# Protocols for Mitigating Cladding Risk Implementation

## G.03 – Cladding Remediation Standards

Version 2
Date: 13 March 2024

## Aboriginal acknowledgement

Cladding Safety Victoria respectfully acknowledges the Traditional Owners and custodians of the land and water upon which we rely. We pay our respects to their Elders past, present and emerging. We recognise and value the ongoing contribution of Aboriginal people and communities to Victorian life. We embrace the spirit of reconciliation, working towards equality of outcomes and an equal voice.

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## Application of Minister's Guideline 15

These documents contain information, advice and support issued by CSV pursuant to Minister's Guideline 15 - Remediation Work Proposals for Mitigating Cladding Risk for Buildings Containing Combustible External Cladding. Municipal building surveyors and private building surveyors must have regard to the information, advice and support contained in these documents when fulfilling their functions under the Act and the Regulations in connection with Combustible External Cladding on buildings:

a) which are classified as Class 2 or Class 3 by the National Construction Code or contain any component which is classified as Class 2 or Class 3;

b) for which the work for the construction of the building was completed or an occupancy permit or certificate of final inspection was issued before 1 February 2021; and

c) which have Combustible External Cladding.

For the purposes of MG-15, Combustible External Cladding means:

a) aluminium composite panels (ACP) with a polymer core which is installed as external cladding, lining or attachments as part of an external wall system; and

b) expanded polystyrene (EPS) products used in an external insulation and finish (rendered) wall system.

## Disclaimer

These documents have been prepared by experts across fire engineering, fire safety, building surveying and architectural fields. These documents demonstrate CSV's methodology for developing Remediation Work Proposals which are intended to address risks associated with Combustible External Cladding on Class 2 and Class 3 buildings in Victoria. These technical documents are complex and should only be applied by persons who understand how the entire series might apply to any particular building. Apartment owners may wish to contact CSV or their Municipal Building Surveyor to discuss how these principles have been or will be applied to their building.

CSV reserves the right to modify the content of these documents as may be reasonably necessary. Please ensure that you are using the most up to date version of these documents.

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## Document Notes

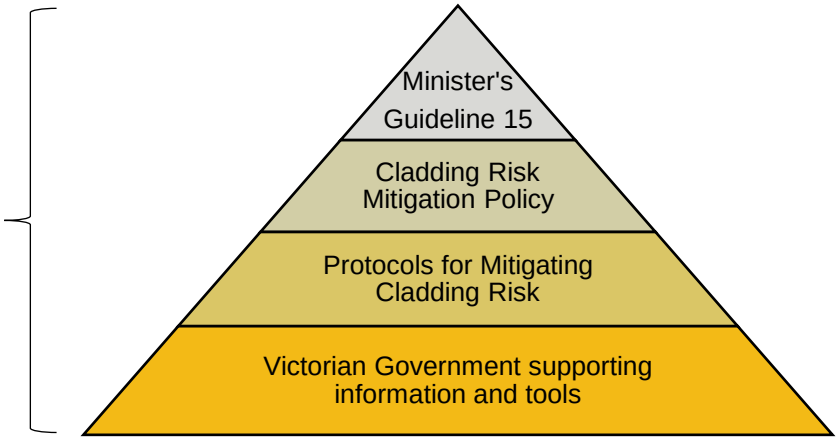
The Protocols for Mitigating Cladding Risk (**PMCR**) is an approach developed by Cladding Safety Victoria (**CSV**) on behalf of the Victorian Government to consistently and systematically address the risk posed by the presence of combustible cladding on Class 2 and Class 3 buildings.

For many buildings, combustible cladding on the facade:

- does not present a high enough level of risk to warrant substantial or complete removal of the cladding; but
- presents enough risk to warrant a tailored package of risk mitigation interventions to be introduced that provide a proportionate response to the risk.

The Framework in which CSV operates is outlined below. This represents the overarching structure for managing the combustible cladding risk in Victoria.

**Framework**




A set of documents has been assembled to describe the purpose, establishment, method, findings and application of the PMCR. The full set of PMCR documents and their relationship to each other is illustrated in a diagram in *Appendix A: PMCR document set and flow.*

There are **seven** related streams of technical documents in the PMCR document set:

| | |
|---|---|
| A. Authorisation | Codifies the Victorian Government decisions that enable PMCR activation. |
| B. CRPM Methodology | Specifies the Cladding Risk Prioritisation Model (CRPM) method used for assessing cladding risk and assigning buildings to three risk levels. |
| C. PMCR Foundation | Defines the PMCR method, objectives and the key design tasks. |
| D. Support Packages | Captures the relevant risk knowledge and science-based findings necessary to systemise and calibrate PMCR application. |
| E. CSV Cladding Risk Policy | Establishes key CSV policy positions in relation to cladding risk. |
| F. PMCR Interventions | Identifies and describes the interventions that the PMCR method can employ to mitigate risk associated with combustible cladding. |
| G. Implementation | Specifies the standards and procedures that guide PMCR application. |

This document is one of the implementation guidelines that describe how and when targeted risk mitigation interventions are applied to reduce cladding risk and make building occupants safer.

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## Abbreviations

| Term | Meaning |
|---|---|
| ACP-PE | Aluminium Composite Panel with a polyethylene core |
| BCA | Building Code of Australia |
| BOWS | Building Occupant Warning System |
| Cladding Cluster | An area of combustible cladding on the façade of a building |
| CFSR | Cladding Fire Spread Risk – a count of the number of SOUs connected by cladding within a Cladding Cluster |
| CRMF | Cladding Risk Mitigation Framework |
| CSV | Cladding Safety Victoria |
| EPS | Expanded Polystyrene |
| FDAS | Fire Detection and Alarm System |
| FDCIE | Fire Detection Control and Indicating Equipment |
| Framework | Cladding Risk Mitigation Framework (CRMF) |
| IF-SCAN | Initial Fire Spread in Cladding Assessment Number |
| MBS | Municipal Building Surveyor |
| MG-15 | Minister's Guideline 15 |
| NCC | National Construction Code |
| PMCR | Protocols for Mitigating Cladding Risk |
| RIS | The greatest number of storeys calculated in accordance with NCC, Volume 1, C1.2 |
| RWP | Remediation Work Proposal |
| SOU | Sole Occupancy Unit as defined in the National Construction Code |

# 1 The function and purpose of the PMCR Standards

The Victorian Government has developed a **standardised** approach for mitigating the risk to life safety posed by the use of Combustible External Cladding[1] on Victorian Class 2 and Class 3 buildings.

Cladding Remediation Standards (the **Standards**) have been developed through Cladding Safety Victoria under a project to design Protocols for Mitigating Cladding Risk (**PMCR**).

| | |
|---|---|
| The **function** of the PMCR | is to provide evidence-based risk mitigation standards and procedures for designing and delivering tailored cladding remediation works for buildings of different risk levels. |
| The **objective** of the PMCR | is to ensure that the risk mitigation solutions applied utilise fire safety measures that are proven and available, and that the level of intervention is proportionate to the risk presented by cladding on each building. |

These Standards are released for the purposes of applying *Minister's Guideline 15* and the *Cladding Risk Mitigation Framework*, published by the Victorian Government in September 2023.

## 1.1 What is a Standard?

A standard is a document that states procedures or criteria for carrying out an activity. A standard will define a set of rules that when applied, will produce a consistent outcome. The application of a standard will not require scientifically based calculation or judgement.

## 1.2 Cladding risk and the implications for the design of Standards

Under the provisions of the *Cladding Risk Mitigation Framework*, intervening to mitigate cladding risk must bring each building to a state of Acceptable Cladding Risk: meaning that the Relevant Building:

- **achieves a 'Low Cladding Risk' rating; or**
- **presents an overall level of risk to the life and safety of the occupants of the Relevant Building which is reasonably similar or less than the risk which would be presented by the same building, if that building had no Combustible External Cladding.**

This involves assessing and responding to cladding risk on two levels:

1. Building Level

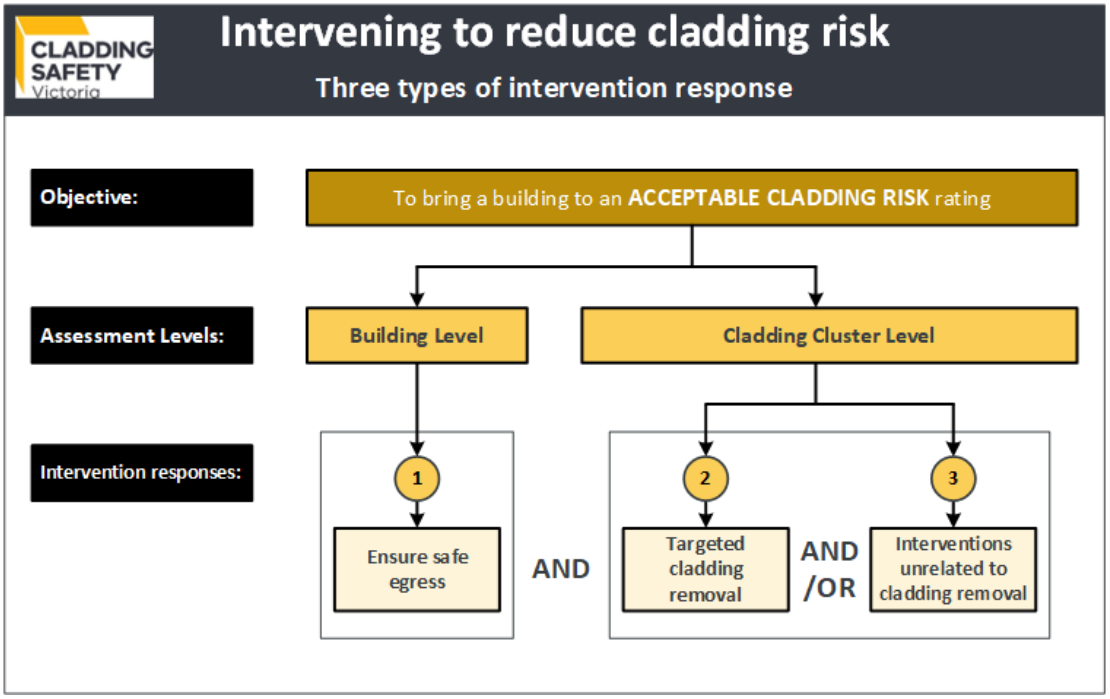
   This level of assessment is focussed on evaluating the safety of egress options for building occupants. It involves consideration of all available paths of egress from a building as a single assessment exercise. That is, there may be no need for intervention in relation to one egress path where other 'cladding safe' egress paths are available for each occupant.

2. Cladding Cluster Level

   A building may have one or more areas on the facade with Combustible External Cladding. Each of these areas is referred to as a separate cladding cluster. Each cladding cluster must be assessed independently of all other cladding clusters on the building. The optimal way to apply interventions may vary from cluster to cluster.

[1] This is a defined term under Minister's Guideline 15 and means:
a) aluminium composite panels (ACP) with a polymer core which is installed as external cladding, lining or attachments as part of an external wall system; and
b) expanded polystyrene (EPS) products used in an external insulation and finish (rendered) wall system.

The method for bringing a Class 2 or Class 3 building with External Combustible Cladding to a state of Acceptable Cladding Risk requires three types of intervention response to be considered. These types of intervention responses are represented diagrammatically below.




The Standards have been designed to provide standardised pathways via which a building can achieve an Acceptable Cladding Risk.

The Standard is based on a significant body of research and analysis, including application of fire engineering principles and scientific consideration of the application of strategies to mitigate risk of fire spread across combustible cladding. Further assessment of the efficacy or effectiveness of the interventions identified in the Standard is not required in the application of this Standard.

## 1.3 The structure of the PMCR Standards

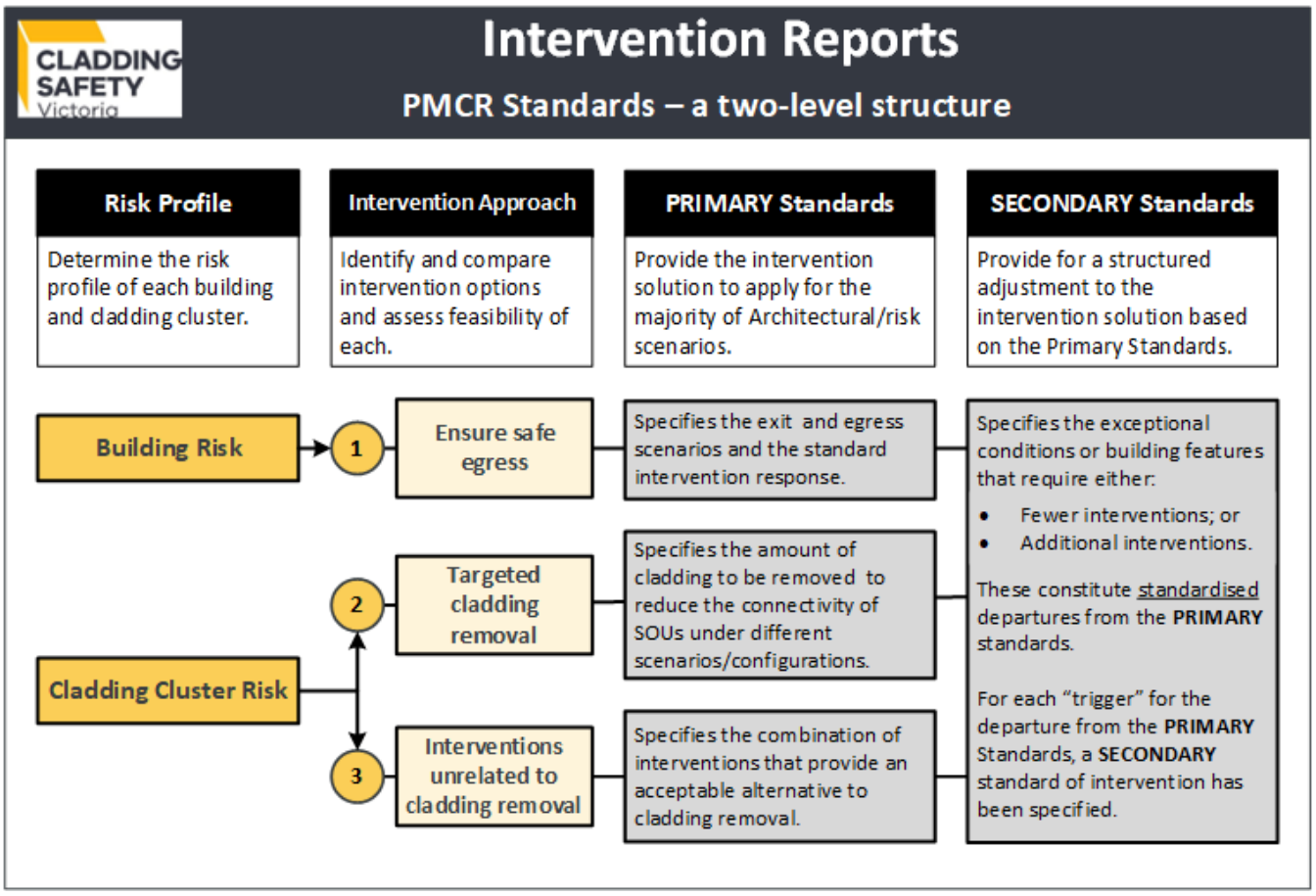
The Standards provide a structured way to:

1. Identify the risk profile of each building (and the risk profile of each cladding cluster); and
2. Specify a 'standard' set of interventions that can be applied to bring each cluster and the building to an Acceptable Cladding Risk.

