

Material resilience

The Where We Build, What We Build Project

As natural hazards intensify, living expenses like energy, mortgages and insurance will get more expensive for climate vulnerable homes – that is, homes that are in high-risk areas and have not been built to mitigate those risks. This project aims to encourage building or retrofitting of homes that are climate-ready, by demonstrating that the benefits of doing so outweigh the costs.

The Where We Build, What We Build project was undertaken in the Adelaide Hills and Fleurieu Peninsula region. One of the goals of the region is to remain liveable, affordable and resilient in the changing climate, by better managing climate risks.

To help achieve this, the project explored:

1. Where We Build – the exposure of the region's existing housing to flood, heat and bushfire risks
2. What We Build – the sensitivity of the region's existing housing to those risks
3. Climate-Ready Home – the ideal specification for a climate-ready home in the region
4. Economic Analysis – the costs and benefits of building or retrofitting to climate-ready specifications, compared with existing housing stock and standards.

The project is an initiative of Resilient Hills & Coasts, delivered by Edge Environment. It was jointly funded by the Commonwealth and South Australian Governments under the South Australian Disaster Resilience Grant Program, and the Insurance Council of Australia. The scope covers Adelaide Hills Council, Alexandrina Council, Mount Barker District Council, City of Victor Harbor and District Council of Yankalilla.

Substantial research on flood, bushfire and heat resilient building materials exists, but an accepted set of standards has not been fully developed and integrated into planning and building codes. Baseline building compliance is inadequate to ensure a home is climate resilient.

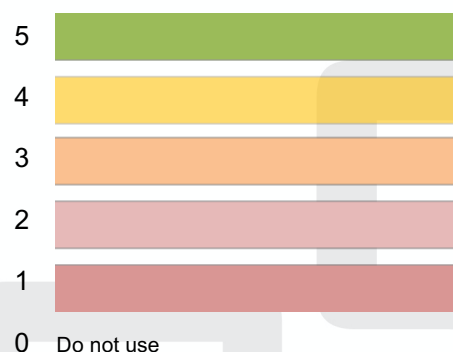
Material selection

Building materials have different resilience performance in response to climate hazards. This factsheet provides information on the resilience rating and costs of different materials in response to flood, bushfire and extreme heat.*

Resilience ratings range from 1 to 5, with 1 being the least resilient to natural hazards and 5 being the most resilient to natural hazards. The Resilience Ratings Key below shows the colour applied to each rating.

From an insurance perspective, the cost of replacement is a factor in the resilience rating, which is why materials are presented based on their replacement value.

Resilience ratings key



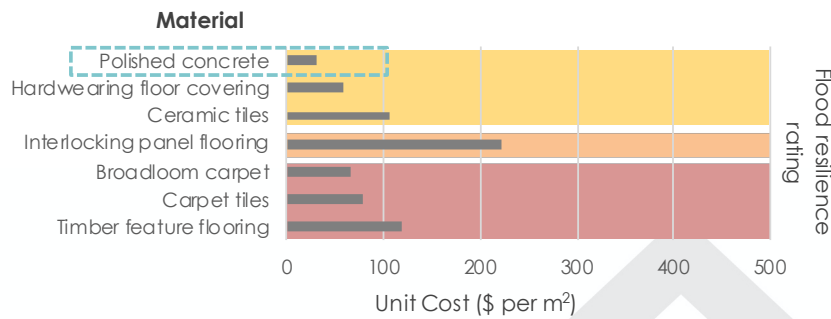
*The climate-ready home has been designed to have improved resilience to bushfire, flood and extreme heat. The specification considers riverine flood prone areas, bushfire prone areas (Bushfire Attack Level 40) and extreme heat within the climate zone 6 according to the Australian Building Code Board.

