# Integrated Solutions for Bushfire Adaptive Homes: Systematic Literature Review

## Acknowledgement of Country

We acknowledge the people of the Woi wurrung and Boon wurrung language groups of the eastern Kulin Nation on whose unceded lands we conduct the business of the University.

We respectfully acknowledge their Ancestors and Elders, past and present.

We also acknowledges the Traditional Custodians and their Ancestors of the lands and waters across Australia where we conduct our business.

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# Projects Objectives and Aims

**Objective 1:** Capture a range of actions and behaviours that contribute to improving the survival of a home.

*RQ1: According to the literature, what are the key factors in survivability or failure of new or existing homes to bushfires?*

**Objective 2:** Map the state of the current scholarship on the use of integrated and adaptive solutions for 'homes' survivability to bushfire.

*RQ2: How does the literature discuss integrated adaptive solutions for preparedness and survivability of homes to bushfire risks that considers co-benefit solutions?*

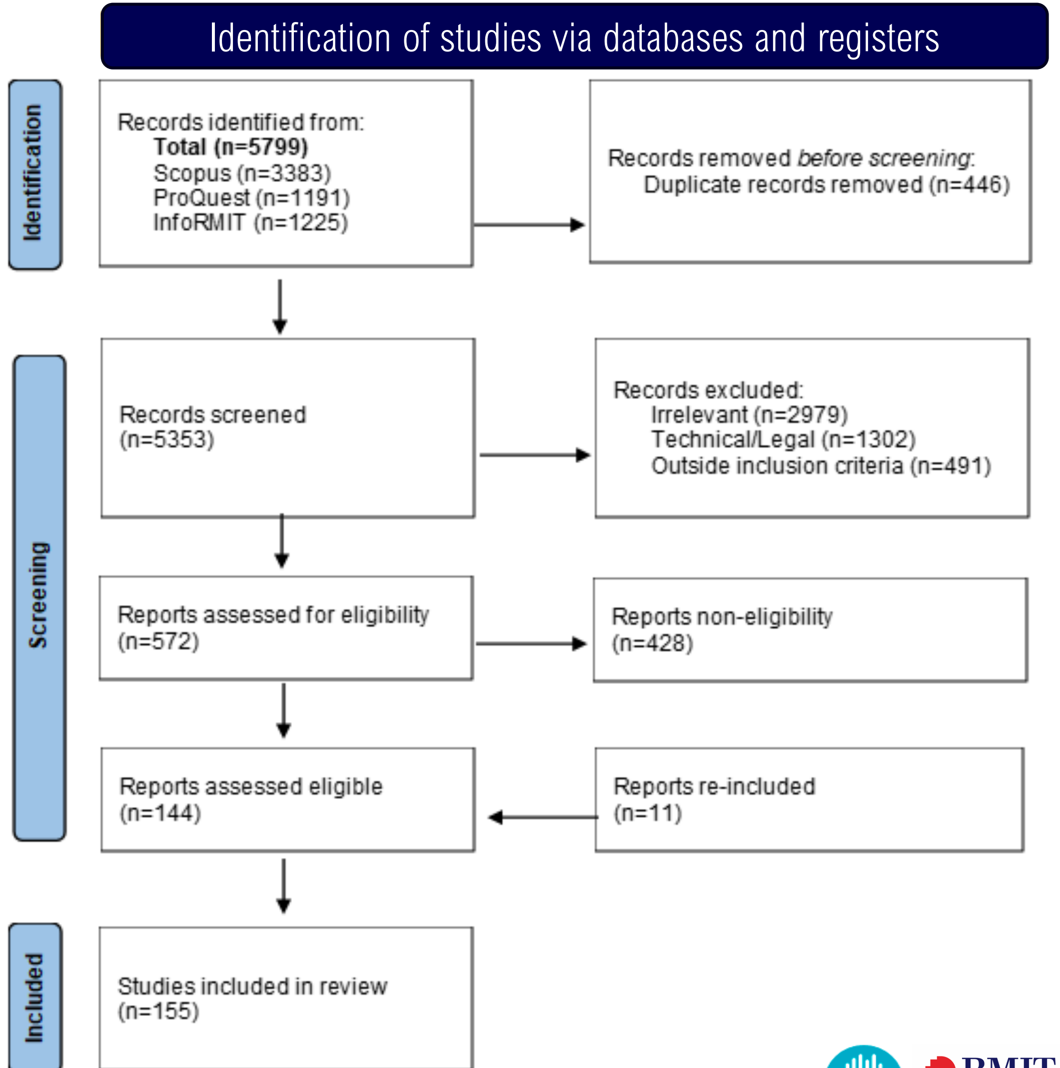
# Systematic Literature Review Search Terms