The PMCR Standards comprise two hierarchical levels of standards. This structure is predicated on a risk perspective that:

- A risk profile can be defined for each building and cladding cluster based on a core set of architectural and risk attributes (focussed on exposure to ignition hazards);
- All buildings and cladding clusters that have the same risk profile can generally be brought to an Acceptable Cladding Risk by applying a common set of interventions (**Primary Standards**); and
- Some buildings and cladding clusters will have unique architectural and risk features that warrant a departure from the Primary Standards, and structured means of departure can be formulated (**Secondary Standards**).

This two-level approach to the design of PMCR Standards is illustrated below.




The Standards provides a set of instructions for the application of intervention options to defined building configurations and cladding clusters, and are supported by a set of standard operating procedures (*G.01 Standard Operating Procedures*) to guide implementation.

# 2 Introduction

Buildings which have combustible cladding on the facade may require an *intervention* to enhance life safety and reduce cladding fire risk to an acceptable level.

The level of risk created by the presence of combustible cladding varies substantially for each building. Accordingly, a decision to intervene and the extent of the *intervention* required must also vary.

The Victorian Government has authorised the use of 15 interventions to mitigate cladding risk. The authority for their use is contained in *Minister's Guideline 15 (**MG-15**)* and is supported by the *Cladding Risk Mitigation Framework (**Framework**)*.

The Guideline and Framework are intended to:

- Support Municipal Building Surveyors (**MBS**) in rating the cladding risk of a building and determining what level of intervention is required to ensure that the building has achieved an Acceptable Cladding Risk); and
- Inform owners about how their building's combustible cladding risk is assessed, the structured way in which Remediation Work Proposals **(RWP)** are developed, and what interventions can be applied to bring cladding risk to an acceptable level.

Cladding Safety Victoria (**CSV**) is assisting MBSs and owners by providing information about the cladding risk associated with each building and the steps necessary to remedy that risk. This information is provided in the form of an RWP that applies the cladding risk mitigation methodologies developed by CSV.

Threat barrier analysis can be used to represent how risk-mitigating actions can function to respond to a problem. The CSV method employs this analysis technique to identify the central problem (the 'top event'), in this case a cladding fire, and depict how risk associated with the problem can be mitigated through the implementations of barriers (interventions) designed to control the key hazards identified.

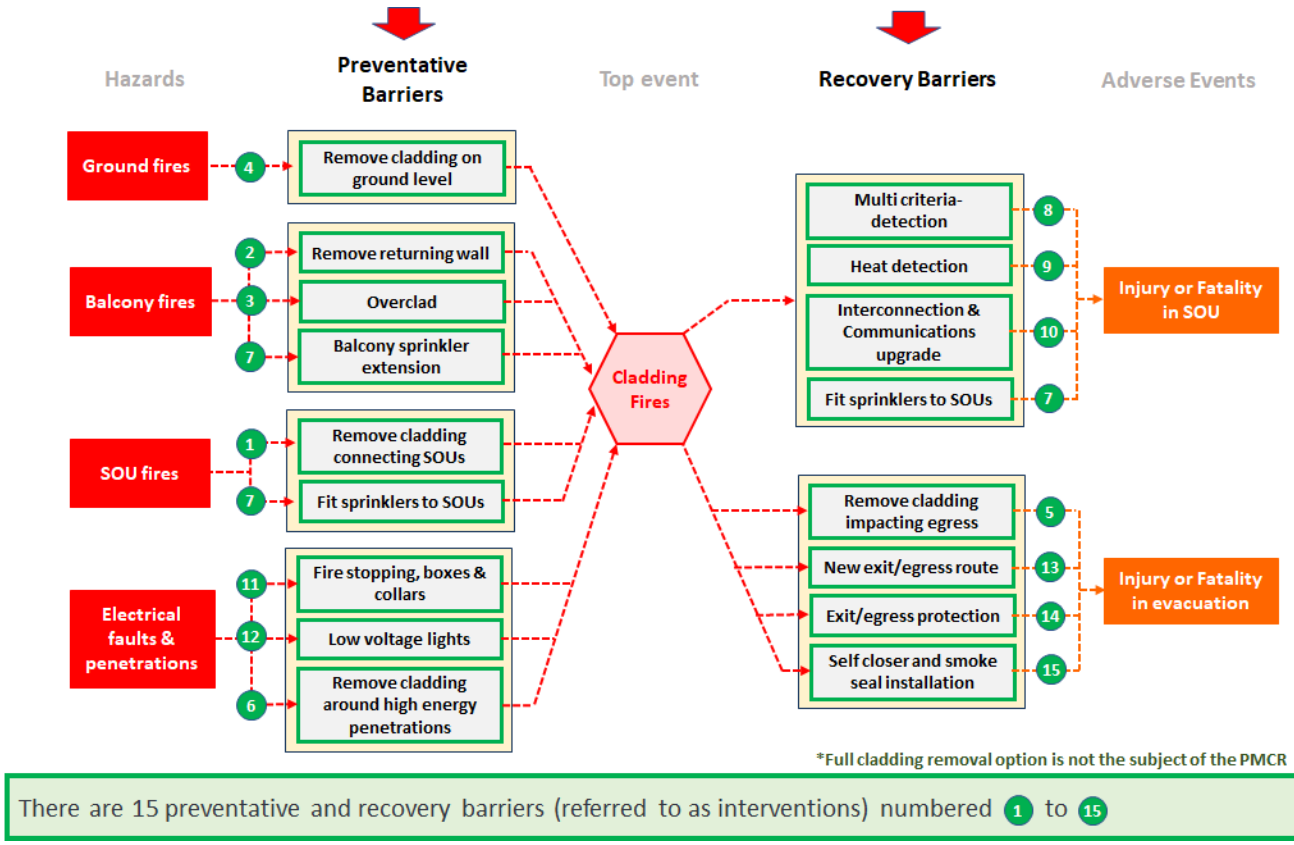



*Figure 1: Threat barrier analysis*

The 15 interventions in the threat barrier analysis act in different ways to mitigate cladding fire risk.

Each intervention may:

- Respond to one or more of the four identified hazards;
- Function to prevent an ignition source from spreading fire to cladding (i.e. interventions that reduce the likelihood of a fire igniting cladding); and/or
- Function to reduce the adverse impacts for building occupants once a fire has reached cladding (i.e. interventions that reduce the consequences of a cladding fire).

Any risk mitigation solution designed under the Framework must target credible hazards on a building and balance both cladding ignition likelihood and consequence considerations.

## 2.1 Purpose

This standard outlines the pathways and processes available for cladding risk remediation on Victorian multi-dwelling residential buildings (Class 2 and Class 3). It does that by:

- Introducing: (Section 3)
  - The development of the pathways and procedures that are necessary for a solution to achieve a PMCR remediation work proposal; and
  - The fundamental concepts, terminology, and thinking required to design a PMCR solution.
- Presenting the primary standards that must be used to break the connection between sole occupancy units (SOUs) provided by cladding when opting for targeted cladding removal. (Section 4.1)
- Presenting the primary standards that must be used to treat any retained cladding clusters with risk ratings other than “low”[2]. (Section 4.2)
- Presenting the standards that relate to exits and the safe egress of occupants from the building. (Section 5)
- Specifying the secondary standards that apply when departures from the primary standards are necessary. (Section 6)
- Providing supplementary technical examples to reinforce key working concepts. (Appendices)

[2] The *Cladding Risk Mitigation Framework* defines the risk rating method used for Class 2 and Class 3 buildings with Combustible External Cladding. There are three risk rating levels: unacceptable, elevated and low.

# 3 Background

The key function of the PMCR is to provide an acceptable cladding risk for buildings that currently do not have one. This section introduces and explains the key design principles and features of the PMCR that enable a building to achieve an acceptable cladding risk.



## 3.1 Acceptable Cladding Risk

Acceptable cladding risk, as a defined term of the Cladding Risk Mitigation Framework (**CRMF**), means that a relevant building either:

i. Achieves a 'Low Cladding Risk' rating, or

ii. Presents an overall level of risk to the life and safety of the occupants of the relevant building which is reasonably similar or less than the risk that would be presented by the same building if that building had no Combustible External Cladding.

### *Cladding Risk Ratings*

Prior to determining what level of intervention (if any) is required to mitigate cladding fire risk, a detailed assessment of the cladding on each building is required. Identifying and assessing the cladding on each building allows the building to be placed in one of three risk rating categories, identified in Table 1 below.

*Table 1: Cladding risk rating categories*

| | Risk description | |
|---|---|---|
| **Cladding risk rating category** | **Sprinkler protected** | **Not sprinkler protected** |
| **Unacceptable** | Risk of fire spread across the Combustible External Cladding of **≥ 4 SOU** | Risk of fire spread across the Combustible External Cladding of **≥ 3 SOU** |
| **Elevated** | Risk of fire spread across the Combustible External Cladding of **3 SOU** | Risk of fire spread across the Combustible External Cladding of **2 SOU** |
| **Low** | Risk of fire spread across the Combustible External Cladding of **≤ 2 SOU** | Risk of fire spread across the Combustible External Cladding of **≤ 1 SOU** |

The risk rating method recognises the benefits of sprinkler protection to mitigate risk. For the purpose of the PMCR, a building is accepted as 'sprinkler protected' where sprinklers have been provided within SOUs. This is made on the basis of the research undertaken in PMCR document *D.05 – Sprinkler Protection* and can be read more comprehensively in PMCR policy document *E.02 – Sprinkler Protection*.

Determining the cluster cladding risk and building level risk by employing the risk rating system constitutes a fundamental principle in the implementation of PMCR solutions. At its core, this enables an approach that provides:

*A measurable, repeatable, and scalable risk-based approach system where the goal is to identify the existing risk, and then to implement interventions that reduce the building to an acceptable cladding risk.*

## 3.2 Cladding Remediation Pathways

Since the release of the CRMF, CSV has worked to design and implement cladding remediation pathways that are more greatly defined. This integrates and builds on from the risk-based approach discussed in the CRMF.

The cladding remediation pathways can be seen in Figure 2, where three distinct pathways are shown:

1) Targeted removal as a means of directly reducing cladding risk; or
2) Treatment of retained cladding risk with active and passive systems, or a
3) Combination of both.

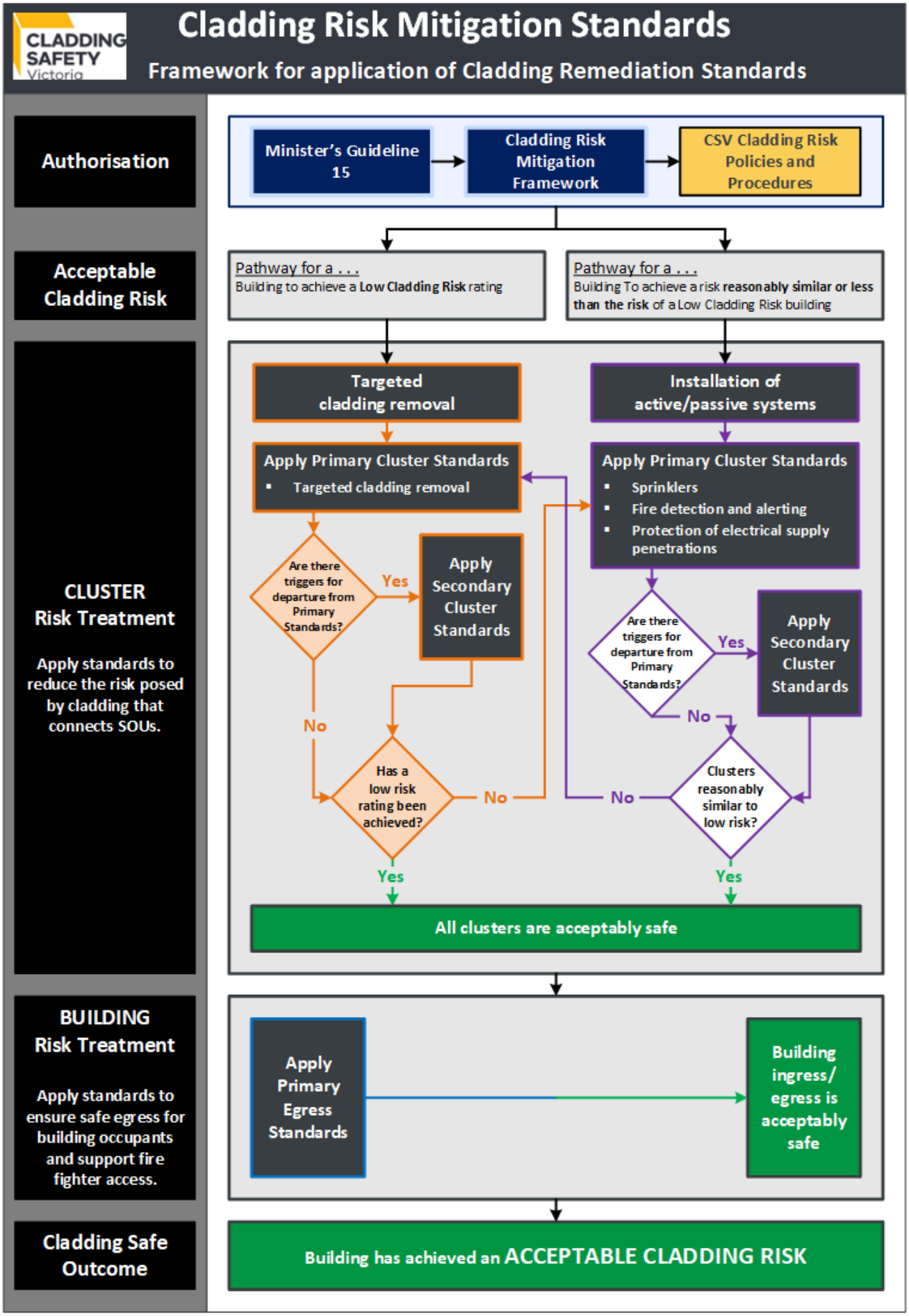



*Figure 2: Cladding Risk Mitigation Pathways*

Each pathway shown in the Figure 2 diagram above follows application of primary standards, with secondary standards and egress and exit interventions applied thereafter.