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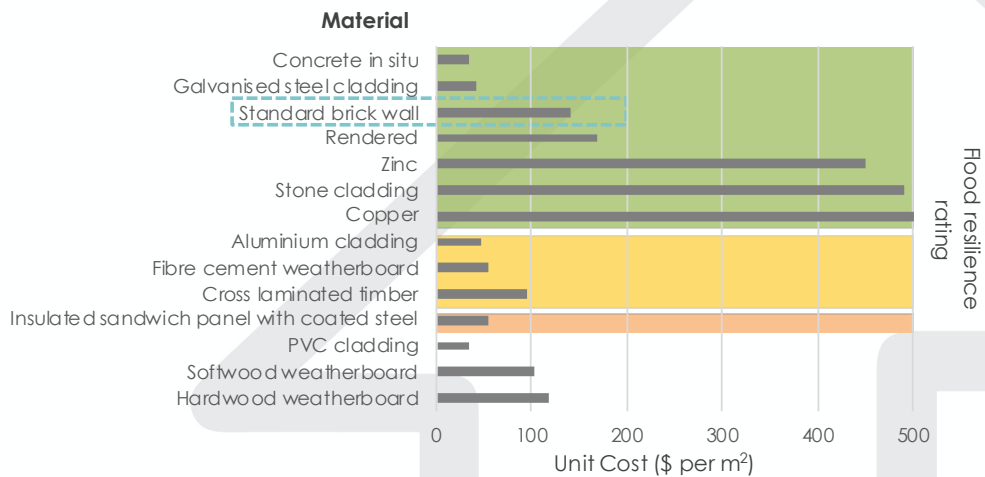
Flood resilience ratings and cost

The following scales indicate the resilience ratings for different types of building materials to flood. Other considerations that affect the resilience of a material in a flood event include: building height, ground floor level, structural soundness, continued function of components and sitting of the house. Materials marked with a blue dashed box were used to develop the specification for the climate ready home. To learn more about them refer to the Project Report.

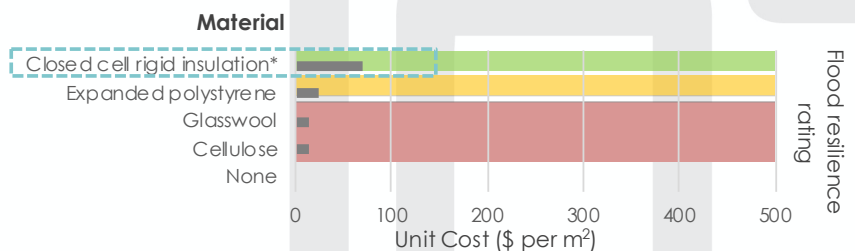
Floor finishes



External wall cladding

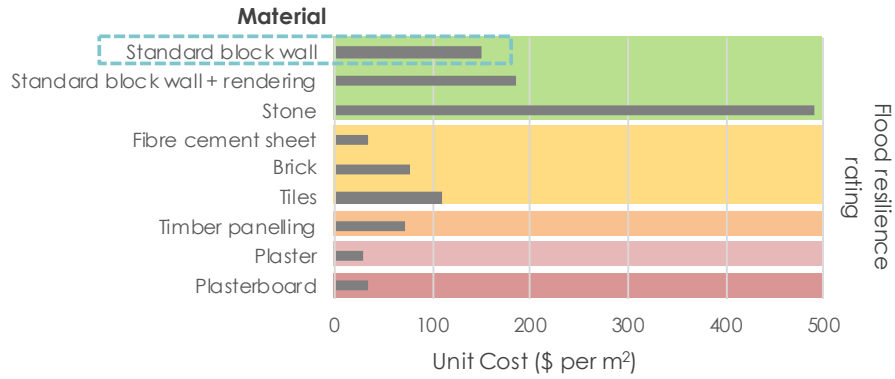


Wall insulation

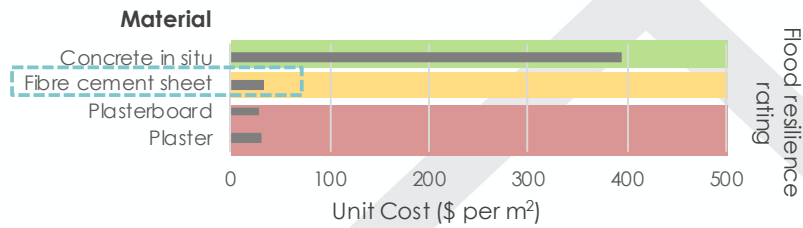


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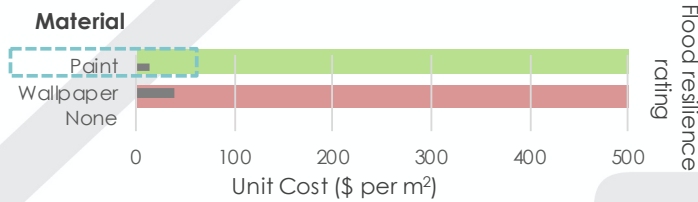
Internal wall linings



