GUIDE TO THE REFERRAL OF ALTERNATIVE SOLUTIONS

Queensland Fire and Rescue Service

Department of Community Safety

Queensland Government
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As a referral (advice) agency for fire safety related Alternative Solutions, Queensland Fire and Rescue Service (QFRS) plays a very important part in helping to ensure that acceptable fire safety standards are achieved and maintained in Queensland’s buildings.

QFRS is committed to providing stakeholders with a quality value-adding advisory service. By working together we can create a safer built environment. The QFRS Guide to the Referral of Alternative Solutions provides valuable guidance that supports this goal by facilitating productive stakeholder discussions and helping to ensure a smooth and effective referral and advisory process.

This guide has been developed in close consultation with stakeholders, in particular the Engineers Australia Society of Fire Safety (SFS) and the Institution of Fire Engineers Australia (IFE). QFRS wishes to thank SFS, IFE and the other stakeholders who contributed, for their valuable input and assistance in the development of this guide.

Chief Superintendent Neil Reid AFSM
Director, State Community Safety Operations Branch
Queensland Fire and Rescue Service
Department of Community Safety
Society of Fire Safety Message

Engineers Australia’s Society of Fire Safety has been established to foster excellence in fire safety in Australia. As a learned society, the aims are to draw together individuals who are actively engaged in fire safety, to provide a national focus and leadership for the development, understanding, practice and application of fire safety engineering to achieve reductions of risk for life, property and environmental damage and the implementation of cost-effective fire safety codes and regulations.

On behalf of the Society of Fire Safety (Queensland Chapter), I am pleased to endorse this Queensland Fire and Rescue Service guide as a suitable tool to assist fire engineers and other professionals engaged in fire safety, to develop appropriate Alternative Solutions for buildings and structures. The guide is clear and concise in its treatment of the process of referral of fire engineering reports to QFRS, while being consistent with the objectives of the Society of Fire Safety.

Chris Gildersleeve
BSc GDip CEng MiStrucE FIE(Aust) NPERQ (Civil, Fire)
Chair - Society of Fire Safety (Queensland Chapter)

In the planning of any complex building or structure design, full and proper stakeholder consultation is vitally important so that successful project delivery is achieved, and on time. This is the case when fire engineering is applied to building design.

The QFRS Guideline document is a clear and useful overview of the fire engineering process in Queensland, which sets out well the key inputs and processes. This administrative document explains in simple terms, the Queensland requirements, which will serve to ensure successful and timely Alternative Solutions delivery, to assist with project success.

IFE Queensland Group is pleased to endorse the use of this document in the fire engineering industry, with the aim of maintaining professional, consistent and high standards of performance based Alternative Solutions.

IFE Queensland Group is also proud to have been associated with QFRS in the review of this guideline.

James Boyes
BE ME CEng MiFireE RPEQ
President

Christopher Odgers
MAppSc CEng FIFireE RPEQ
Immediate Past President

Our mission:

“To promote, encourage and improve the science and practice of fire extinction, fire prevention and fire engineering, and all operations and expedients connected therewith, and to give an impulse of ideas likely to be used in connection with or in relation to such science and practice to the members of the Institution and the community at large”.

The objectives of the Society of Fire Safety are:

» To develop, and extend the application of, the science and technology of fire safety engineering
» To promote excellence in the practice of fire safety engineering
» To promote the use of the science and technology of fire safety engineering in the built environment
» To promote education, training and research in all aspects of fire safety engineering
» To maintain and improve professional and educational standards for fire safety practitioners
» To influence community, corporate and regulatory attitudes and practices in relation to fire safety
» To communicate knowledge about fire safety engineering with, and to promote collaboration between members, organisations and other societies
» To provide expert advice for government, industry and the community
1. INTRODUCTION AND PURPOSE

1.1 Introduction

Under the terms of the Sustainable Planning Act 2009(a) and associated legislation, as part of the building approvals process any application for building work that involves a fire safety system(b) and that proposes a performance-based Alternative Solution(c) relating to fire safety must be referred to the Queensland Fire and Rescue Service (QFRS) for advice.

This applies to Alternative Solutions being assessed against the Performance Requirements of Volume 1 of the Building Code of Australia (BCA)(d) and Mandatory Part 2.2 (MP2.2) of the Queensland Development Code (QDC) – Fire Safety in Residential Care Buildings(e).

This document provides guidance on the expectations of the QFRS with respect to the referral of fire safety related Alternative Solutions. It is also envisaged that the use of this guide will facilitate a more effective and timely Alternative Solution advisory process.