### 3.2.1 Primary and Secondary Standards

*Primary Standards* refer to the fundamental benchmarks that have been generated through science led research which serve as the foundational guidelines to be attributed to a design.

*Secondary standards* include departures, concessions and recommendations that may deviate a solution away from the primary standards. These are also standards and manage unique building characteristics or intricacies where necessary.

### 3.2.2 Cluster Risk and Building Risk

*Cluster Risk* is the most accurate representation of the inherent risk posed from fire spreading on cladding facades that adjoin SOUs. It is therefore the first stage in the assessment of potential remediation work whereby reference is made to the treatment of external combustible cladding clusters immediately contacting SOU. This is measured in Cladding Fire Spread Risk (**CFSR**), and the corresponding response typologies range from A-I. The worst CFSR measured on each building is also known as the building's IF-SCAN.

*Building Risk* refers to the risk incurred via elements of cladding that affect the greater building, rather than any individual SOUs. An example of this is combustible external wall cladding that affects occupants egressing the building, or high energy fuel loads of cladding at ground level exits and egress paths.

*Table 2: Cluster risk typologies*

**Sprinkler Protected Buildings**

| CFSR | Rise in Storeys | | | | |
|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 to 8 | 9 + |
| 0 | Type A | | | | |
| 1 | | | | | |
| 2 | | | | | |
| 3 | Type B1 | | Type B2 | | |
| 4 | Type C1 | | Type C2 | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 + | Type D | | | | |

**Non-Sprinkler Protected Buildings**

| CFSR | Rise in Storeys | | | | |
|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 to 8 | 9 + |
| 0 | Type E | | | | |
| 1 | | | | | |
| 2 | Type F | | | | |
| 3 | Type G | | Type H | | |
| 4 | | | | | |
| 5 | Type I | | | | |
| 6 | | | | | |
| 7 + | | | | | |

## 3.3 Considerations

Whilst formulating an RWP, there are two important considerations that must be addressed. The first, is the key risk-based considerations that are required to be addressed in each solution to maintain compliance with the CRMF. The second, hierarchical intervention, is a series of RWP design considerations that are available to allow differentiation between comparable solutions so that a clear, prescriptive means of selecting a solution is available.

### 3.3.1 Key risk-based considerations

Section 3.5 of the CRMF highlights the procedures for assessing RWPs. It specifies that to achieve a successful design, a combination of interventions may be incorporated into a solution to reach acceptable cladding risk. Moreover, where these interventions are used, regard should be had towards prioritising four key criteria and four key fire hazards, which are:

| ***Key Intervention Criteria*** | ***Key Fire Hazard Associated with Combustible Cladding*** |
|---|---|
| 1. Removal of Combustible Cladding near ignition sources<br>2. Preventing fires from reaching Combustible Cladding<br>3. Preventing fires from reaching residents<br>*4.* Providing early warning of fire | 1. Balcony fire<br>2. SOU fire (flashover)<br>3. Ground based fire<br>***4.*** Electrical fire via penetration |

### 3.3.2 Considerations of hierarchical intervention – Highest benefit through prioritisation

✓ The key intervention criteria, along with the key fire hazards, outline the risk-based thinking required whilst working to reduce the risk rating of a cluster or building.

To most effectively apply a PMCR solution, interventions must aim to maximise benefit whilst minimising negative implications. Interventions will provide the greatest overall benefit when incorporating the following considerations, in order of their prioritisation:

***1. Life-Safety Risk Reduction***

The greatest consideration when implementing solutions is to consider the life-safety risk reduction, since the primary function of a PMCR solution is to enhance the safety of building occupants. Where interventions are applied to a SOU, it must be ensured that an Acceptable Cladding Risk is reached.

***2. Cost-Time Reduction***

Where multiple solutions are viable to generate an Acceptable Cladding Risk, the overall cost and time implications of a solution should be evaluated. If an option is available to apply a solution in a more cost and time effective manner whilst providing a comparable life-safety benefit, then that solution should be chosen.

***3. Disruption Reduction***

Lastly, in instances where multiple solutions exist that have comparable costing, time implications, and reach an Acceptable Cladding Risk, consideration should be given to the disruption caused to building occupants during solution implementation. Provided that at least an equal life-safety benefit is achieved, the solution that disrupts residents the least shall be considered the most appropriate.

When applying a solution, standard or otherwise, this hierarchy should be applied where multiple solutions are available. If solutions have identical benefits across the three considerations, all can be recommended.

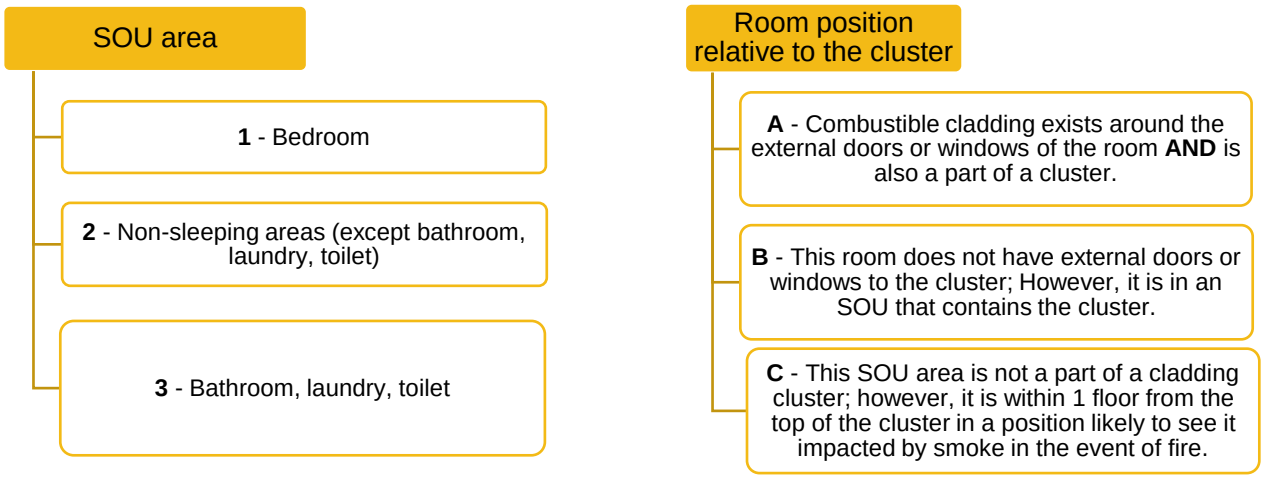
✓ In terms of practical application, the considerations of 3.3.1 should be addressed to ensure compliance with the CRMF and the considerations in 3.3.2 should be used when a cluster/building has multiple viable solutions.

## 3.4 Design philosophies

Remediation Work Proposals have incorporated design philosophies to simplify the complexity of interventions. At its core, a design philosophy aims to identify the predominant theme of a buildings cluster interventions and allow for this to be scaled to other clusters of the same building where it is viable. It is critical however that a design philosophy, at minimum, provides an equal risk reduction as what the corresponding typology would have otherwise.

## 3.5 SOU codification

In response to the vast and complex configurations of not only SOU size and geometry, but also of how that SOU interacts with combustible cladding, CSV have implemented a codification scheme to help most accurately characterise the risk posed to occupants of any SOU. For this reason, CSV have categorised SOU rooms into three types (1, 2, 3) and the interactions of these spaces with the cladding into another three (A, B, C). A brief description of this codification can be seen below, with visual aid and examples also shown.




*Note: where rooms are isolatable (with a door) and it is feasible to be considered a sleeping area (studies, repurposed bedrooms) CSV's worst case risk approach will treat these areas as bedrooms.*

Further explanation of the SOU codification can be found in *Appendix B: SOU codification,* alongside worked examples.

## 3.6 Assumptions

Implementation of the PMCR is founded upon the obligation for building owners to ensure that essential safety measures are maintained in accordance with the occupancy permit and the builder constructed or installed the required systems/installations as required by any performance solutions in accordance with fire engineering reports and approved plans. The identification of non-conformances during the due diligence process will be noted within the RWP, however the overarching principal shall be that solutions are designed for a building's essential safety measures which have been built and maintained accordance with the approved plans and occupancy permit(s).

## 3.7 Non-standard solutions

It is acknowledged that the PMCR may not adequately provide a solution for all buildings and/or all clusters, as although it was designed to capture the vast majority of similar building/cluster configurations, not all will adequately achieve a low cladding risk using PMCR interventions. With this in consideration, PMCR allows nonstandard solutions[3] to RWPs subject to –

1. The Building Review Panel (BRP) process including subject matter expert review; and
2. Supervision from a registered fire safety engineer.

To determine when this type of solution is appropriate, the building shall still be marked up with combustible cladding locations, have had the CFSRs measured **AND** subsequently the cluster risk types attributed.

If, however, after designating the building and cluster risks, the methods discussed in this document either do not proportionately capture the required risk reduction **OR** there is a better solution available (regarding risk, cost-time, and disruption reduction etc.), a non-standard solution can be proposed.

[3] The solution must still use PMCR intervention material to design the solution.

# 4 Primary Standards – Cluster treatment methods

Cluster treatment methodology encompasses all available intervention techniques aimed at mitigating the risk posed by individual clusters to an acceptable level. As previously discussed, this can be achieved via either:

i. Achieving a 'Low Cladding Risk' rating, or

ii. Presenting an overall level of risk to the life and safety of the occupants of the relevant building which is reasonably similar or less than the risk that would be presented by the same building if that building had no Combustible External Cladding.

The achievement of either of the above can only be facilitated via one of the following three solution pathways:

1) Targeted removal as a means of directly reducing cladding risk; or

2) Treatment of retained risk with active & passive systems, or a

3) Combination of both.

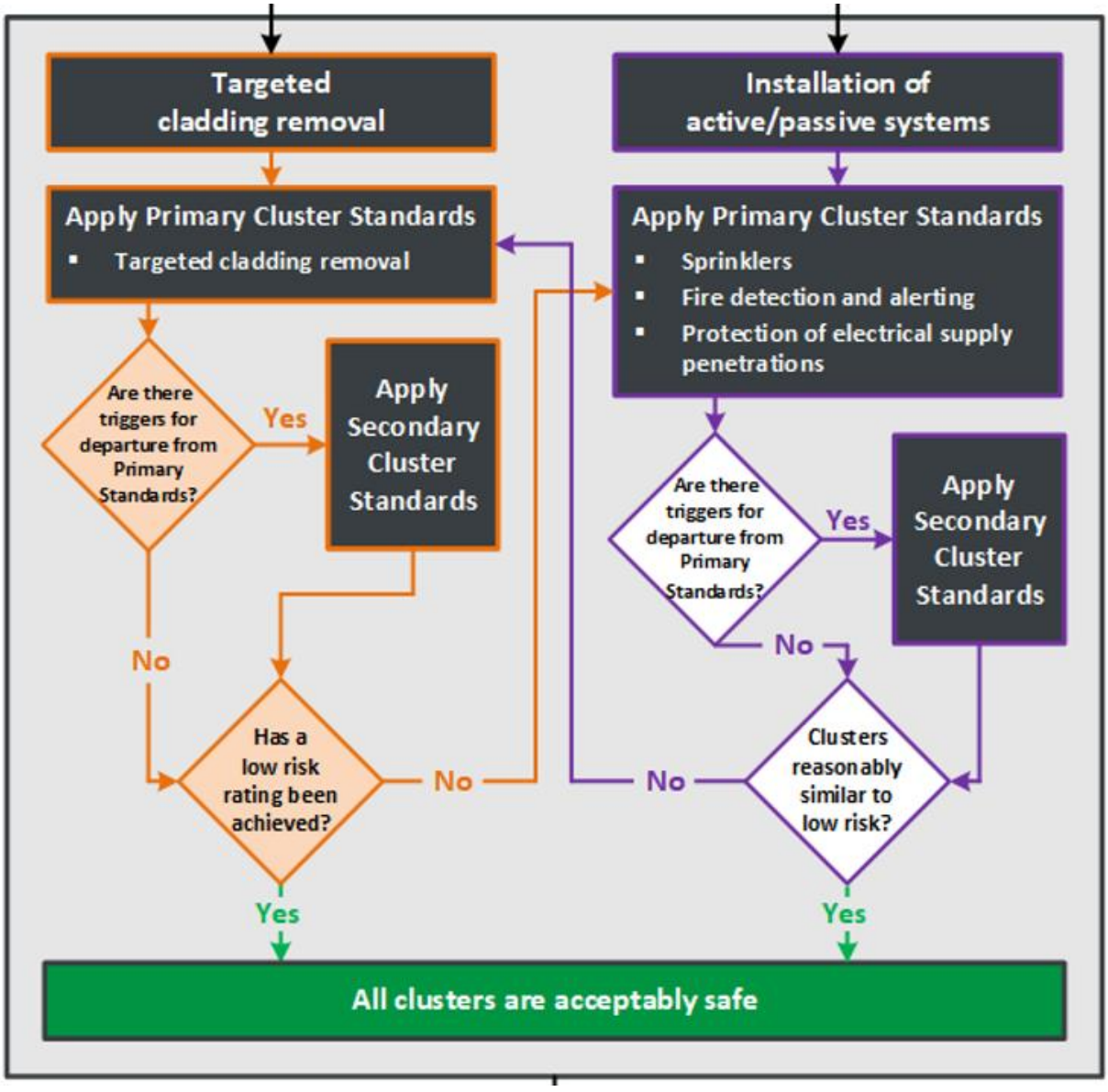



*Figure 3: Cluster Remediation Pathways*

This section will discuss the methods that can be used to satisfy each of the three pathways using prescriptive means.

## 4.1 Targeted cladding removal

As illustrated in Figure 3 above, targeted cladding removal forms one of the two pathways available to achieve a PMCR solution. Provided in this section are the prescriptive rules available to remove continuous sections of cladding (i.e. the absence of any fire breaks) as a means of de-escalating the residual risk for retained combustible cladding. Where targeted cladding removal is used, it must either:

(a) Reduce a cluster to an acceptable cladding risk; or

(b) Reduce a cluster to a lower cladding risk to enable more efficient residual risk mitigation techniques.

***Minimum requirements***

Throughout this section, emphasis is placed on the term 'minimum' for each cladding rectification option. For clarification, this term indicates that the specifications given are the minimum values permissible that provide a satisfactory level of risk reduction. If, for example, the removal of a larger section of cladding would be more cost effective or be a simpler solution to apply, then it would be permissible as it exceeds the minimum specification.

### 4.1.1 Vertical configuration removal

Buildings with **ACP-PE or EPS** as part of the external wall system in a **vertical** configuration, and where the cluster extends only to a RIS of 4 or less, elicit a **minimum** cladding removal of:

(a) A **900** mm strip of cladding spanning between the targeted SOU and the SOU above which;

(b) Extends **not less** than **600** mm above the FFL (Finished Floor Level) of the intervening floor; and

(c) Extends **not less** than **300** mm below the FFL of the intervening floor; and

(d) Extends **not less** than the **full width** of the combustible cladding forming the cluster.