***Table 1. Clusters of Keywords and their associated meanings.***

| Cluster of terms | Focus | Seach terms |
|---|---|---|
| **Cluster 1: 'Homes'** | Capturing the physical structure of the house and social connections | "hous*" OR "dwell*" OR "buil*" |
| **Cluster 2: Fire Risks and Preparedness** | Capturing risk and vulnerability to fire as well as defensive and adaptive actions | "fire risk" OR "fire prepar*" OR "fire defen*" OR "fire adapt*" OR "fire resilien*" OR "fire-prone areas" |
| **Cluster 3: 'Integrated Solutions'** | Capturing relevant areas of interest, including urban planning, design, construction, zoning | "plan*" OR "design*" OR "expos*" OR "construction" OR "archi*" OR "zon*" OR "integrat*" |

'*' Wildcards were used to capture a range of terms relevant to the cluster

# Systematic Literature Review



# Findings: Five Pillars of Home Survival

| ***Building Location & Design*** | ***Planning, Building Policy, & Advocacy*** | ***Education, Knowledge & Local Actions*** | ***Social Networks & Shared Responsibility*** | ***Economic Constraints*** |
|---|---|---|---|---|
| Identified in 47% of Articles<br><br>Consideration of fire risk during the design phase improves home survival by minimising potential for direct flame exposure; while appropriate material choice improves fire resistance. | Identified in 42% of Articles<br><br>Building codes and planning policies are associated with improved building survival due to enforcing adoption of fire-resistant design and materials choices, dwelling placement and housing density. | Identified in 30-42%* of Articles<br><br>Knowledge of fire risk and localised action play a role in minimizing **residual risks** associated with both household maintenance (i.e., vegetation management) and settlement maintenance (i.e., fuel loads in adjacent land). | Identified in 32% of Articles<br><br>Responsibility of households, land managers and fire agencies – whether felt, assumed or mandated – reinforces the regular maintenance and local perception of fire risk. | Identified in 19% of Articles<br><br>Economic constraints and financial capital play a role as enabler for action. Yet, cost remains a considerable deterrent of fire risk mitigation, regardless of financial capital. |

*- Difference due to differences between individual resident and community level actions

# Findings: From Home Survival to Bushfire Adaptive Homes

**Home survival**

| Building Location & Design | Planning, Building Policy, & Advocacy | Education, Knowledge & Local Actions | Social Networks & Shared Responsibility | Economic Constraints |
|---|---|---|---|---|
| Consideration of fire risk during the design phase improves home survival by minimising potential for direct flame exposure; while appropriate material choice improves fire resistance. | Building codes and planning policies are associated with improved building survival due to enforcing adoption of fire-resistant design and materials choices, dwelling placement and housing density. | Knowledge of fire risk and localised action play a role in minimizing residual risks associated with both household maintenance (i.e., vegetation management) and settlement maintenance (i.e., fuel loads in adjacent land). | Responsibility of households, land managers and fire agencies – whether felt, assumed or mandated – reinforces the regular maintenance and local perception of fire risk. | Economic constraints and financial capital play a role as enabler for action. Yet, cost remains a  considerable deterrent of fire risk mitigation, regardless of financial capital. |

**Bushfire adaptive home**

| Built/Technical Capital | Political Capital | Human Capital | Social Capital | Financial Capital |
|---|---|---|---|---|
| **Built/Technical Capital:** The 'know-how' and practices to undertake adaptive solutions to fire risk. | **Political Capital:** The political will to support adaptive solutions to fire risk. | **Human Capital:** The knowledge needed to take action. | **Social Capital:** The connectivity and social networking key to adaptive capacities. | **Financial Capital:** The financial capacity and instruments to cultivate proactivity. |

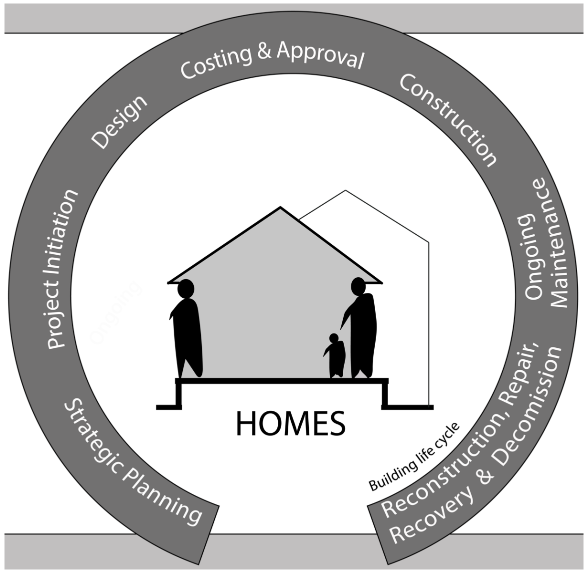
**Natural Capital:** The connection to and understand of natural system and their role in fire risk and home susceptibility.