Practitioners that provide fire safety related Alternative Solutions are generally referred to as ‘fire engineers’ and this term has been used throughout this guide. For the purposes of this document a fire engineer is taken to include a practitioner that is either a Registered Professional Engineer of Queensland (RPEQ) in the appropriate area of engineering (e.g. fire engineering or fire safety), or a licensed Fire Safety Professional (FSP).

It is stressed that this document is a guide only. Reference should be made to all relevant legislation and associated codes, standards and other guidance documents for full details of applicable legislative requirements.

1.2 Purpose

The purpose of this guide is to provide:

- Guidance on the QFRS position in relation to fire safety related Alternative Solutions under the BCA and QDC; and
- Guidance on the referral and consultation process with regards to QFRS providing advice on fire safety related Alternative Solutions; and
- Guidance on the general format and content of Fire Engineering Briefs and Fire Engineering Reports that are provided to QFRS for advice; and
- Guidance on procedures and processes at the substantial completion, testing, commissioning and post-construction phases of a project.

The guide also seeks to:

- Improve the quality of Alternative Solution submissions; and
- Provide greater consistency of Alternative Solution submissions; and
- Facilitate a smoother Fire Engineering Brief process and more productive stakeholder discussions; and
- Assist interstate fire engineers who may not be acquainted with Queensland legislation and fire engineering practice.

1.3 Latest Revisions

It is intended that this guide will be subject to periodic updates and amendments. This version is Issue 2, dated July 2010. Users should ensure that their copy of this document and any referenced codes or standards are the latest revisions or include the latest amendments.

Feedback on the content of this document is welcome. Comments or suggestions for improvement should be sent to Mr Steven McKee, Manager, Fire Engineering Unit, State Community Safety Operations Branch, Queensland Fire and Rescue Service, GPO Box 1425, Brisbane, Queensland 4001.

(a) fire safety system is defined in the Sustainable Planning Regulation (SPR)(f) (Schedule 14) and the Building Code of Australia (BCA)(Part A1, Section A1.1)

(b) Alternative Solution is defined in the BCA (Part A1, Section A1.1)
2. THE BCA & FIRE BRIGADE INTERVENTION

2.1 Goals of the BCA

» In a submission to the Productivity Commission® “The ABCB Chairman submitted that the BCA’s goals in the area of fire safety are to:

» protect the lives of building occupants; and

» facilitate fire brigade intervention in the event of emergency; and

» protect adjacent property from the spread of fire and physical damage caused by structural failure”.

» Alternative Solutions need to address these objectives, to the extent necessary within the compliance framework of the BCA.

» As a referral agency under the Sustainable Planning Act, advice provided by QFRS in relation to Alternative Solutions encompasses all three of these areas.

To assist with the development of Alternative Solutions it is recommended that the relevant Objectives and Functional Statements contained in the BCA be referred to, along with any supporting information contained in the Guide to the BCA®. These provide valuable information and guidance on the intent of the BCA, including with respect to fire brigade intervention.

For example, in Section C of the BCA (Fire Resistance) Objective CO1 states that the objectives of Section C include to “facilitate the activities of emergency services personnel”. The Guide to the BCA provides additional information and states that “a building should facilitate the role of emergency services personnel, such as the fire brigade, if it becomes necessary for them to undertake such operations as fire-fighting and search and rescue”.

2.2 Identification of BCA Performance Requirements

» Under BCA Clause A0.4 a Building Solution will comply with the BCA if it satisfies the Performance Requirements of the BCA.

» Under BCA Clause A0.5 compliance with the Performance Requirements can only be achieved by complying with the Deemed-to-Satisfy (DTS) provisions; or by formulating an Alternative Solution; or by a combination of both the DTS provisions and an Alternative Solution. It also states that the Alternative Solution must either comply with the Performance Requirements or be shown to be at least equivalent to the DTS provisions.

» BCA Clause A0.10 outlines how Performance Requirements relevant to an Alternative Solution must be identified. This is understood to be primarily the responsibility of the building certifier, but there should be opportunity for other stakeholders to provide input during the Fire Engineering Brief process.

» To ensure compliance with the BCA is achieved it is essential that all relevant Performance Requirements are identified. Accordingly, it is recommended that the building certifier gives careful consideration to this area, in consultation with the fire engineer and other stakeholders, including QFRS, as appropriate.