*Note: if a waterproofing membrane is present on the ground level of the cladding cluster, a small section of cladding may be retained to maintain the integrity of the membrane.*

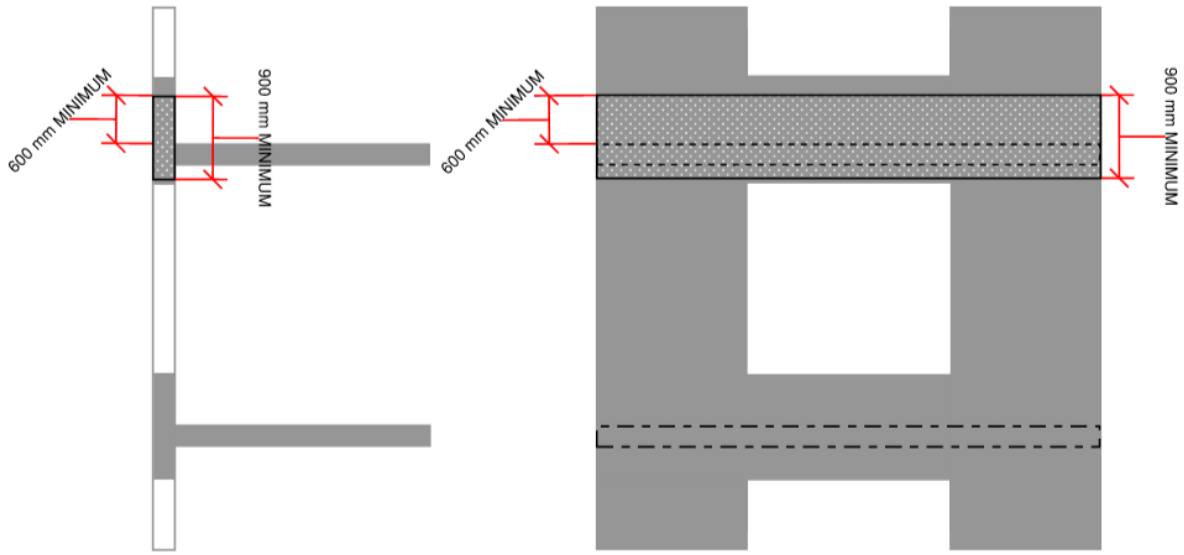



*Figure 4: Cross section (left) and elevation view (right) for vertical configuration removal*

### 4.1.2 Horizontal configuration removal

Buildings with **ACP-PE or EPS** attached in a **horizontal** configuration elicit a **minimum** cladding removal of:

(1) **450** mm in width, **centred** on the **internal separating wall** between SOUs which are deemed part of the cluster.

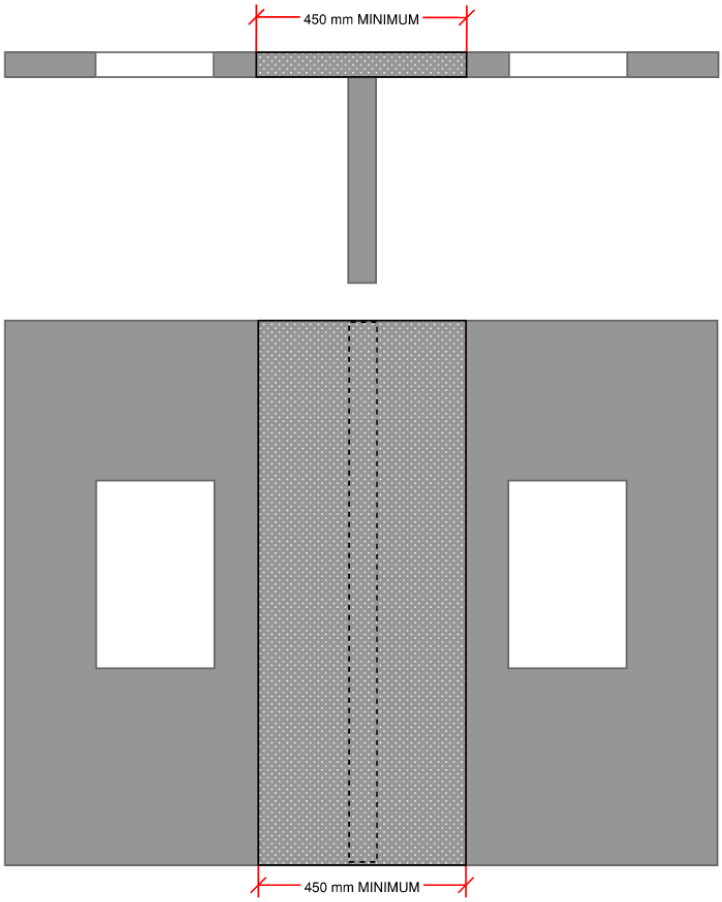



*Figure 5: Plan view (top) and elevation view (bottom) of horizontal configuration cladding removal*

### 4.1.3 Combined vertical and horizontal configuration removal

Buildings with **ACP-PE or EPS** attached in a combined **vertical and horizontal** configuration elicit a **minimum** cladding removal of:

(1) **Any** combination of vertical and horizontal configuration removal to sufficiently reduce the CFSR of the cluster to an '**elevated**' or '**low**' rating.

### 4.1.4 Balcony attachment removal

Buildings with **ACP-PE or EPS** on open or semi-enclosed balcony attachments **only** elicit a **minimum** cladding removal of:

(1) **All** cladding on every **second** balcony for a **vertical** configuration **only**.

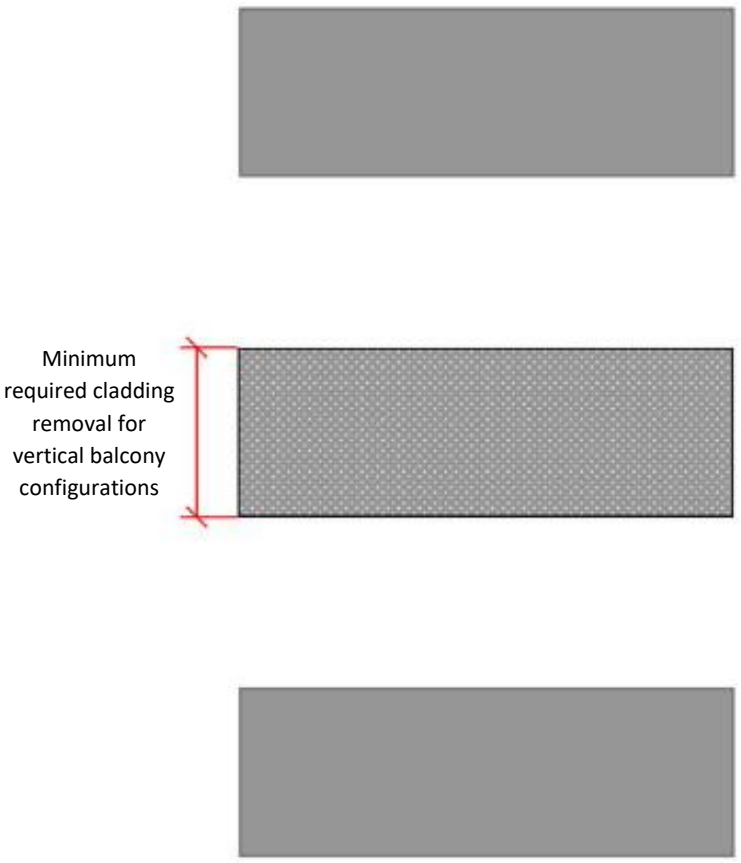



*Figure 6: Elevation view of a vertical balcony attachment configuration (left), and a horizontal balcony attachment configuration (right)*

### 4.1.5 Balcony return wall removal/encapsulation

Balconies with **ACP or EPS** return walls elicit a **minimum** response of either:

(1) Overclad or replace with **non-combustible cladding** affixed to the **entirety** of the balcony return wall frame; **with** permitted retention to the **lower 250** mm of the return wall; **and**

(2) **Removal** of the balcony soffit if also clad in combustible material.

## OR

(3) **Removal** of **1500** mm of cladding from the **outside edge** of the balcony return wall, with the **exception** of the **lower 250** mm of the return wall; **and**

(4) **Removal** of the balcony soffit if also clad in combustible material.

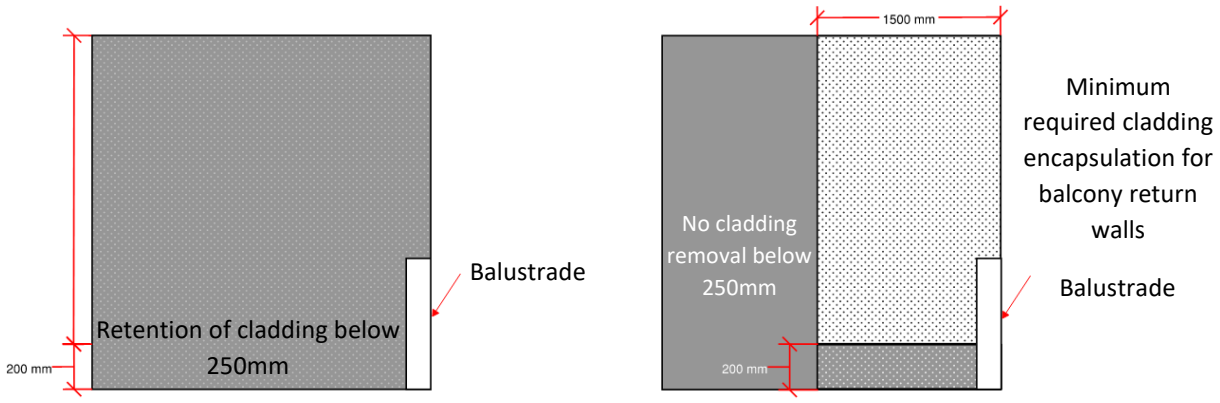



*Figure 7: Elevation of balcony return wall cladding encapsulation (left) and cladding removal (right)*

Notably, the restriction on the lower 250 mm of the return wall is to prevent potential damage to the delicate waterproofing membrane and the resulting ingress of water to the structure (identified as a key risk in balcony rectification work).

### 4.1.6 Ground floor cladding removal

Buildings that have combustible cladding that:

- Is located at the ground floor;
- Has a plausible fire source; and
- Can cause/generate a cluster fire.

Requires a minimum response of:

***For vehicles adjacent to combustible cladding*** *– See F.02 – Section 4 for more information.*

(1) The removal of combustible cladding corresponding to Table 3; or

(2) The removal of the fire plausibility source through access restriction.

***For wastebins or designated wastebin areas adjacent to combustible cladding*** *See F.02 – Section 4 for more information.*

(1) The removal of combustible cladding corresponding to Table 4; or

(2) The removal of the fire plausibility source through access restriction.

*Table 3: Removal table for vehicles or designated carparking in proximity to ground level combustible cladding*

| X (m) | EPS cladding | | | ACP PE cladding | | |
|---|---|---|---|---|---|---|
| | $H_{safe}$ (m) | $Y_{safe}$ (m) | $Y_{sabel,\ 3.0}$ (m) | $H_{safe}$ (m) | $Y_{safe}$ (m) | $Y_{safe,\ 3.0}$ (m) |
| 0.5 | 4.5 | 2.75 | 1.25 | 6.0 | 4.25 | 2.75 |
| 1.0 | 3.5 | 2.75 | 1.25 | 4.5 | 2.75 | 1.25 |
| 1.5 | 0.5 | 1.25 | 0.0 | 4.0 | 2.75 | 1.25 |
| 2.0 | 0.5 | 1.25 | 0.0 | 3.5 | 2.75 | 1.25 |
| 2.5 | 0.5 | 1.25 | 0.0 | 2.5 | 1.25 | 0.0 |
| 3.0 | 0.5 | 1.25 | 0.0 | 0.5 | 1.25 | 0.0 |

*Table 4:* Removal table for wastebins or designated wastebin areas in proximity to ground level combustible cladding

| X(m) | EPS cladding | | | ACP PE cladding | | |
|---|---|---|---|---|---|---|
| | $H_{safe}$ (m) | $Y_{safe}$ (m) | $Y_{safe, 3.0}$ (m) | $H_{safe}$ (m) | $Y_{safe}$ (m) | $Y_{safe, 3.0}$ (m) |
| 0.5 | 4.0 | 3.4 | 1.5 | 4.9 | 5.2 | 2.5 |
| 1.0 | 2.7 | 2.3 | 0 | 4.1 | 3.8 | 1.8 |
| 1.5 | 0 | 0 | 0 | 3.2 | 2.7 | 0.4 |
| 2.0 | 0 | 0 | 0 | 2.3 | 0.6 | 0 |

*Where:*

*X(m) = The distance (in metres) between the facade with combustible cladding and the vehicle that provides the plausible ignition threat.*

*Hsafe (m)= The minimum removal height (in metres) from the ground floor level.*

*Ysafe(m)= The minimum removal width (in metres)* from the centre of the car space.