**Cultural Capital:** The cultural connection to and understand of fire risk and home susceptibility.

# Framework for Bushfire Adaptive Home

HOMES

# Framework for Bushfire Adaptive Home



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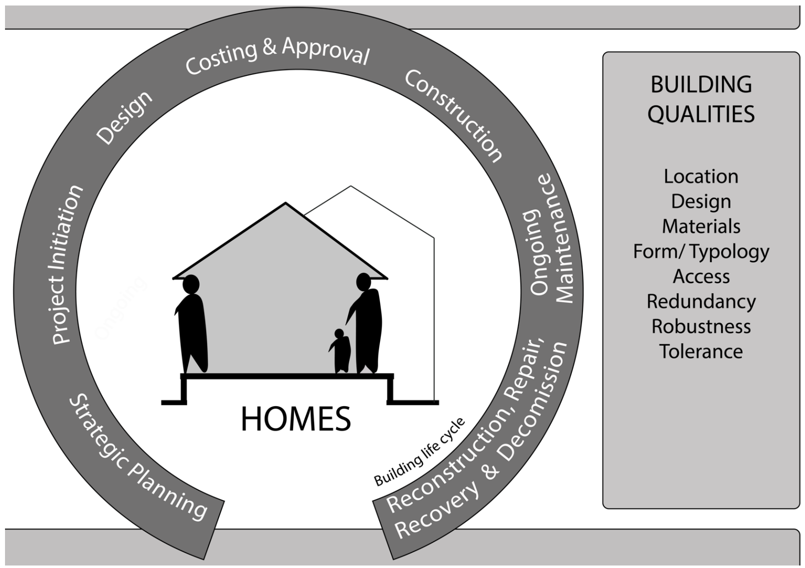

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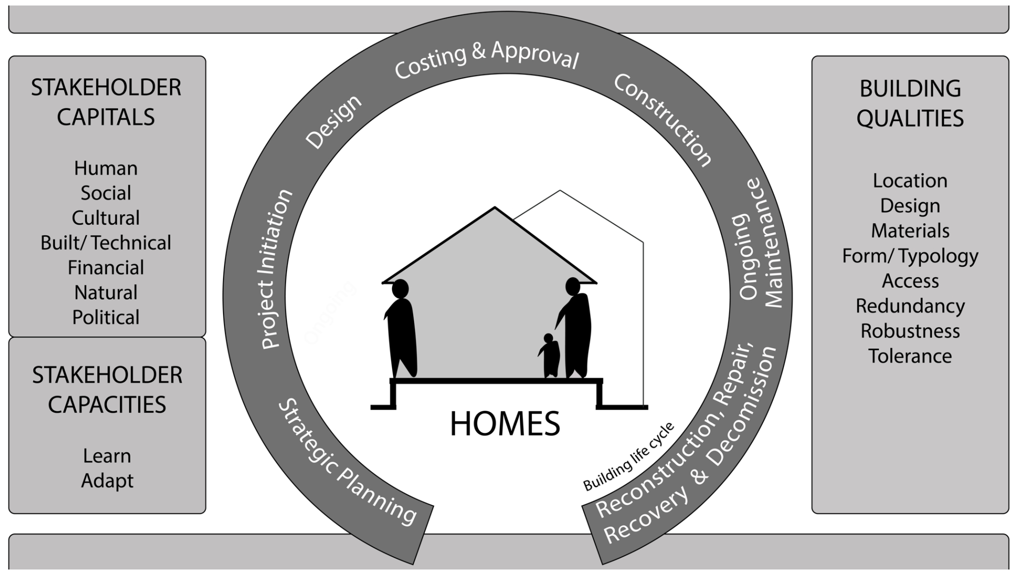