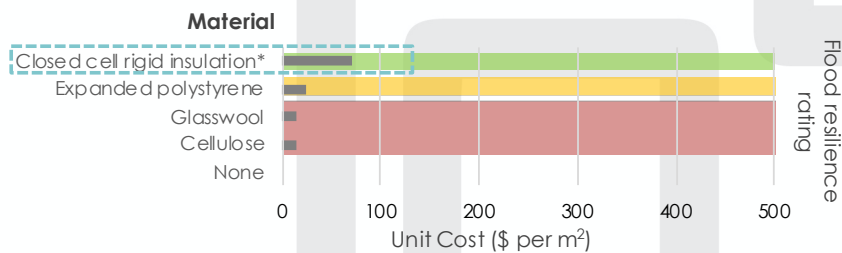
Ceiling lining (This element and materials have been included for retrofit scenarios and are applicable only where flooding may reach this level.)



Internal wall coverings



Roof insulation (This element and materials have been included for retrofit scenarios and are applicable only where flooding may reach this level.)

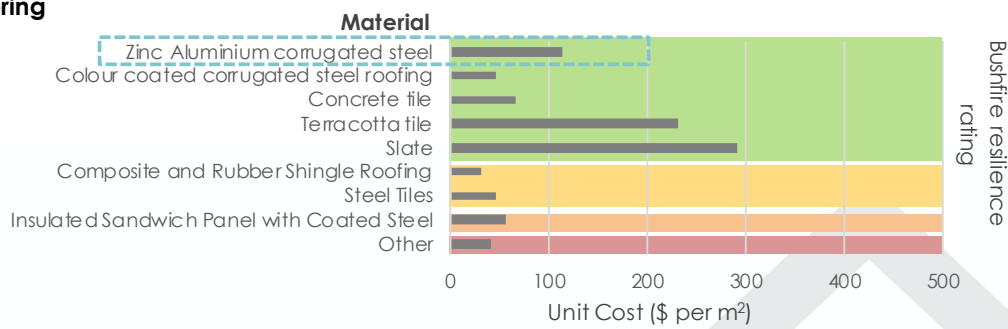


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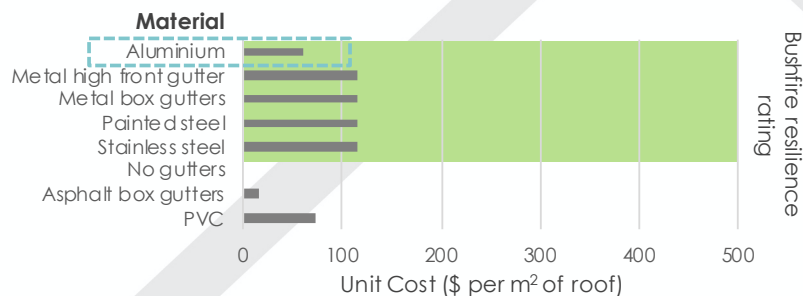
Bushfire resilience ratings and cost

The following scales indicate the resilience ratings for different types of building materials to bushfire. In a bushfire scenario, no ember is considered to enter beyond external materials, therefore bushfire resilience ratings have only been given to materials on the building envelope. Other considerations that affect the resilience of a house in a bushfire event include: external rafters and beams or soffits openings, size of external vents, weep holes and gaps, roof assembly, Bushfire Attack Level (BAL) that the house is exposed to and proximity to vegetation. Materials marked with a blue dashed box were used to develop the specification for the climate ready home. To learn more about them refer to the Project Report.