*Ysafe,3.0(m)= The minimum removal width (in metres) required up to the height of Hsafe above 3m.*

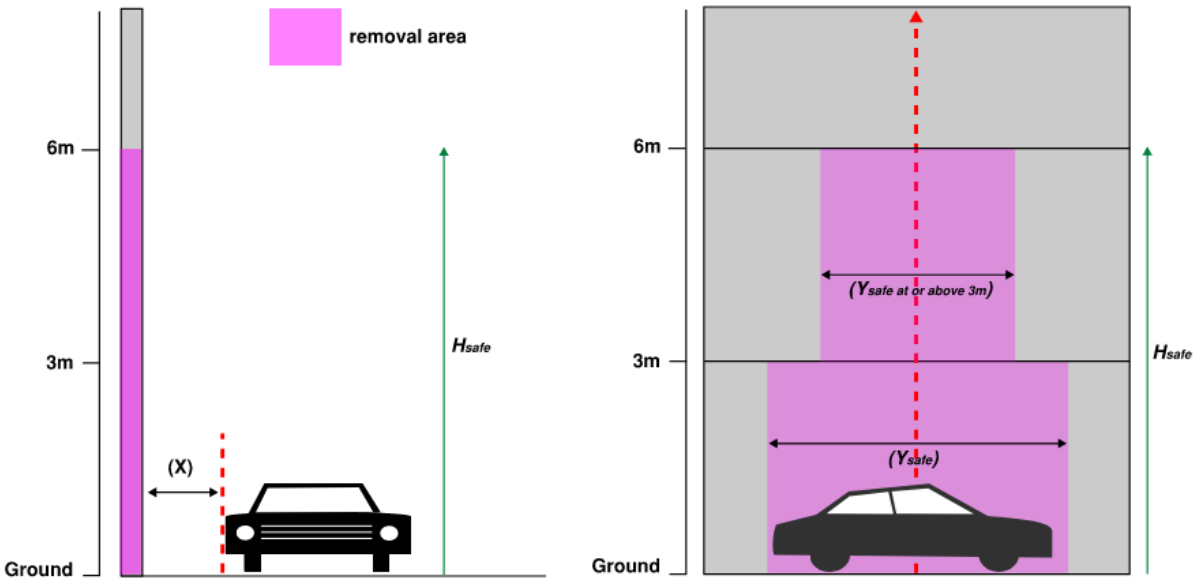



*Figure 8: Example schematic for the removal of cladding, corresponding with a vehicle or carparking at distance X, horizontally from walls with ACP-PE cladding*

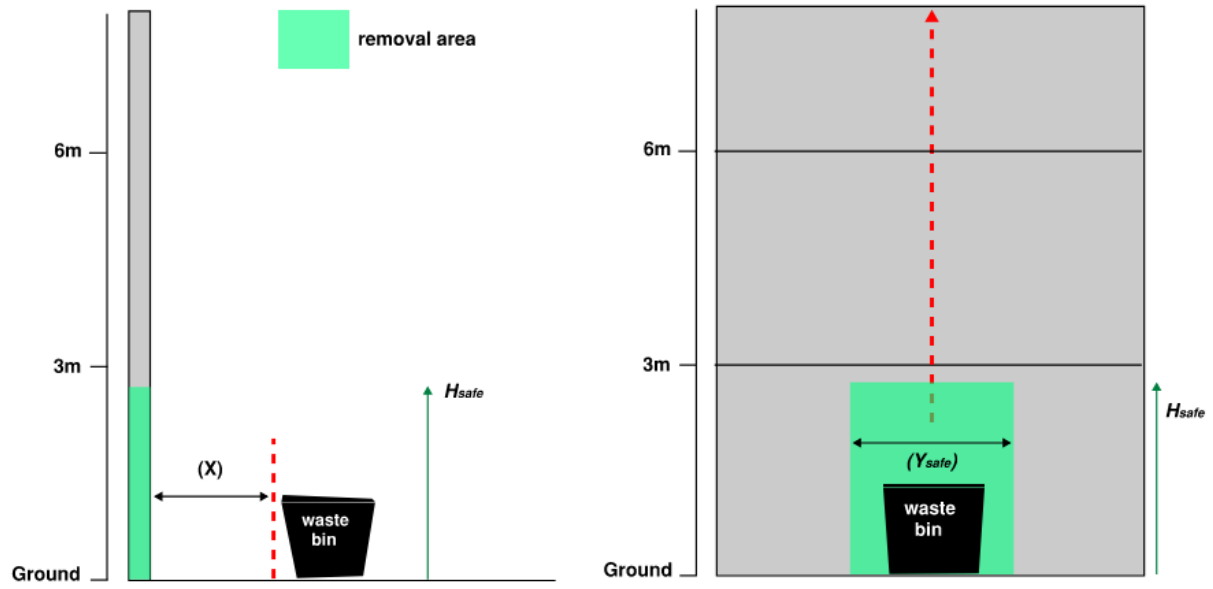



*Figure* 9: Example schematic for the removal of cladding, corresponding with a wastebin or designated wastebin area at distance X, horizontally from walls with EPS cladding

## 4.2 Installation of active and passive fire safety systems

Furthermore, review of the Cluster Treatment Pathway diagram in Figure 2*:* and Figure *3* demonstrates that treatment via installation of active and passive systems is an alternative mode of intervention available to pathways that are not entirely/at all remediated using cladding removal.

Each of the typologies outlined in 3.2.2 have had prescriptive active and passive solutions attributed to them to treat the most observed cluster configurations rapidly and proportionately. Table *2*, Table 5, and Table *6* show the cluster risk types as 'Policy Response Types' for buildings with and without sprinkler protection, and designates the prescriptive methods required to satisfy each risk type.

To determine the cluster typology, reference should be made to Table 5 and Table *6* which distinguish a cluster risk as a function of:

- SOU sprinkler protection;
- The uppermost SOU of the cluster position on a building as a measure in rise in stories (RIS);
- Type of combustible cladding present; and
- Cluster Fire Spread Risk (CFSR).

Once a 'Policy Response type" is designated, a brief representation of the corresponding solution is provided in the table along the same row. However, sections 4.2.1 & 4.2.2 provide more specific information regarding solution design and should be referred to.

Furthermore, the secondary standards, in section 6, may iteratively influence the standard response provided and as such should always be referenced in tandem with the primary standards when implementing a typology into a solution.

### 4.2.1 Sprinkler protected building

*Table* 5: Active and passive system solutions – for sprinkler protected buildings

| Sprinkler Status | Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| SOUs **ARE** sprinkler protected | A | 0-2 | ALL | Both | Existing | | | | |
| | B1 | 3 | Up to 4 | Both | Existing | | ✓ | ✓ | ✓ |
| | B2 | 3 | 5+ | Both | Existing | ✓ | ✓ | ✓ | |
| | C1 | 4-6 | Up to 4 | Both | Existing | | ✓ | ✓ | ✓ |
| | C2 | 4-6 | 5+ | Both | Existing | ✓ | ✓ | ✓ | |
| | D | 7+ | ALL | Both | Existing | | | | |

## Type A

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| A | 0-2 | ALL | Both | Existing | | | | |

SOUs **are** sprinkler protected.

Cladding Risk Rating = **LOW**

No cluster intervention is required.

## Type B

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| **B1** | **3** | **Up to 4** | **Both** | Existing | | ✓ | ✓ | ✓ |
| **B2** | **3** | **5+** | **Both** | Existing | ✓ | ✓ | ✓ | |

SOUs **are** sprinkler protected.

Cladding Risk Rating = **ELEVATED**

### *For Both B1 & B2 Typologies*

***(1)*** ***FDAS Intervention*** *see F.04 – Section 4*

(a) **1A Rooms (Bedrooms)** – Provide smoke detection to external doors and windows so that it is:

(i) Installed in accordance with BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(b) **1A & 1B Rooms (Bedrooms)** – Ensure the location of smoke detection within the SOU is positioned so as to detect smoke that may impact the path between the bedroom(s) and the SOU exit:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems*.

(c) **1C Rooms (Bedrooms)** – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in accordance with BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(d) **BOWS** – Ensure thermal detection exists between the external cladding hazard and the SOU Exit in a common space within the SOU that activates BOWS:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems*.

***For B1 Typologies only***

***(2) Penetrations***

It must be ensured that for each wall with combustible external cladding that:

*(a)* ***For lighting remediation*** *see F.03 – Section 4.2.1 – Light Remediation:*

(i) Complete comprehensive lighting audit to identify halogen and incandescent lighting for replacement with LED alternative.

(ii) Verify that all wiring related to lighting is in sound condition, without aging signs, exposed wires, or combustible ACP cores. Additionally, refer to F.03 - Section 4.2.2 for further guidance.

(iii) Ensure no insulation within the soffit services void is covering the downlight wiring or components and has sufficient clearances in accordance with AS 3000.

*(b)* ***For Wall remediation*** *see F.03 – Section 4.2.2 – Wall remediation:*

(i) Electrician to inspect all wiring-related penetrations, including those for power points and lights, to assess any damage, repairs, and apply any fire safety or fire-resistant treatments around the penetration/cladding as necessary.

(ii) Electrician to ensure that outdoor power points are equipped with appropriate waterproof covers and inspect the cladding area for any gaps or damage around penetrations that could expose a combustible ACP core.

*(c)* ***For cladding remediation*** *see F.03 – Section 4.2.3 – Cladding remediation:*

(i) Overclad and/or cladding removal on affected areas.

***For B2 Typologies only***

***(3) Sprinkler Extension see*** *F.01 – Section 5*

(a) Extend sprinkler head(s) to the balcony, using a system that complies with:

(i) AS 2118.1; or

(ii) AS 2118.4; or

(iii) AS 2118.6; or

(iv) FPAA101D; or

(v) FPAA101H.

So long as it is appropriately installed in accordance with Volume One of the BCA.

## Type C

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| C1 | 4-6 | Up to 4 | Both | Existing | | ✓ | ✓ | ✓ |
| C2 | 4-6 | 5+ | Both | Existing | ✓ | ✓ | ✓ | |

SOUs **are** sprinkler protected.

Cladding Risk Rating = **UNACCEPTABLE**

***For Both C1 & C2 Typologies***

***(1)*** ***FDAS Intervention*** *see F.04 – Section 4*

(a) **1A Rooms (Bedrooms)** – Provide smoke detection to the external doors / windows so that it is:

(i) Installed in accordance with BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(b) **1A & 1B Rooms (Bedrooms)** – Ensure the location of smoke detection within the SOU is positioned so as to detect smoke that may impact the path between the bedroom(s) and the SOU exit:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

(c) **1C Rooms (Bedrooms)** – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in accordance with BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(d) **BOWS** – Ensure thermal detection exists between the external cladding hazard and the SOU exit in a common space within the SOU that activates BOWS:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

***For Both C1 Typologies only***

***(2) Penetrations***

It must be ensured that for each wall with combustible external cladding that:

(a) ***For lighting remediation*** *see F.03 – Section 4.2.1 – Light Remediation:*

(i) Complete comprehensive lighting audit to identify halogen and incandescent lighting for replacing with LED alternative.

(ii) Verify that all wiring related to lighting is in sound condition, without aging signs, exposed wires, or combustible ACP cores. Additionally, refer to F.03 - Section 4.2.2 for further guidance.

(iii) Ensure no insulation within the soffit services void is covering the downlight wiring or components and has sufficient clearances in accordance with AS 3000.

(b) ***For wall remediation*** *see F.03 – Section 4.2.2 – Wall remediation:*

(i) Electrician to inspect all wiring-related penetrations, including those for power points and lights, to assess any damage, repairs, and apply any fire safety or fire-resistant treatments around the penetration/cladding as necessary.

(ii) Electrician to ensure that outdoor power points are equipped with appropriate waterproof covers and inspect the cladding area for any gaps or damage around penetrations that could expose a combustible ACP core.

(c) ***For cladding remediation*** *see F.03 – Section 4.2.3 – Cladding remediation:*

(i) Overclad and/or cladding removal on affected areas.

***For Both C2 Typologies only***

***(1) Sprinkler Extension*** *see F.01 – Section 5*

(a) Extend sprinkler head(s) to the balcony, using a system that complies with:

(i) AS 2118.1; or

(ii) AS 2118.4; or

(iii) AS 2118.6; or

(iv) FPAA101D; or

(v) FPAA101H.

So long as it is appropriately installed in accordance with Volume One of the BCA.

## Type D

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| D | 7+ | ALL | Both | Existing | | | | |

SOUs **are** sprinkler protected.

Cladding Risk Rating = **UNACCEPTABLE**

*(1)* ***Targeted cladding removal as per section 4.1***

(a) **Full/significant targeted cladding removal** – from identified clusters.

### 4.2.2 Non-sprinkler protected buildings

*Table 6: Active and passive system solutions - for non-sprinkler protected buildings*

| Sprinkler Status | Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| SOUs **ARE NOT** sprinkler protected | E | 0-1 | ALL | Both | | | | | |
| | F | 2 | ALL | Both | | | ✓ | ✓ | ✓ |
| | G | 3-4 | Up to 4 | Both | ✓ | | ✓ | ✓ | ✓ |
| | H | 3-4 | 5+ | Both | ✓ | ✓ | ✓ | ✓ | |
| | I | 5+ | ALL | Both | | | | | |

## Type E

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| E | 0-1 | ALL | Both | | | | | |

SOUs **are not** sprinkler protected.

Cladding Risk Rating = **LOW**

No cluster intervention is required.

Type F

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| **F** | **2** | **ALL** | **Both** | | | ✓ | ✓ | ✓ |

SOUs **<u>are not</u>** sprinkler protected.

Cladding Risk Rating = **ELEVATED**

***For Vertical Cluster Configurations***

***(1)*** ***FDAS Intervention*** *see <u>F.04 – Section 4</u>*

(a) **1A Rooms (Bedrooms) – Lower** – Provide smoke and thermal detection to external doors and windows, so that:

*Smoke Detection:*

(i) Is installed in accordance with BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

*Thermal Detection:*

(iii) Must be installed accordance with BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(iv) That the thermal detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(b) **1A Rooms (Bedrooms) – Upper** – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(c) **1A & 1B Rooms (Bedrooms)** – Ensure the location of smoke detection within the SOU is positioned so as to detect smoke that may impact the path between the bedroom(s) and the SOU exit:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

(d) **1C Rooms (Bedrooms) -** Provide smoke detection to the external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(e) **2A Rooms (Kitchen/Living) – Lower** – Install thermal detection to the external doors and windows:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems.*

(f) **BOWS** – Ensure thermal detection exists between the external cladding hazard and the SOU Exit within the SOU:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

---

***For Horizontal Cluster Configurations***

***(2)*** ***FDAS Intervention*** *see F.04 – Section 4*

(a) **1A Rooms (Bedrooms**) – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(b) **1A** & **1B Rooms (Bedrooms)** – Ensure the location of smoke detection within the SOU is positioned so as to detect smoke that may impact the path between the bedroom(s) and the SOU exit:

*(i)* In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

(c) **1C Rooms (Bedrooms)** – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(d) **BOWS** – Ensure BOWS activation is possible to each floor level of the cluster. This can be achieved via:

(i) Ensuring thermal detection exists between external cladding hazard and SOU exit in a common space within the SOU that is installed in accordance with BCA Specification 20 – *Smoke detection and alarm systems;* or

(ii) Smoke seepage from the SOU reaches the common corridor detection (that activates BOWS).

***For All Configurations***

### *(3)* ***Penetrations***

It must be ensured that for each wall with combustible external cladding that:

(a) ***For lighting remediation*** *see F.03 – Section 4.2.1 – Light Remediation:*

(i) Complete comprehensive lighting audit to identify halogen and incandescent lighting for replacing with LED alternative.

(ii) Verify that all wiring related to lighting is in sound condition, without aging signs, exposed wires, or combustible ACP cores. Additionally, refer to F.03 - Section 4.2.2 for further guidance.

(iii) Ensure no insulation within the soffit services void is covering the downlight wiring or components and has sufficient clearances in accordance with AS 3000.

(b) ***For Wall remediation*** *see F.03 – Section 4.2.2 – Wall remediation:*

(i) Electrician to inspect all wiring-related penetrations, including those for power points and lights, to assess any damage, repairs, and apply any fire safety or fire-resistant treatments around the penetration/cladding as necessary.

(ii) Electrician to ensure that outdoor power points are equipped with appropriate waterproof covers and inspect the cladding area for any gaps or damage around penetrations that could expose a combustible ACP core.

(c) ***For cladding remediation*** *see F.03 – Section 4.2.3 – Cladding remediation:*

(i) Overclad and/or cladding removal on affected areas.

## Type G

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| G | 3-4 | Up to 4 | Both | ✓ | | ✓ | ✓ | ✓ |

SOUs **are not** sprinkler protected.