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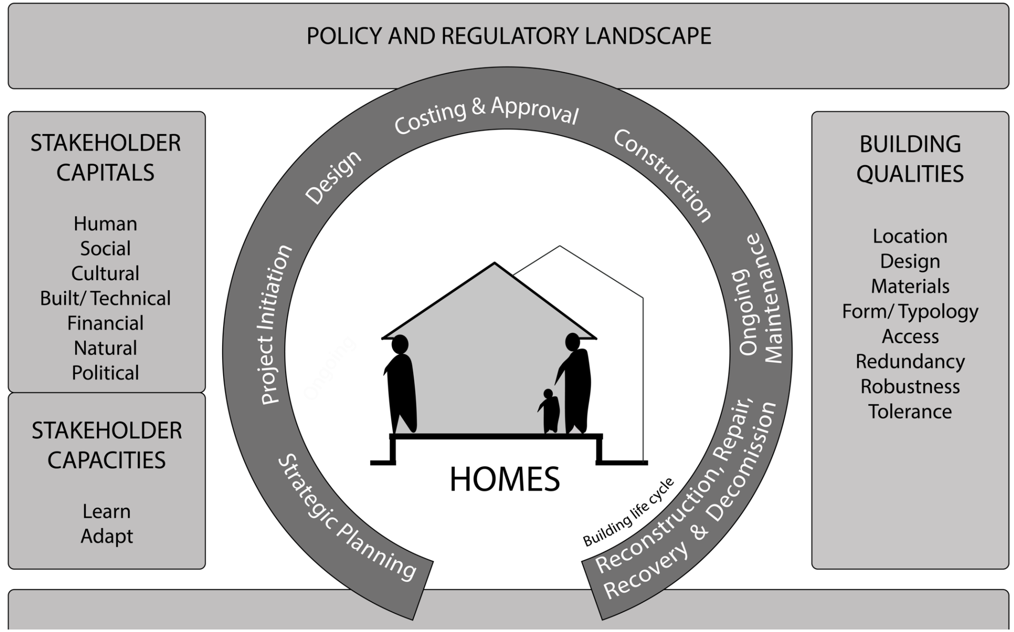

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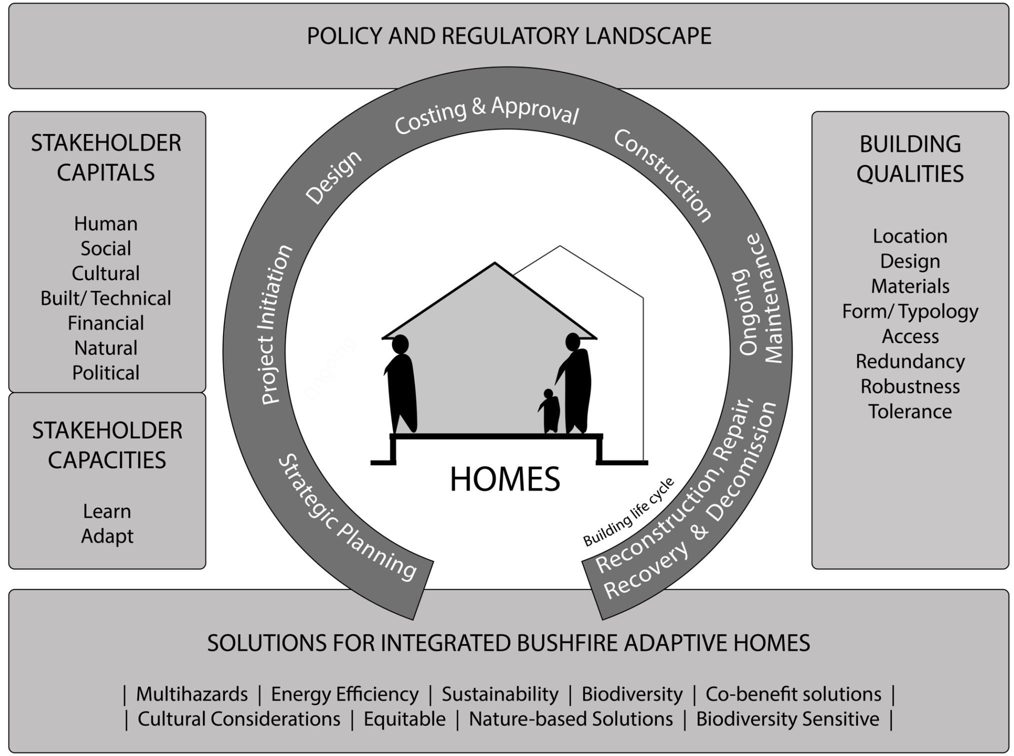