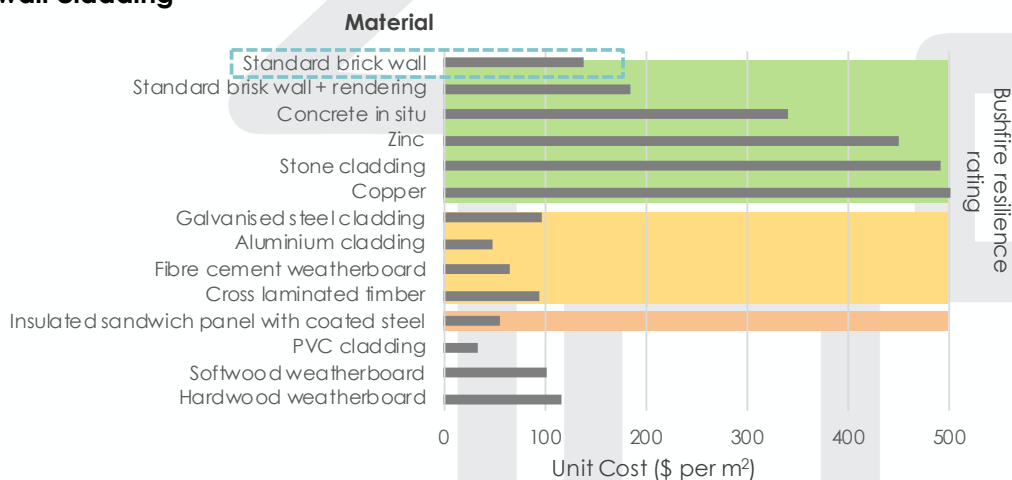
Roof covering



Guttering*



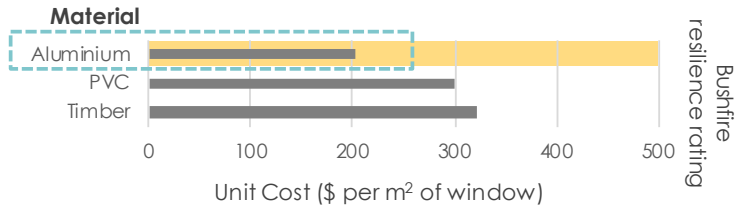
External wall cladding



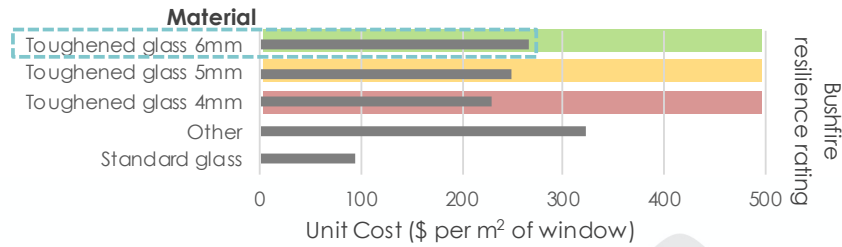
*For guttering, windows and external doors, the inclusion of non-combustible mesh with a maximum aperture of 1.8mm is necessary in addition to the materials listed to provide bushfire resilience. Bushfire Attack Level (BAL) resistance of the materials used should also be considered. Bushfire shutters are strongly encouraged in place of mesh where or when applicable.

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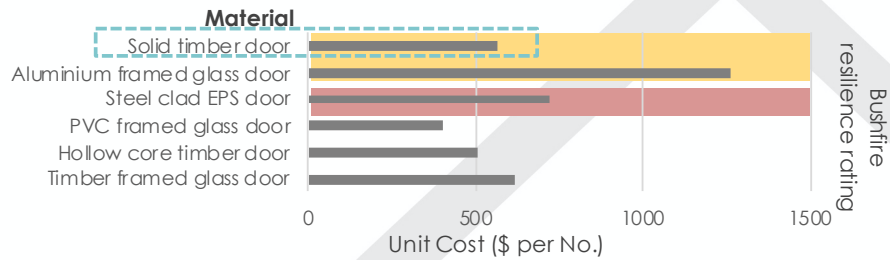
Window frame*