Cladding Risk Rating = **UNACCEPTABLE**

***(1)*** ***Sprinklers Intervention*** *see F.01 – Section 5*

(a) **All Rooms** – For all SOU of the identified cluster, provide sprinklers to all rooms using a system that complies with:

(i) AS 2118.1; or

(ii) AS 2118.4; or

(iii) AS 2118.6; or

(iv) FPAA101D; or

(v) FPAA101H.

So long as it is appropriately installed in accordance with volume one of the BCA.

***(2)*** ***FDAS Intervention*** *see F.04 – Section 4*

(a) **1A Rooms (Bedrooms)** – Provide smoke detection to external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(b) **1A & 1B Rooms (Bedrooms)** – Ensure the location of smoke detection within the SOU is positioned so as to detect smoke that may impact the path between the bedroom(s) and the SOU exit:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

(c) **1C Rooms (Bedrooms)** – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(d) **BOWS** – Ensure thermal detection exists between external cladding hazard and SOU Exit in a common space within the SOU:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

***(3) Penetrations***

It must be ensured that for each wall with combustible external cladding that:

(a) ***For lighting remediation*** *see F.03 – Section 4.2.1 – Light Remediation:*

(i) Complete comprehensive lighting audit to identify halogen and incandescent lighting for replacing with LED alternative.

(ii) Verify that all wiring related to lighting is in sound condition, without aging signs, exposed wires, or combustible ACP cores. Additionally, refer to F.03 - Section 4.2.2 for further guidance.

(iii) Ensure no insulation within the soffit services void is covering the downlight wiring or components and has sufficient clearances in accordance with AS 3000.

(b) ***For Wall remediation*** *see F.03 – Section 4.2.2 – Wall remediation:*

(i) Electrician to inspect all wiring-related penetrations, including those for power points and lights, to assess any damage, repairs, and apply any fire safety or fire-resistant treatments around the penetration/cladding as necessary.

(ii) Electrician to ensure that outdoor power points are equipped with appropriate waterproof covers and inspect the cladding area for any gaps or damage around penetrations that could expose a combustible ACP core.

(c) ***For cladding remediation*** *see F.03 – Section 4.2.3 – Cladding remediation:*

(i) Overclad and/or cladding removal on affected areas.

## Type H

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| H | 3-4 | 5+ | Both | ✓ | ✓ | ✓ | ✓ | |

SOUs **<u>are not</u>** sprinkler protected.

Cladding Risk Rating = **UNACCEPTABLE**

***(1)*** ***Sprinklers Intervention*** *see <u>F.01 – Section 5</u>*

(a) **All Rooms** – For all SOU of the identified cluster, provide sprinklers to all rooms using a system that complies with:

(i) AS 2118.1; or

(ii) AS 2118.4; or

(iii) AS 2118.6; or

(iv) FPAA101D; or

(v) FPAA101H.

So long as it is appropriately installed in accordance with volume one of the BCA.

(b) **Balconies** – Extend sprinkler head(s) to the balcony, using a system that complies with a system listed in:

(i) AS 2118.1; or

(ii) AS 2118.4; or

(iii) AS 2118.6; or

(iv) FPAA101D; or

(v) FPAA101H.

So long as it is appropriately installed in accordance with volume one of the BCA.

***(2)*** ***FDAS Intervention*** *see <u>F.04 – Section 4</u>*

(a) **1A Rooms (Bedrooms)** – Provide smoke detection to external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(b) **1A & 1B Rooms (Bedrooms)** – Ensure the location of smoke detection within the SOU is positioned so as to detect smoke that may impact the path between the bedroom(s) and the SOU exit:

(i) In accordance with BCA Specification – Smoke detection and alarm systems.

(c) **1C Rooms (Bedrooms)** – Provide smoke detection to the external doors and windows so that it is:

(i) Installed in the SOU pursuant to BCA Specification 20 – *Smoke detection and alarm systems*; with the exception being:

(ii) That the smoke detection must be positioned within 300-1500mm from the midpoint of the external doors and windows such that it is perpendicular to the opening.

(d) **BOWS** – Ensure thermal detection exists between external cladding hazard and SOU exit in a common space within the SOU:

(i) In accordance with BCA Specification 20 – *Smoke detection and alarm systems.*

Type I

| Policy Response Type | Cluster Fire Spread Risk (CFSR) | RIS | Cladding Type | Sprinkler Installation | | Detection & Alerting | | Penetrations |
|---|---|---|---|---|---|---|---|---|
| | | | | in SOUs | on balconies | Smoke Detection (bedrooms) | Smoke & heat detection | Remediation of lights, walls, and cladding |
| I | 5+ | ALL | Both | | | | | |

SOUs **are not** sprinkler protected.

Cladding Risk Rating = **UNACCEPTABLE**

***(1) Targeted cladding removal as per section 4.1***

(a) **Full/significant targeted cladding removal** – from identified clusters.

# 5 Primary Standards – Building treatment methods

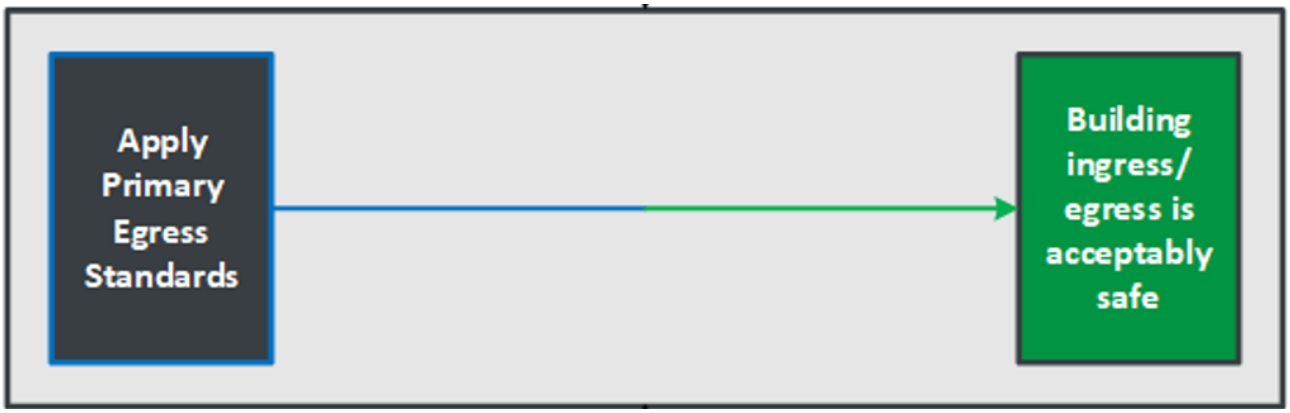



*Figure* 10: Exit/egress standards pathway

Building treatment methodology encompasses all available intervention techniques aimed at mitigating the risk posed by elements of cladding that affect the greater building, rather than to SOU(s).

*This section will discuss the methods that can be used to satisfy the conditions using prescriptive means.*

## 5.1 Exit and egress interventions

The primary standard to assess the impact of combustible cladding elements in proximity to building egress paths and appropriate Interventions when required, are documented within Document *F.05 – PMCR – Interventions to assist safe egress*. A Logic Tree (Figure 11 and Figure 12 below) nominates steps to assess the impact of combustible elements on occupant egress *(and fire brigade access to a building)* and as necessary, which of the following interventions must be implemented.

### 5.1.1 Remove cladding impacting egress

Combustible cladding elements used in proximity to an exit will be required to be removed where the building configuration does not provide users with an egress path which is considered safe, having assessed the occupant risks posed by exposure to radiant heat or falling debris from combustible elements above an egress path.

### 5.1.2 Installation of new exit/egress route

Where the combustible cladding elements in proximity to an exit are not considered to be provide occupants a safe means of egress and removal of cladding elements is not feasible, creating of new exit or egress path may be considered. Regulatory design frameworks do not consider simultaneous fires in different parts of a building as a likely scenario. As such the provision of a designated alternative exit is an intervention that will safeguard egress.

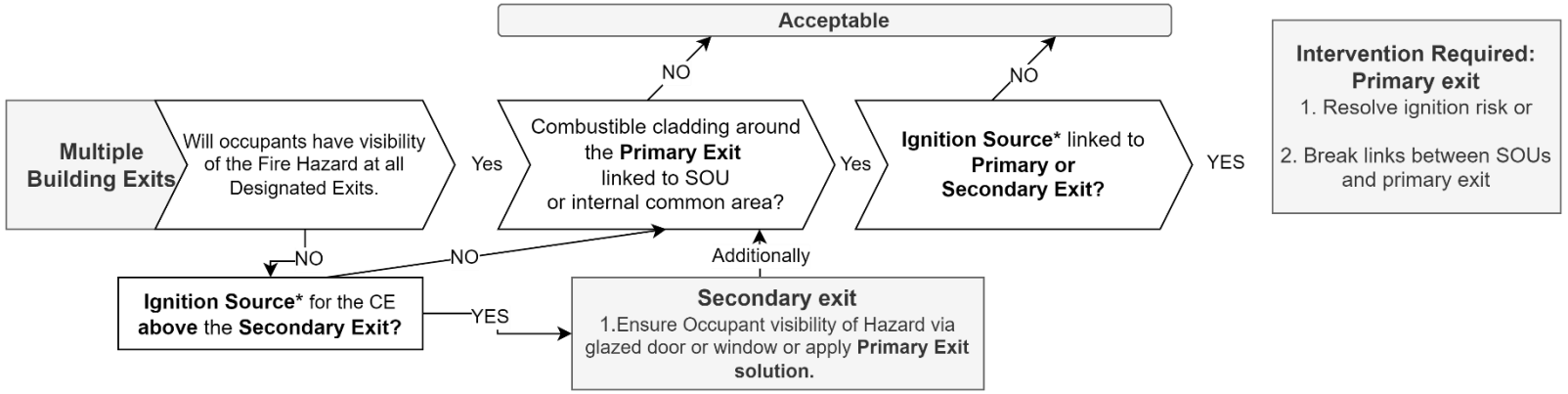
### 5.1.3 Exit/egress protection

Elements of a building can provide protection by shielding an occupant from radiant heat or falling debris posed by combustible cladding elements used in proximity to an exit. A canopy structure is a common building component that can be considered as a means of protection where cladding removal is impractical.

### 5.1.4 Self-closers and smoke seal installation

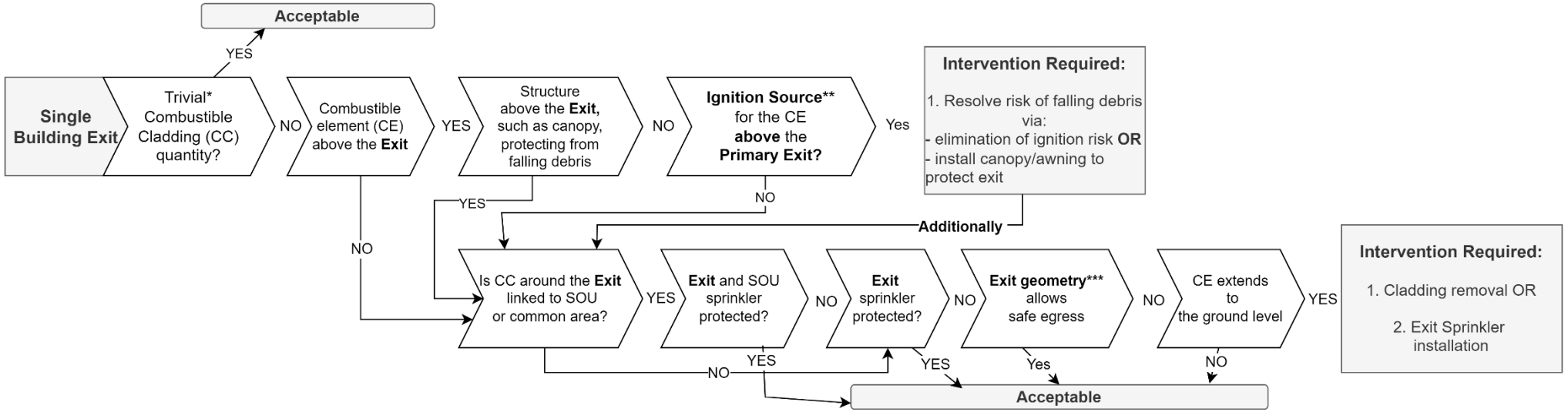
The use of self-closers and smoke seals to doors are intended to assist in maintaining the tenability of a designated exit or egress path so that occupants can safely evacuate from a building.

### 5.1.5 Exit/egress intervention decision diagrams




* Ignition Source such as: non sprinkled SOU, non-sprinkled balcony/common area, electrical penetrations to ACP, ground level benign fire source.

*Figure 11: More than one primary exits intervention pathway*




* Examples of trivial CC quantity available in F.05.

** Ignition Source such as: non sprinkled SOU/balcony linked via CE, electrical penetrations to ACP, ground level link-benign fire source risk.

*** Suitable distance maintained from cladding elements (CE) when exiting the building/no cladding above egress path OR/AND a non-combustible CE provides shielding from CE.

*Figure 12: One primary exit intervention pathway*

# 6 Secondary Standards – Building and cluster

This section sets out the secondary standards that a PMCR solution must have regard towards. A secondary standard can be through either a departure, a concession, or a recommendation.

## 6.1 Departures

Where the conditions discussed in this section are met, a departure from the primary standards shall be permitted. The corresponding departure therefore shall take precedence for that component of the solution.

### 6.1.1 "Ensure" protocols

Where a solution relies on an existing essential safety measure (ESM) or building feature via an "ensure" clause (e.g. BOWS) and further investigation has uncovered that the ESMs or building features have not been implemented, the RWP shall be revoked, or installation of the referenced system or feature shall be completed as part of the remediation work.

