhaust fans.
<b>DOORS &amp; WINDOWS</b> 	<input type="checkbox"/> Close and seal off external doors with door snakes. Close curtains and blinds as soon as the sun goes down. R	<input type="checkbox"/> Install draught seals on external doors and windows.
<b>INTERIOR</b> 	<input type="checkbox"/> Use heaters or reverse cycle air conditioners to keep warm. Turn ceiling fans to winter setting. Zone off a space that can be heated and that you can spend time during the coldest times. Rooms that capture direct sunlight for the longest periods of the day, like north facing rooms and upstairs areas tend to be the warmest rooms in a house. R	<input type="checkbox"/> Install thermally backed curtains/ blinds or honeycomb blinds; use pelmets and seal curtains/blinds down to the floor or to window sill to prevent convection currents of air. Seal all gaps with suitable draught proofing products.

	PREPARATION 🗨️ 📅 💰	MINIMAL 🗨️ 📅 📅 💰 💰
<b>GARDEN</b> 	<input type="checkbox"/> Landscape gardens with deciduous species on north side of house that allow winter sun to windows.	
<b>FLOORS</b> 	<input type="checkbox"/> Install under floor insulation under raised timber floors. Select insulation with a high R-value. Enclose subfloor cavity.	<input type="checkbox"/> Strengthen foundations to avoid movement caused by changes in soil moisture due to wet weather.
<b>WALLS</b> 	<input type="checkbox"/> Install wall insulation. Select insulation with a high R-value. Seal external surfaces with weather protecting sealants and paints to protect against thermal movement as the temperature fluctuates.	
<b>ROOF</b> 	<input type="checkbox"/> Install bulk insulation in the ceiling. Select insulation with a high R-value.	
<b>DOORS &amp; WINDOWS</b> 	<input type="checkbox"/> Control direct sunlight to northerly glass with eaves, verandahs and awnings calculated to let in winter sun. The width of the projection relates to the height of the glass, and must be calculated before construction. Install adjustable blinds, screens or deciduous planting in front of east and west facing glass to let in winter sun.	<input type="checkbox"/> Install timber, UPVC or thermally improved window and door frames. Replace window glazing with low U-value double glazing. Different glazing may be selected for each façade. Seek advice for your situation.
<b>INTERIOR</b> 		<input type="checkbox"/> Make the home air-tight using a heat exchange ventilation system. Add internal thermal mass that is heated by winter sun to help regulate interior temperature.

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# MY HOME ASSESSMENT

Address

Which extreme events may impact your home

FIRE
  STORM
  FLOOD
  EXTREME TEMPERATURES

When was your house built?

What is it built with?

**Walls**  Lightweight  Heavyweight  Metal  Tiles
 **Roof**

House type/s

Is your subfloor cavity open or enclosed?  Open  Enclosed

Is your house insulated?  Roof  Ceiling  Walls  Floors

What type of windows do you have?  Timber  Steel  Aluminium  Other

Are your doors & windows draught sealed?  Yes  No

Are your windows double glazed?  Yes  No

Do you have window coverings?  Blinds  Thermal blinds  Curtains  Curtains with pelmets

Are your windows shaded in summer?  Yes  Mostly  Some  No

Does your garden drain well after rain?  Yes  No

Do you have any of the following?  Rainwater Tank  Pump

Is your emergency plan up to date?  Yes  No **Date you will update:**

# MY HOME ACTION PLAN

Performance issues you have identified at your house

Actions and upgrades you can take on within 12 months

Actions and upgrades you can take on within 10 years

Actions and upgrades you can take on after 10 years

Notes



# Glossary

AEP flood	Annual Exceedance Probability. A term describing how likely a flood is to occur in a given year; 1% AEP flood is a flood with a one in a hundred chance of being exceeded in any year.
Brick piers	Vertical structures built to support floor structures or walls.
Brick veneer	A single layer of brick built on a timber-framed house.
Building envelope	All the building components that separate the indoors from the outdoors.
Cavities	Empty spaces under the house or within the walls.
Cladding	Covering of boards, tiles, tin or other material fixed to the outside of a building.
Door snakes	A long strip placed in the bottom crack of a door or window to exclude draughts.
Draughts	An unwelcome current of air coming into a room.
Eaves	The part of a roof that meets or overhangs the walls of a building.
Ember mesh	Product designed to block entry of burning embers during a bushfire. Mesh should have a maximum hole size of 2mm and be made from corrosion resistant steel, bronze or aluminium.
Fire wise plants	Plants with low flammability.
Flashings	Thin material used for waterproofing.
Glazing	Part of a window or wall, made of glass.
Hollow core doors	Doors made of fibreboard or laminated wood with honeycomb cardboard interior.
Joinery	The wooden components of a building, such as doors and window frames.
Kick plates	A metal plate at the base of a door or panel to protect it from damage or wear.
Non-combustible	Material that does not burn if exposed to fire.
Orientation	The position your house faces, particularly in relation to where the sun moves.
Passive design	House design that considers orientation to sun and natural breezes in order to maintain a comfortable temperature in the home, with minimal heating & cooling.
Pelmets	A narrow piece of wood or fabric placed above a window, to hide the curtain rail & reduce heat loss.
Permeable	Allowing water to pass through.
Pitch	The steepness of a roof.
Pitched roof	A two-sided roof that slopes downwards, at an angle from a central ridge.
Ridge capping	Roofing material used to cover the ridges of a pitched roof, where two roof sides meet.
Roof fasteners	Any type of screw, rivet or device used to secure roofing materials.
Roof valleys	The channel created where two roof planes meet.
Sarking	A pliable membrane which is installed under tiled or metal roofs for insulation and protection from weather.
Services	Electrical, plumbing and mechanical systems such as air conditioners, hot water units and electrical meter boards.
Skillion roof	A roof with a single sloping plane.
Slab	A flat horizontal surface, such as a floor, made of concrete.
Star rating system	Energy efficiency standards for houses.
Stumps	Foundations of a home that elevate the building above the ground.
Subfloor cavity	The area, under the house, between the floor structure and the ground.
Sump and pump	A device that moves water from your basement to the outside of your home.
Surge protection system	An electrical device used to protect equipment against power surges.
Thermal breaks	An insulating material or barrier used to prevent heat transfer.
Thermal mass	The ability of material to absorb, store and release heat.
Thermal performance	The amount of heating or cooling required to make a home a 'comfortable' space to live in.
Ventilation	The provision of fresh air to a room.

# Resources

[Adapt Loddon Mallee](#) Victorian State Government  
[Bushfire Resilience Rating Home Self-assessment](#) Resilient Building Council  
[Climate Change in Australia](#) CSIRO  
[Cooling your Home: Home retrofits, appliances and adaptations for a hotter future](#) Beyond Zero Emissions  
[Flood Resilient Guide to Retrofitting your Home](#) Melbourne Water  
[Heat Wave Help](#) Central Victorian Greenhouse Alliance  
[Landscaping for Bushfire: Garden Design and Plant Selection](#) CFA  
[Plan and Prepare](#) CFA  
[Plan for Emergencies at Home](#) SES  
[Preparing for Emergencies](#) Australian Red Cross  
[Renew magazine](#)  
[Smart Gardens for a Dry Climate](#) Coliban Water and City of Greater Bendigo  
[State of the Climate](#) CSIRO  
[Your Home](#) Adapting to Climate Change ACT Government

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# Home upgrades for climate resilience

Making your home ready for extreme weather events