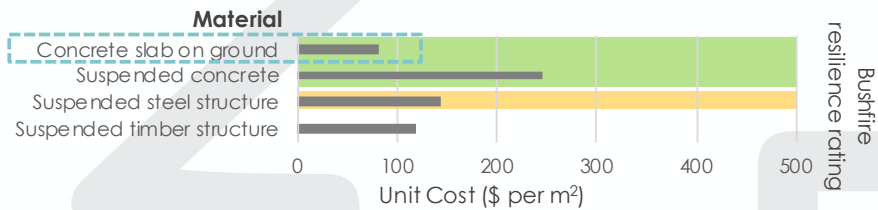
Window glazing



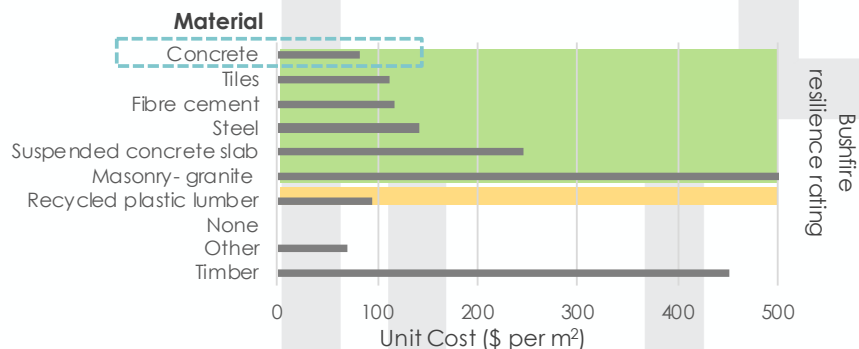
External door*



Ground floor structure



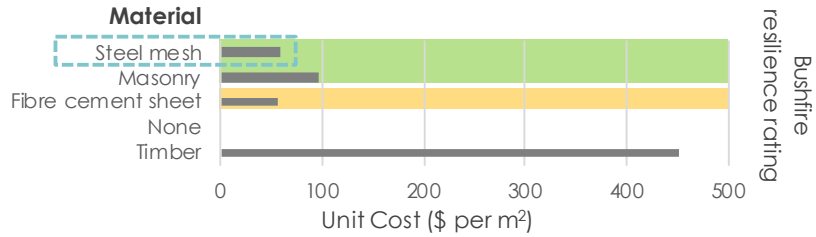
Decks, patios and verandahs



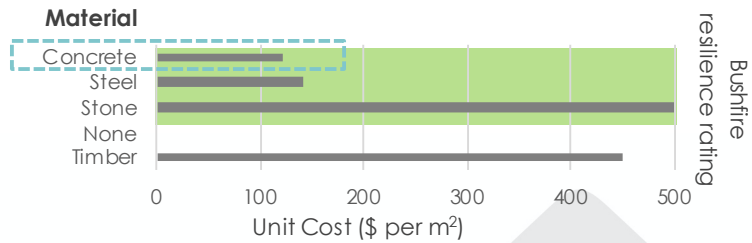
*For windows, the inclusion of non-combustible mesh with a maximum aperture of 1.8mm is necessary in addition to the materials listed to provide bushfire resilience. Bushfire shutters are strongly encouraged in place of mesh where or when applicable.

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Ground floor enclosure



External stairs

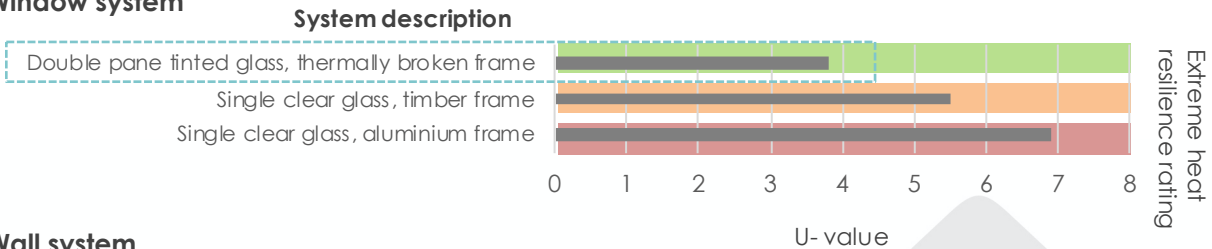


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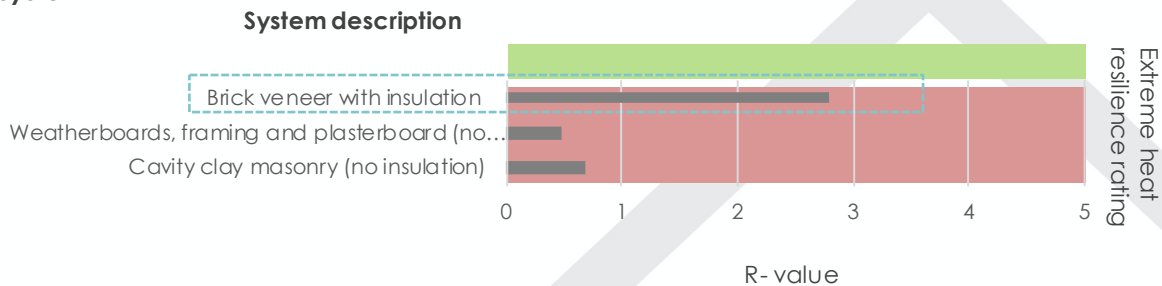
Extreme heat resilience ratings

The following scales indicate the resilience ratings for different types of building materials to extreme heat. The two principal characteristics that define a material's thermal performance and which are referred to below, are the U-value which measures the rate of heat transfer (conducted heat) and the R-value which is the measurement of a material's capacity to resist heat flow. Materials marked with a blue dashed box were used to develop the specification for the climate ready home. To learn more about them refer to the Project Report.

Window system



Wall system



Roof system