### 6.1.2 Vertical separation from a cluster

A non-combustible element that separates a cluster from:

1) A door or window opening in a SOU above the cluster; or
2) A door or window opening in a SOU below the cluster,

must not be less than 900mm in height to mitigate the likelihood of flame propagation. Where the separation is less than 900mm in height and the building is not sprinkler protected, the solution must:

(a) Incorporate thermal detection to provide early warning (as appropriate) to mitigate the consequence of flame propagation to the cluster from the level below, and/or from the cluster to the level above; or

(b) Apply targeted cladding removal interventions to create a vertical separation of not less than 900mm; or

(c) Apply sprinkler installation interventions to the cluster and the adjoining SOUs that lack the required separation.

a) Section showing use of spandrel to separate external window

b) *An example of a relevant cluster configuration.*

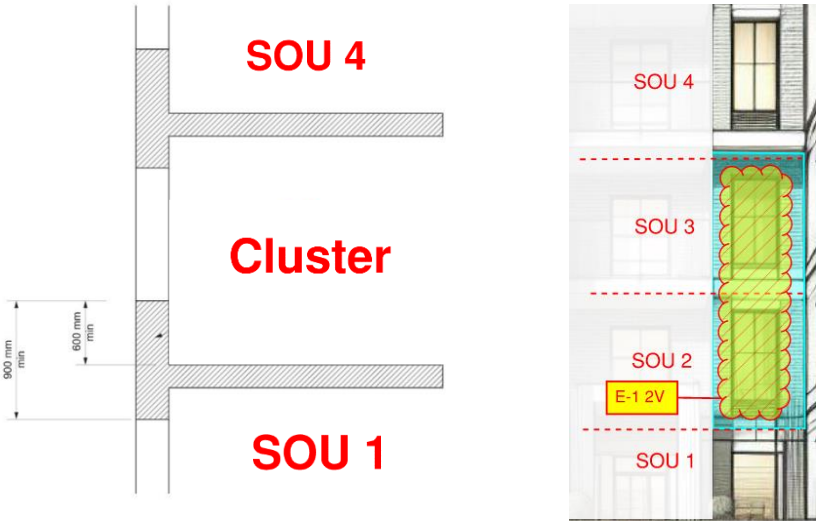



*Figure 13: The intention of this standard is to ensure that SOU 1 and 4 in the images "a)"and "b)" above have adequate separation from the cluster. An example of the required separation is the spandrel that separates SOU 1 from the cluster in image "a)" [8]. Where there is not a 900mm non-combustible separation from the cluster to the nearest window or door of SOU 1 or 4, an action to remediate is required.*

### 6.1.3 Emergency fire service access

The holistic building design philosophy shall consider each cluster which requires intervention. If analysis of the building access routes, positioning, height and configuration determines that there are clusters which cannot be accessed and subdued by the fire service on arrival then the interventions selected shall prioritise preventative barriers (i.e. cladding removal or sprinkler protection) rather than recovery barriers (i.e. detection and alerting).

### 6.1.4 High risk commercial spaces

(1) For commercial premises (typically at ground floor level) which are identified in buildings within CSV scope, due diligence shall be undertaken to examine the use of the commercial premises e.g. a restaurant, public house, café etc. Once the current commercial use has been established, the building performance solutions, essential safety measures, compartmentation and exits associated with the commercial premises shall be reviewed to assess any impact on the building SOUs.

(2) Combustible cladding identified on commercial premises which has connectivity to SOUs will be investigated and treated in accordance with the Cluster Treatment Methods (Primary Standards) and combustible cladding risks identified which impact on SOU egress routes or exits will be also treated in accordance with the Building Treatment Methods herein (Primary Standards).

### 6.1.5 Multi-storey SOU

Where a cluster impacted SOU is more than one storey, it is required that each floor of the cluster is provided with thermal detection.

### 6.1.6 Type “3A” rooms

Where a SOU in a cluster has a type “3A” room, no intervention is required to that room. However, any room with door access that opens directly into this 3A room should be re-codified as an “A” type room and treated accordingly to the applicable standards.

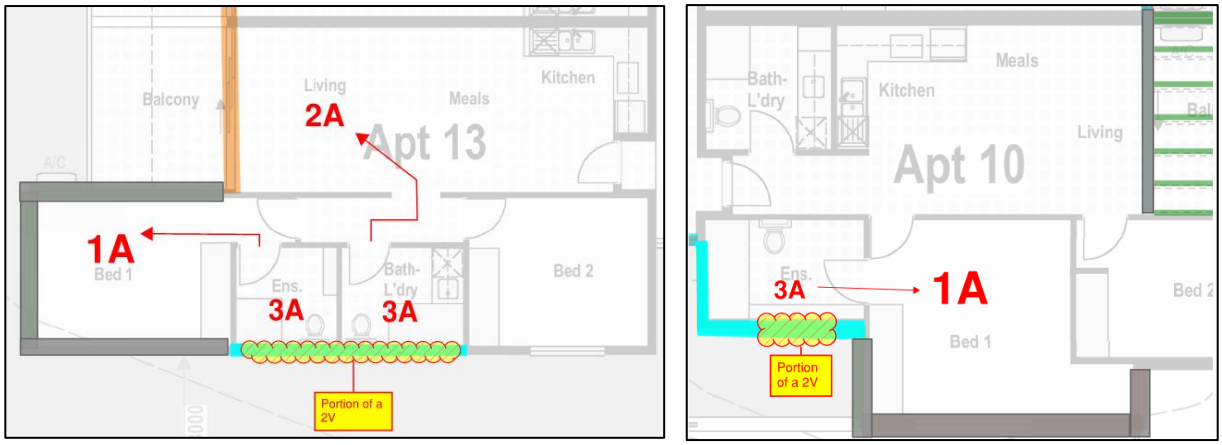



*Figure 14 - The rooms that these 3A's are adjoined to become type A's as they now have a greater risk of being impacted by fire*

## 6.2 Concessions

The following concessions are permitted to solutions provided with the specified corresponding criterion.

### 6.2.1 Sprinkler protected SOUs

If a SOU is sprinkler protected to all rooms, the following concessions can be made:

(1) An ASE is not required; and

(2) The BOWS and thermal activation requirements are satisfied ***(except FPAA101D sprinkler systems. Separate heat detection is required where FPAA101D systems are installed)***.

### 6.2.2 Townhouse style building configurations

(1) If the building is configured so that SOUs are townhouses or have townhouse like arrangements, an ASE is not required in solution design to satisfy PMCR requirements. To be considered a townhouse style, a SOU must:

(a) Not have other SOUs above or below; and

(b) Not have shared internal corridors.

### 6.2.3 Vertical fire break via horizontal projection

A horizontal projection is considered to provide adequate separation to mitigate the risk of fire spread between 2 elements of combustible cladding subject to the following:

(1) the projection must be non-combustible; and

(2) the horizontal dimensions (a) and (c) in Figure 15 are not less than 600mm; and

(3) the projection is constructed so that the sum of the height (of the projection, “b”) and one of the lengths (either of the horizontal dimensions “a” and “c) is not less than 900mm.

Where a horizontal projection meets these criteria, the initial cluster can be broken into two smaller clusters, either side of this separation.

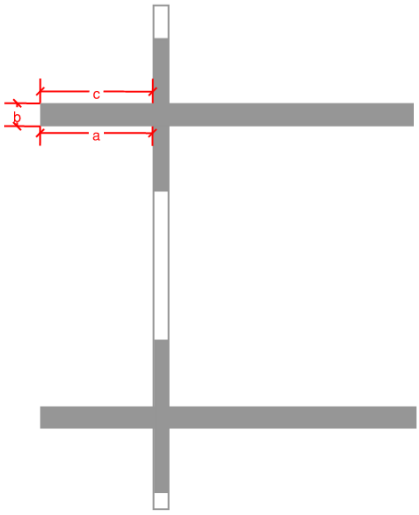



*Figure 15: A section view of the horizontal projection dimensions. either the sum of length “a” and height “b” or the sum of length “c” and height “b” must be not less than 900mm*

### 6.2.4 Set-back SOU

Type C SOUs that are set back in a wedding cake formation to provide at least a 1500mm horizontal displacement do not require smoke detection intervention.

***NOTE: This can be satisfied by an effective displacement caused by an at least 1500mm balcony. This causes a 1500mm horizontal displacement from the fascia to the opening above.***

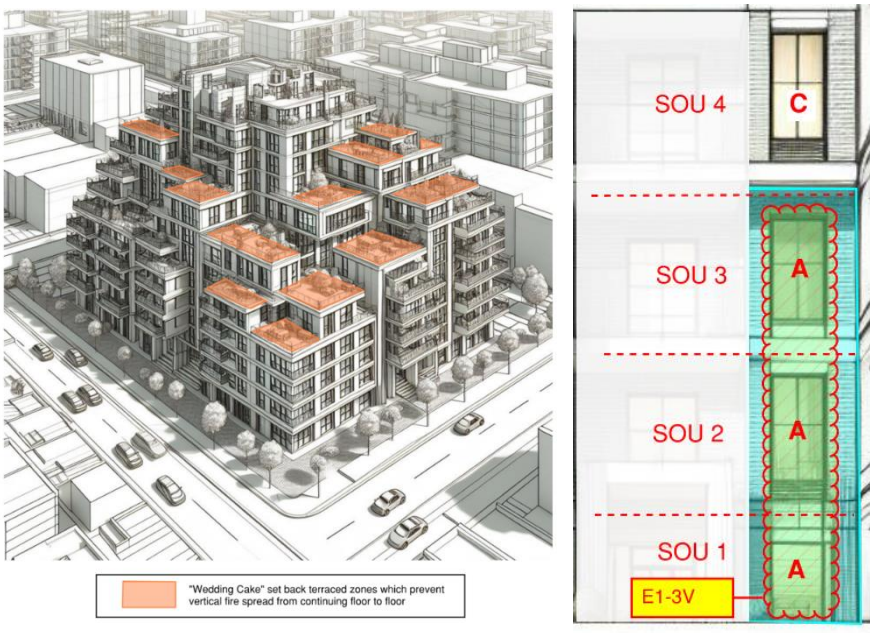



*Figure 16: A setback 'Wedding Cake' configuration (left) and an example of a relevant cluster configuration (right). The cluster shown on the right is an example of where a set-back concession would not be applicable as there is no horizontal displacement between the facades of the type "A" SOUs and the type "C" SOU. The image on the left however shows the displacements that would be applicable to apply this concession.*

### 6.2.5 Rooms with multiple openings to a cluster

Where a room is found to be impacted via multiple clusters, or has multiple openings to a single cluster, the FDAS solutions may prescribe a single of each of the primarily required detection devices, rather than multiple, so long as it proportionately treats the risk of the room. Where this is applied, the device is required to positioned at the midpoint of openings, so that each opening is equally treated.

### 6.2.6 Rooms with existing detection

If a room is found to have the prescribed detection already installed, it is not required to be moved to meet PMCR positioning requirements. This can only be applied where the original positioning is effective in performing the intent of the PMCR solution.

## 6.3 Recommendations

### 6.3.1 Type F clusters at a rise in stories of greater than four

Where a "type F" cluster is found at a rise in stories of five or more, it should be included in the Remediation Work Proposal that CSV recommends sprinkler installation to the SOUs of that cluster. Included in sprinkler installation is balcony sprinkler extensions.

### 6.3.2 Sprinkler Installation to egress pathways from SOU that are in a cluster.

Where sprinklers are used as an intervention to a cluster, it should be recommended that the sprinklers also be extended to the egress pathways that are used by occupants of the cluster, including common area corridors as piping infrastructure will already be required to be extended.

## 6.4 Interconnectivity and transmission pathways

### 6.4.1 Smoke detection

Smoke detection or components with smoke detection installed to a SOU must:

(a) Be configured so that detection of smoke only triggers local SOU alarm; and

(b) Where there is more than one smoke detection device, they all must be interconnected within that SOU.

### 6.4.2 Thermal detection

Thermal detection or components with thermal detection must be configured so that thermal detection activation triggers the building occupant warning system (BOWS).

***(This excludes FPAA101D sprinkler systems. Separate heat detection is required where FPAA101D systems are installed.)***

### 6.4.3 Multi-criteria detection

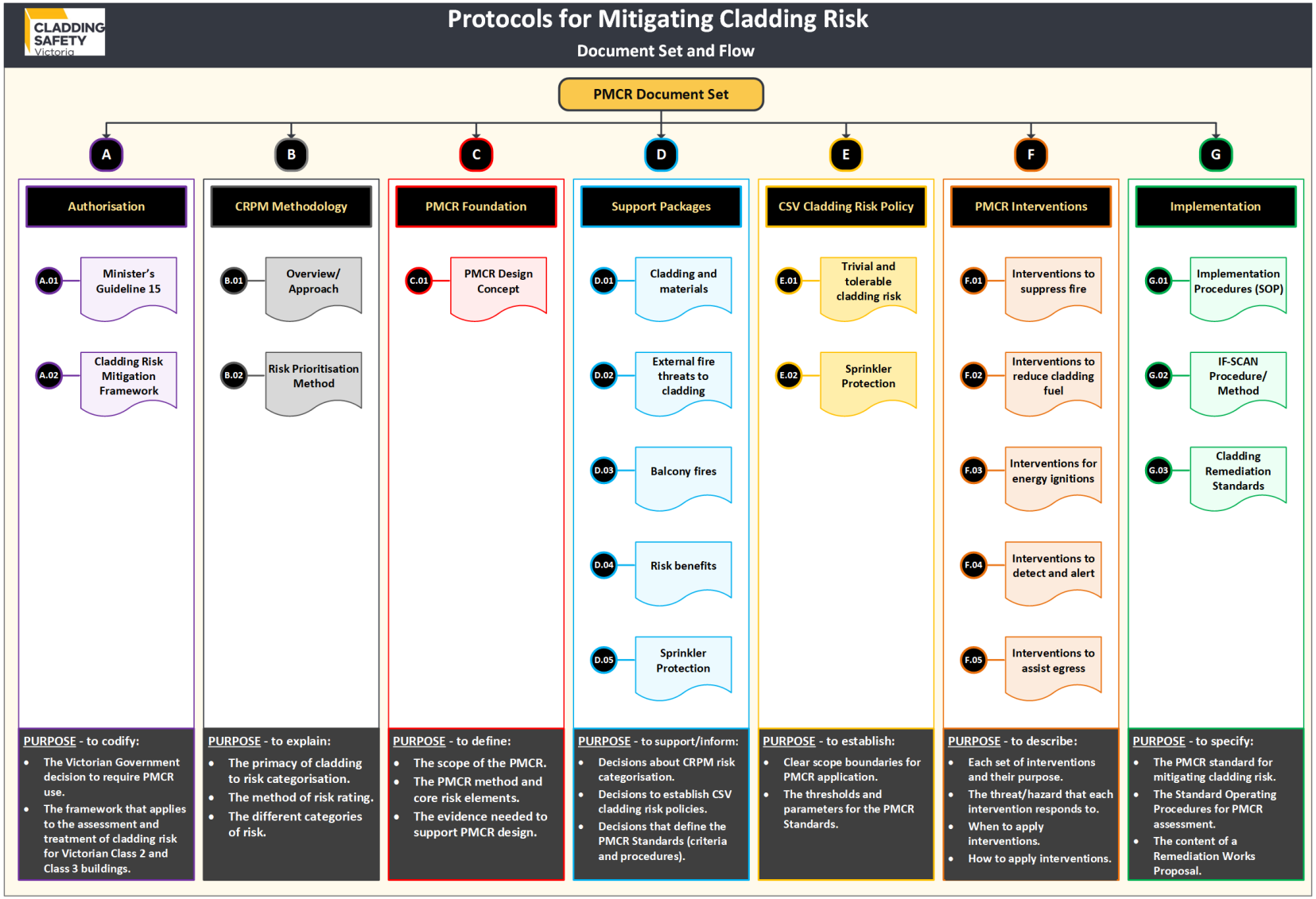
The combined components (smoke and thermal) must satisfy their respective detection interconnectivity and transmission pathway requirements as stated in:

(a) 5.4.1 for smoke detection; and

(b) 5.4.2 for thermal detection.