» In terms of A0.10, QFRS will provide advice on any fire brigade intervention issues associated with a proposed Alternative Solution, in order to assist with the correct identification of all relevant Performance Requirements.
2.3 Facilitating Fire Brigade Intervention

» In line with the goals of the BCA, Alternative Solutions need to adequately facilitate fire brigade intervention in the event of an emergency.

» The potential impact of a particular proposed Alternative Solution on fire brigade intervention requires careful consideration and should be discussed in detail with QFRS during the Fire Engineering Brief process.

» Advice provided by QFRS will include relevant details of applicable operational procedures and comment on any fire brigade intervention issues associated with a proposed Alternative Solution.

» Acceptance criteria appropriate to the specific Alternative Solution proposals should be discussed and agreed with QFRS.

» In some instances it may be agreed that the design proposals have minimal potential for adverse impact on fire brigade intervention, and it may be agreed that only a limited examination of fire brigade intervention is necessary.

» However, it may also be considered necessary for the fire engineer to quantitatively demonstrate that the proposed design adequately facilitates safe and effective fire brigade intervention. For example, the fire engineering analysis may need to demonstrate, to the degree necessary, that:

  » Fire-fighters are given adequate opportunity to rescue occupants prior to the onset of hazardous conditions and significant structural failure; and

  » Fire-fighters are provided with the necessary equipment, systems and water quantities to effectively carry out fire-fighting activities.

» The Fire Brigade Intervention Model (FBIM)\textsuperscript{7} can assist with the assessment of fire brigade intervention and it may be appropriate to utilise the FBIM in relation to some proposed Alternative Solutions. This should be carried out in close consultation with QFRS, to help ensure that the model inputs, assumptions made and outputs are appropriate for the specific situation.
2.4 Fire-Fighter Safety Limits

Where appropriate, fire-fighter safety limits for the specific situation should be discussed and agreed with QFRS during the Fire Engineering Brief process. Again, the FBIM provides valuable information that can assist with the assessment process. For example, the FBIM identifies the following critical factors that affect fire-fighters and their equipment:

- Air temperature
- Visibility
- Humidity
- Incident thermal radiation
- Air flow past the fire-fighter
- Time for which they are exposed.

The FBIM provides the following criteria in relation to time, temperature, radiation and humidity:

- It should be noted that a radiation level of 4.5kW/m² is an “Extreme Condition” and can be withstood by fire-fighters for up to one minute only. Accordingly, this value is not considered to be applicable to the majority of situations, as fire brigade activities within a building would be expected to exceed this short duration.

- The FBIM does not nominate specific criteria relating to visibility and these should be determined in consultation with QFRS, taking into account site specific hazards, the proposed Alternative Solution and the particular fire brigade intervention requirements for the situation.

### Routine Condition
Elevated temperatures, but not direct thermal radiation.

- Maximum Time: 25 minutes
- Maximum Air Temperature: 100°C (in lower layer)
- Maximum Radiation: 1kW/m²

### Hazardous Condition
Where fire fighters would be expected to operate for a short period of time in high temperatures in combination with direct thermal radiation.

- Maximum Time: 10 minutes
- Maximum Air Temperature: 120°C (in lower layer)
- Maximum Radiation: 3 kW/m²

### Extreme Condition
These conditions would be encountered in a snatch rescue situation or a retreat from a flashover.

- Maximum Time: 1 minute
- Maximum Air Temperature: 160°C (in lower layer)
- Maximum Air Temperature: 280°C (in upper layer)
- Maximum Radiation: 4 - 4.5 kW/m²

### Critical Conditions
Fire fighters would not be expected to operate in these conditions, but could be encountered. Considered to be life threatening.

- Time: < 1 minute
- Air Temperature: > 235°C (in lower layer)
- Radiation: > 10 kW/m²
3. DEVELOPMENT OF ALTERNATIVE SOLUTIONS

3.1 Fire Engineering Guidelines

» The ABCB has published the *International Fire Engineering Guidelines* (IFEG), 2005 Edition, to support the development and use of fire safety related *Alternative Solutions* under the BCA.

» The following organisations have endorsed the IFEG, as describing an appropriate process for the design and approval of fire safety in buildings by competent practitioners:
  - Australian Building Codes Board (ABCB)
  - Australasian Fire & Emergency Service Authorities Council (AFAC)
  - Australian Institute of Building Surveyors (AIBS)
  - Engineers Australia Society of Fire Safety (SFS)

» As an AFAC member agency, QFRS endorses the use of the IFEG, and has an expectation that practitioners will follow these guidelines as representing industry ‘best practice’. Guidance provided in this document is based on this expectation.