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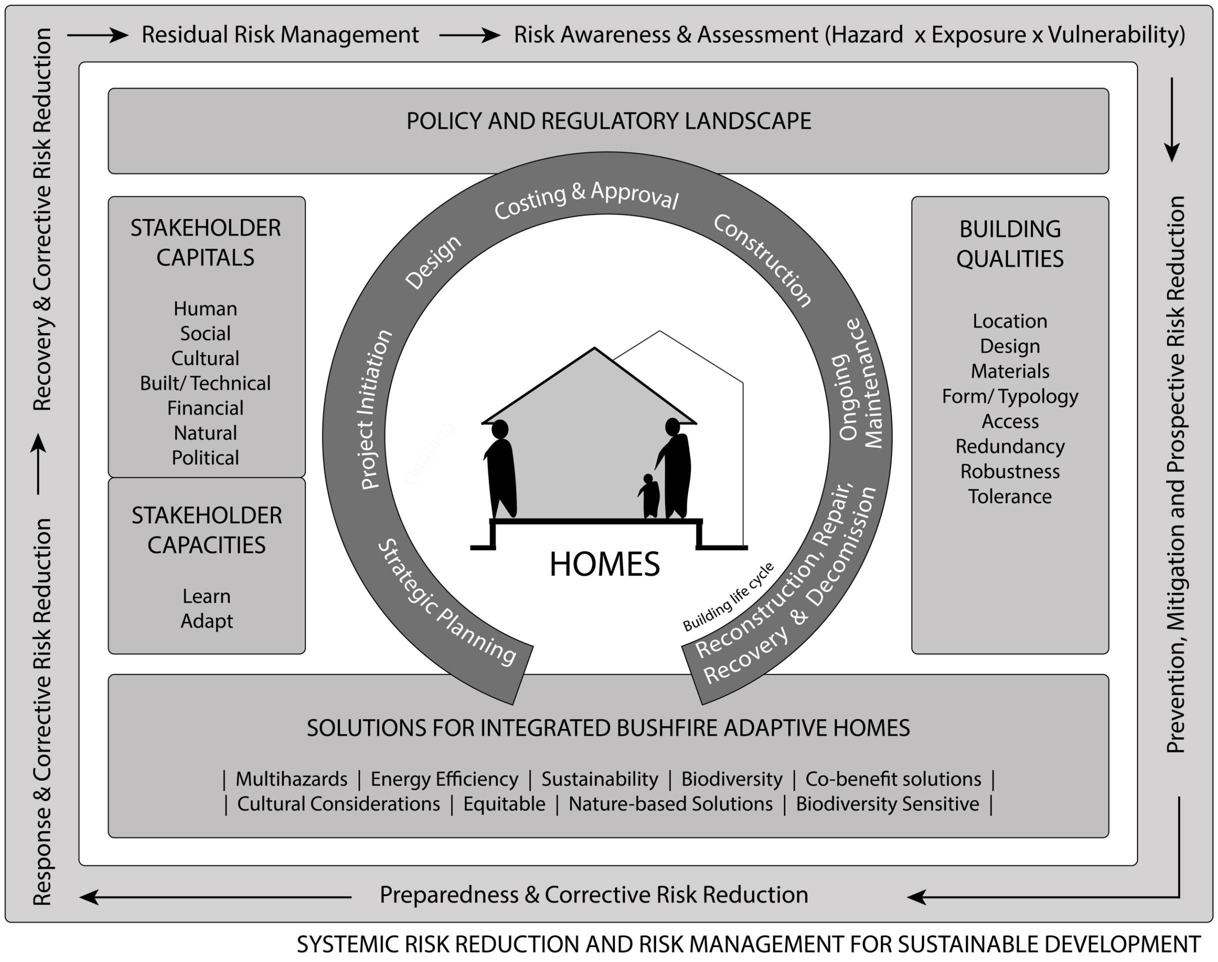

# Directions for Further Investigation

## *Culture and Disaster Response*

- Emerging thread connecting cultural values to disaster response and preparedness (see Carr 2020; Howe *et al.,* 2024).
    - The international samples present in this review warrants a comparative analysis that examines cultural distinctions that may profoundly shape responses to fire risk and the uptake of adaptive measures.
    - Such studies would provide entry points to critically examine how practice trends elsewhere, particularly as nation cultural identities bleed into organisational cultures and risk behaviours.

## *Role of Practitioners*

- Practitioners from housing sector and connected industries of insurance and financial services can play a crucial part in bridging policy, practice, and lived experience.
    - Yet, the analysis of their risk perception and ability is under-researched. Examining the implicit (or lack thereof) transfer of risk from practitioners to residents or between professionals proves vital for understanding key dimensions of human and social capitals as pathways for adaptive and proactive fire risk mitigation.

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# Thank you

Please feel free to email us any time if you would like to discuss anything

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