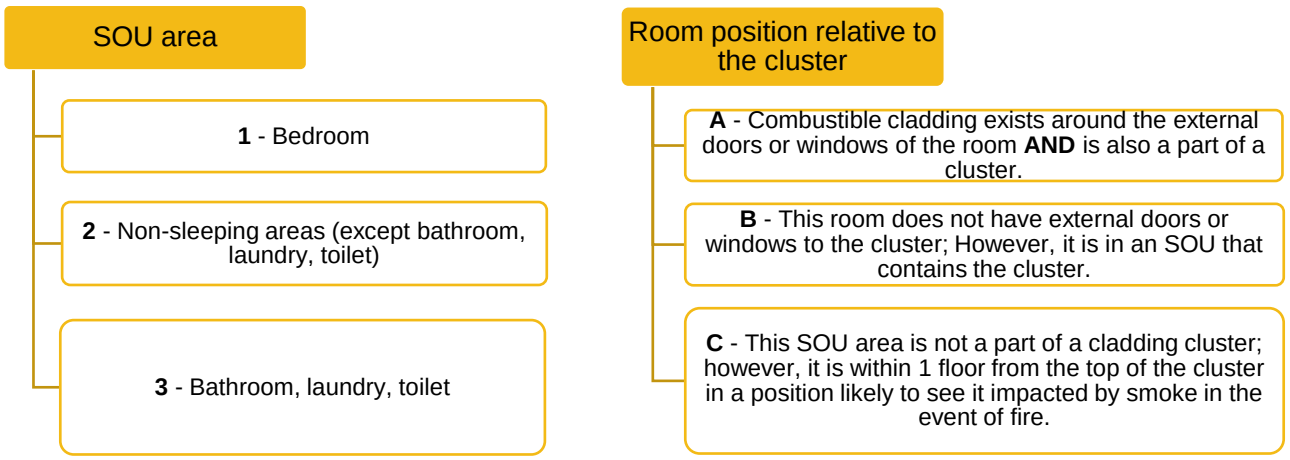
# Appendices

## Appendix A: PMCR document set and flow



## Appendix B: SOU codification

A brief description of this codification can be seen below, with visual aid and examples also shown.




*Note: where rooms are isolatable (with a door), and it is feasible to be considered a sleeping area (studies, repurposed bedrooms) CSV's worst case risk approach will treat these areas as bedrooms.*

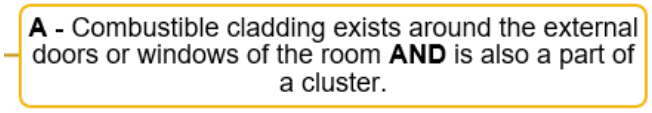
### "A" Types

Type "A" configurations represent the worst-case risk in the PMCR. These are areas that have combustible cladding that exists around the external doors and windows of the room and is also a part of a cluster. Depending on the cluster assessment, and the inherent risk posed to occupant safety through a plausible cluster fire, various levels of detection are required.

### Intention:

There are three main intentions for type "A" areas depending on room type (1, 2, 3). Firstly, bedrooms that are identified as A's (1A), require smoke detection to the impacted openings. Secondly, type 1&2 (1A & 2A) rooms may require heat/thermal detection where it is plausible that flashover may occur and subsequently impact an above SOU(s). Finally, type 3 areas (3A) require a form of detection that minimises the risk to SOU occupants through notification of fire before fire or smoke obstructs the path to the SOU exit in such a way as to make it untenable.

**Type "A"** rooms are defined as:




In the below example, the blue sections represent combustible cladding. The rooms that interface the combustible cladding may become type "A's" depending on how the cluster comes to be formed.

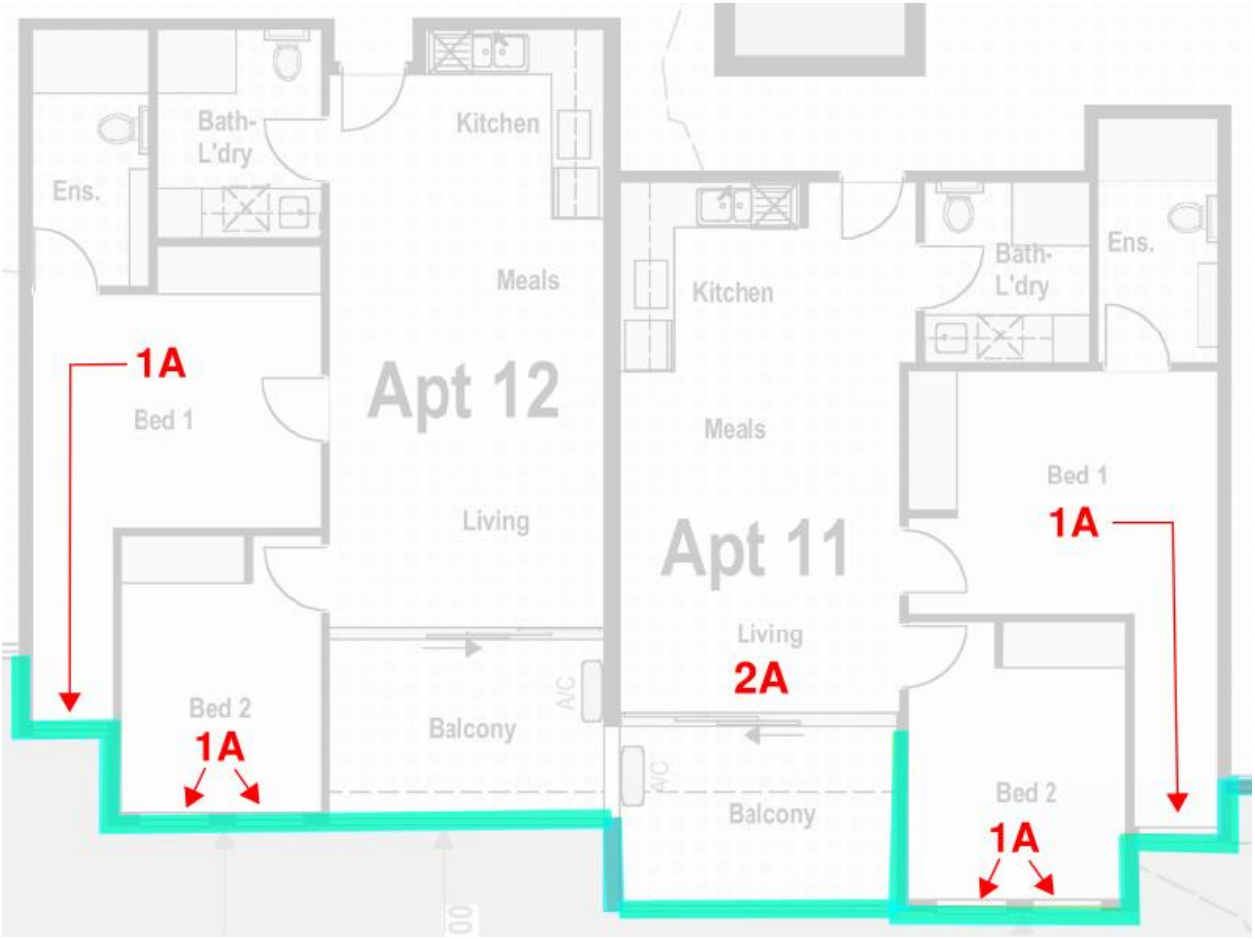



*Figure 17: Potential "A" type rooms of a cluster, these have doors or windows that sit directly on combustible cladding but are not yet also a part of a cluster*

Example:

**Step 1:** Regarding the bedrooms in Figure 17 each have external doors or windows connected to combustible cladding but are not yet given a SOU codification as they currently only meet the first condition towards becoming a type “A”, as per Page 42 of this document.

**Step 2:** Identify where the clusters exist along the facade. In Figure 18, the same floorplate has been used to illustrate how the “change” in the location of the clusters dictates the SOU codification.

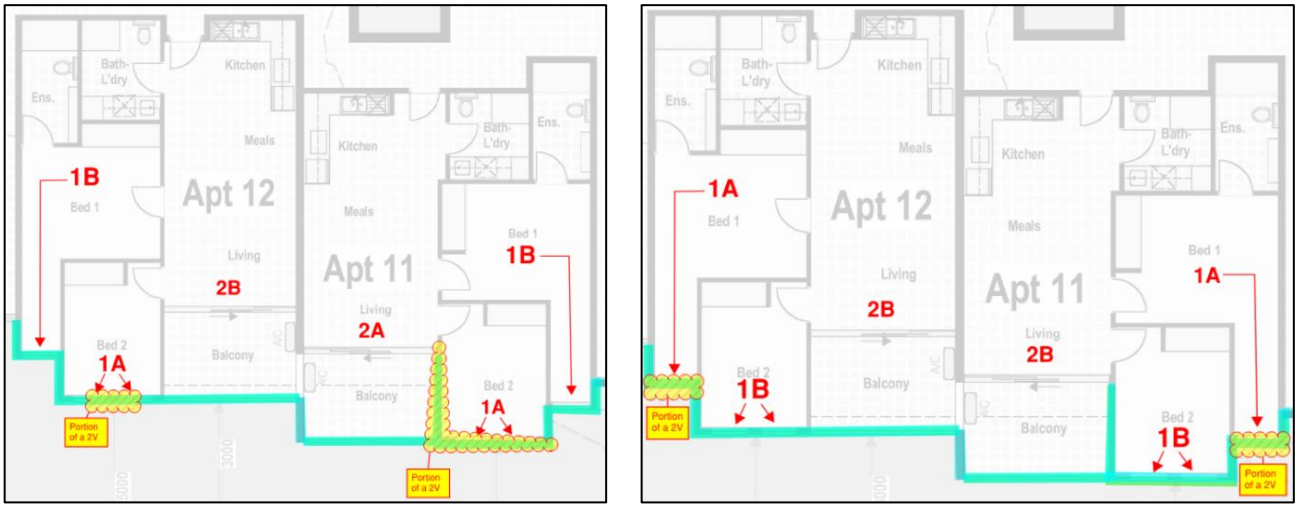



*Figure 18: The cluster markup is the second condition to assigning type "A" rooms*

### “B” Types

Type “B” rooms are defined as:

> **B** - This room does not have external doors or windows to the cluster; however, it is in an SOU that contains the cluster.

This is all areas of a SOU (that is a part of the cluster) that do not have openings to a cluster. If a SOU has a type “A” then every other room that is not also a type “A” becomes a type “B” room. Figure 19 also shows that type “B” rooms may have combustible cladding located on the facade, but if this has not been identified as part of a cluster, then it is defined as a type “B” room.

### Intention:

The principal intention of intervening upon type “B” rooms is to provide smoke detection to a SOU common area(s) so that occupants of bedrooms are given necessary time to evacuate their SOU.

### Example:

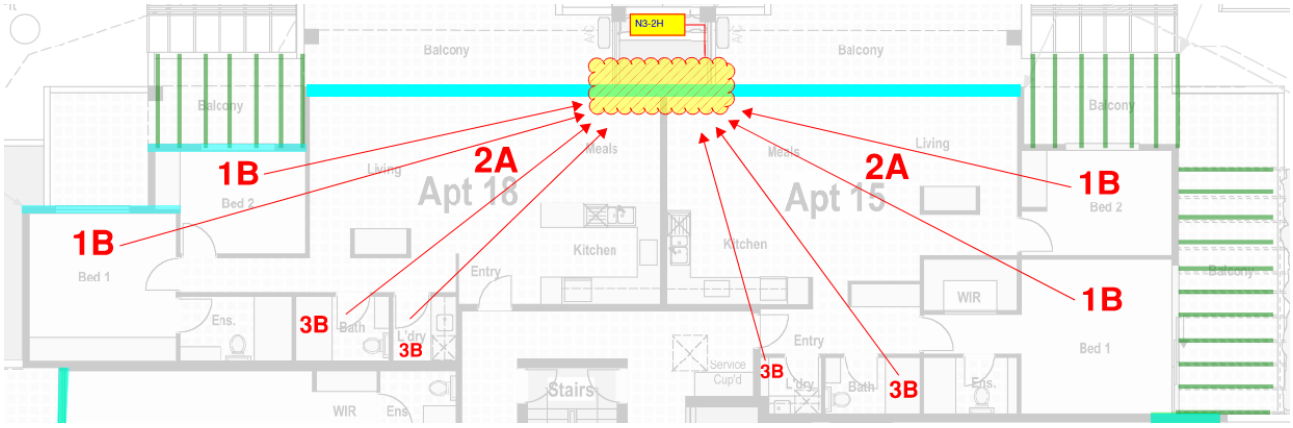



*Figure 19: B type rooms of a cluster. The distance from the cluster can be seen here even though cladding (represented in blue) resides on the facades of bedroom in apartment 18.*

### “C” Types

Type “C” are rooms of a SOU that do not belong to a cluster, however due to cluster/SOU configuration, they are at risk of being significantly impacted by smoke ingress from the below cluster.

**Type “C” rooms** are defined as:

> **C** - This SOU area is not a part of a cladding cluster; however, it is within 1 floor from the top of the cluster in a position likely to see it impacted by smoke in the event of fire

Therefore, smoke detection is required to type “A” bedrooms, since these spaces house sleeping occupants.

**Intention:**

Protect type “C” bedrooms from smoke ingress – via smoke detection to the openings of these rooms.

**Example:**

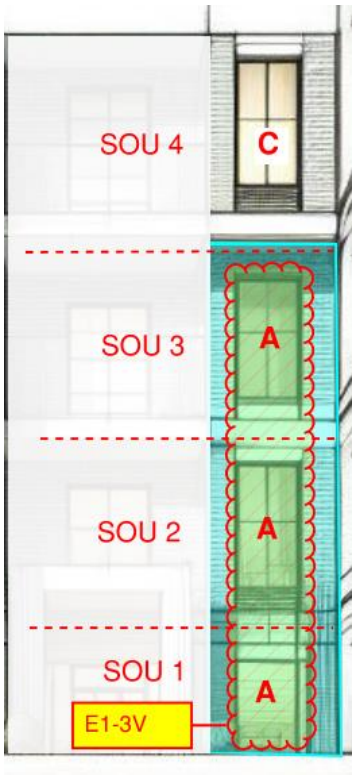



*Figure 20: “Type C” above “Type A” - 3V cluster*

In the example above (Type *"C” above type “A”- 3V cluster*), there is no horizontal displacement between SOU facades (the facade is on the same plane), and thus smoke ingress in foreseeable. Therefore, an invention of Smoke Detection to SOU 4 is required.

In contrast, if for example SOU 4 was set back (in a “wedding cake” formation) by more than 1.5m, smoke ingress would not be likely, and it would not be codified as a type “C”.