3.2 Other Considerations

3.2.1 Automatic Fire Suppression Systems

» The QFRS strongly advocates and endorses the use of reliable fire sprinkler systems in buildings where appropriate, such as in the occupancies listed in Table E1.5 of the BCA. The QFRS is of the opinion that sprinkler systems provide a high degree of protection to life, property and the environment and greatly assist the fire-fighting operations and safety of QFRS personnel.

» BCA Performance Requirement EP1.4 states that an automatic fire suppression system must be installed to the degree necessary to control the development and spread of fire, appropriate to the size of the fire compartment, the function or use of the building, the fire hazard and the height of the building. Various other Performance Requirements also require consideration of installed active fire safety systems, such as a sprinkler system.

» It is the position of QFRS that in some situations it may not be possible to achieve compliance with the Performance Requirements of the BCA without the installation of a suitable automatic fire suppression system.

3.2.2 Unwanted Alarms

» If an *Alternative Solution* proposal includes the installation of a QFRS-monitored fire detection and alarm system, consideration must be given to the risk of unwanted alarm activations. For example, this would typically include situations where detectors are proposed in locations where they are not normally required by AS1670.1 (Section 3.26) and/or other locations that could result in the occurrence of unwanted alarms.

» Incorrect detector type and location will generate unwanted alarms in most circumstances. QFRS will not support *Alternative Solutions* that may be expected to generate unwanted alarms.

Example: the proposed use of smoke detectors as part of an *Alternative Solution* involving minor extended travel distance on an open access balcony in a Class 2 or 3 building.

_in this situation the installation of smoke detectors would expose the devices to the effects of weather and/or insects, thus creating unwanted alarms._

» The *Fire & Rescue Service Act 1990* (Section 104DA) creates an offence when more than four unwanted alarms are signalled to the QFRS since the end of the last financial year. The QFRS will enforce these provisions.

3.2.3 Consideration of Arson

» Arson is a major cause of serious fires and should be considered in any proposed *Alternative Solution*.

» QFRS strongly recommends that suitable measures to minimise both the likelihood and the consequences of arson be incorporated in the building design and by the ongoing building management and security procedures. Further guidance on this matter is provided in a range of general guidance documents on arson prevention and protection.
3.2.4 Consideration of Dangerous Goods

» The impact of dangerous goods storage within a building should be considered in a building by (i) satisfying relevant dangerous goods legislation and (ii) the implementation of additional fire safety measures as part of a proposed Alternative Solution design, if considered necessary.

3.2.5 Comparison to a DTS ‘Benchmark’ Design

» BCA Clause A0.5 states that an Alternative Solution must either comply with the Performance Requirements or be shown to be at least equivalent to the DTS provisions. Section 1.2.9.1 of the IFEG provides the following guidance in relation to the use of the comparative or equivalence approach:

“Typically, the fire safety provided by one element, or a sub-system, or the complete fire safety system, is compared to the level of fire safety that would be achieved in an identical building in which that element, sub-system or system is designed in compliance with the deemed-to-satisfy or prescriptive provisions identified in Section 1.2.8. If the analysis is carried out on such a comparative basis, it will involve the same assumptions, models, calculations and input data for the proposed trial design and the deemed-to-satisfy or prescriptive design.”

Therefore, where an Alternative Solution utilises a comparative approach, it is very important that all relevant stakeholders agree a suitable DTS ‘benchmark’ design for the purposes of the comparative assessment. It is not considered appropriate to develop a hypothetical DTS ‘benchmark’ design that bears little resemblance to the actual proposed Alternative Solution building i.e. ‘comparing apples to oranges’.

» If stakeholders cannot agree on a suitable DTS ‘benchmark’ design it may be appropriate for the proposed Alternative Solution to be assessed for direct compliance with the Performance Requirements under BCA Clause A0.5(b)(i).

3.2.6 BCA Part A1.1 – Definitions

» As the BCA Performance Requirements do not directly apply to the definitions contained in Part A1 of the BCA it is not possible to develop an Alternative Solution in relation to a BCA definition. For example, the BCA definition of an atrium or effective height cannot be varied by using an Alternative Solution or via some form of fire engineering discussion or analysis. The definition must be applied as written in the BCA, the applicable DTS provisions identified and then any proposed departures from the DTS provisions considered and assessed as potential Alternative Solutions.
4. REGISTRATION & LICENSING OF FIRE ENGINEERS

4.1 General

As noted in the introduction, for the purposes of this guide a fire engineer is taken to include a practitioner that is either a Registered Professional Engineer of Queensland (RPEQ) in the appropriate category of engineering, or a licensed Fire Safety Professional (FSP).

As both a referral (advice) agency for Alternative Solutions and an end-user of installed building fire safety measures, QFRS places significant reliance on the design and analysis information supplied by the fire engineer. It is therefore necessary for QFRS to confirm that fire engineers providing fire safety related Alternative Solutions hold the necessary registration or licence required under applicable legislation.

The information contained in this section has been included to provide guidance on current legislative requirements in Queensland relating to the registration and licensing of fire engineers.

It is the understanding of QFRS that in Queensland there are currently two registration/licensing options for fire engineers who provide fire safety related Alternative Solutions, as follows:

Registration by the Board of Professional Engineers Queensland as a Registered Professional Engineer of Queensland (RPEQ).

Licensing by the Queensland Building Services Authority as a Fire Safety Professional (mandatory from 1st January 2011).

However, a professional engineering service, as defined in the Professional Engineers Act 2002\(^1\), must be provided by a Registered Professional Engineer of Queensland (RPEQ).

Reference should be made to relevant legislation, including the Professional Engineers Act 2002, the Queensland Building Services Authority Act 1991\(^2\), associated subordinate legislation and relevant guidance documents.

Specific queries relating to registration and licensing should be directed to the Board of Professional Engineers Queensland (BPEQ) and/or the Queensland Building Services Authority (BSA) as appropriate.

4.2 Registered Professional Engineers of Queensland

It is understood that under the terms of the Professional Engineers Act 2002, practitioners providing a professional engineering service must either be registered as a RPEQ, or be supervised by a RPEQ.

The Professional Engineers Act 2002 definition of professional engineering service is as follows:

"professional engineering service means an engineering service that requires, or is based on, the application of engineering principles and data to a design, or to a construction or production activity, relating to engineering, and does not include an engineering service that is provided only in accordance with a prescriptive standard."

The definition of prescriptive standard is:

"prescriptive standard means a document that states procedures or criteria for carrying out a design, or a construction or production activity, relating to engineering; and the application of which, to the carrying out of the design, or the construction or production activity, does not require advanced scientifically based calculations."

Accordingly, if the provision or formulation of the Alternative Solution involves a professional engineering service then the fire engineer providing or formulating the Alternative Solution must be registered as a RPEQ in the relevant area of engineering e.g. fire engineering or fire safety.

It is the opinion of QFRS that the provision or formulation of the majority of fire safety related Alternative Solutions would involve professional engineering services. However, where this is unclear or in dispute, it may be necessary to seek advice from the BPEQ and/ or BSA as appropriate.

The Minister for Public Works and Information and Communication Technology has appointed Engineers Australia and the Institution of Fire Engineers Australia as Approved Assessment Entities for the purposes of assessing professional engineers for RPEQ registration in the area of fire safety/ fire engineering. Further information can be obtained from the BPEQ.
4.3 Fire Safety Professional Licensees

» It is understood that under the terms of the Queensland Building Services Authority Act 1991 and subordinate legislation practitioners carrying out or supervising fire protection work require a licence in the appropriate class.

» BSA licence classes include the class of ‘Fire Safety Professional’.

» The scope of work for a Fire Safety Professional, as nominated in the Queensland Building Services Authority Regulation 2003, is as follows:

  “Scope of work

  (1) The formulation and provision of alternative solutions relating to fire safety.

  (2) The inspection of, or reporting on, buildings (including existing, temporary or special structures) against fire performance legislation, such as the Building Code of Australia and the Building Act 1975.

  (3) Certify, inspect and test a fire protection system.

  (4) However the scope of work does not include professional engineering services under the Professional Engineers Act 2002.”

4.4 Summary

» Fire safety related Alternative Solutions that involve professional engineering services must be developed by a Registered Professional Engineer of Queensland (RPEQ) in the appropriate category of engineering.

» Fire safety related Alternative Solutions that do not involve professional engineering services may be developed by a practitioner holding a BSA licence as a Fire Safety Professional (mandatory from 1st January 2011).
5. REFERRAL OF ALTERNATIVE SOLUTIONS TO QFRS

5.1 General

» As part of the legislated building approvals process the QFRS is a referral (advice) agency for Alternative Solutions assessed against Volume 1 of the BCA or MP2.2 of the QDC.

» The reader should refer to relevant legislation, including the Sustainable Planning Act 2009 (SPA), the Sustainable Planning Regulation 2009 (SPR), the Building Act 1975 (BA) and the Building Regulation 2006 (BR). However, the following diagram summarises the ‘triggers’ for referral of Alternative Solutions to QFRS.

» Fire safety system is defined in the SPR and BCA as follows:

“Fire safety system means one or any combination of the methods used in a building to:
(a) warn people of an emergency; or
(b) provide for safe evacuation; or
(c) restrict the spread of fire; or
(d) extinguish a fire,
and includes both active and passive systems.”

» Note: reference should be made to Table 1 of Schedule 7 of the SPR for more comprehensive details of the referral jurisdiction of QFRS in relation to building work. For example, QFRS also has referral jurisdiction for fire safety management procedures for budget accommodation buildings, and in relation to the fire and evacuation plans for residential care buildings.

Is the building work assessable against the BR?

- no → Referral to QFRS not required

- yes →

  Does the application involve a fire safety system?

    - no →

    - yes →

      Does the building work require Special Fire Services?

        - no →

        - yes →

          Referral of the Special Fire Services to the QFRS is required

      Does the building work include an Alternative Solution to be assessed against the Performance Requirements of BCA Vol.1 or QDC MP2.2 for the fire safety system?

        - no →

        - yes →

          Referral of the Alternative Solution to the QFRS is required

« Special Fire Services is defined in the SPR (Schedule 8)
5.2 Minor Deviations from the DTS Provisions

» For proposed Alternative Solutions involving ‘minor’ variations from the Deemed-to-Satisfy (DTS) provisions of the BCA, it is suggested that initial consultation can occur via a phone call or email to QFRS to:
  » Discuss the proposed deviation from the DTS provisions of the BCA;
  » Discuss the fire engineering and consultation process to be followed;
  » Discuss the methodology to be used for meeting the Performance Requirements of the BCA;
  » Seek in-principle support from QFRS to commence the fire engineering analysis and prepare the Fire Engineering (Alternative Solution) Report;
  » Discuss other fire safety issues that may be of concern to QFRS and/or other stakeholders.

» Determination of what constitutes ‘minor’ variations from the DTS provisions should be made jointly by relevant stakeholders, including the building certifier, fire engineer and QFRS.

» If the proposals are agreed as being ‘minor’ a Fire Engineering Report should be prepared in line with Section 7 of this document and the IFEG, to the extent agreed as necessary for the particular issue(s) under consideration. This report is then submitted to QFRS for consideration.

» Where a minor deviation from the DTS provisions arises during the construction phase of the project, the minor deviation should be discussed with QFRS and may be submitted as an addendum to the Fire Engineering Report. However, prior to final completion of the building, a single consolidated Fire Engineering Report incorporating all addenda should be formally submitted to QFRS.

5.3 Other than Minor Deviations from the DTS Provisions

» If the proposed Alternative Solution is not considered to be minor the formal Fire Engineering Brief process described in Section 6 of this document and the IFEG should be followed, and a Fire Engineering Brief submitted to the QFRS for consideration and advice.

» Once in-principle agreement on the Fire Engineering Brief is reached, a fire engineering analysis and assessment should be undertaken, and the results presented in a suitable Fire Engineering (Alternative Solution) Report. This report should then be submitted to the QFRS for consideration and advice.
6. THE FIRE ENGINEERING BRIEF

6.1 Process

» Chapter 1.2 of the IFEG sets out the Fire Engineering Brief (FEB) process and states that “a FEB is a process that defines the scope of work for the fire engineering analysis. Its purpose is to set down the basis, as agreed by relevant stakeholders, on which the fire safety analysis will be undertaken...The FEB is an essential part of the fire engineering process [and it] should be developed collaboratively by all the relevant stakeholders...”.

» If the Alternative Solution proposals are not considered to be minor deviations from the DTS provisions of the BCA, the formal FEB process should be followed, including the following:

  » A draft FEB, including a clear description of the proposed Alternative Solutions, should be prepared and submitted to QFRS.

  » A FEB meeting should be held, attended by QFRS and key stakeholders involved in the building project.

  » A record (or minutes) of the FEB meeting should be prepared and provided to QFRS for review and in-principle support of the issues discussed (as appropriate). This will allow the fire engineer to proceed with the detailed analysis, assessment and preparation of the Fire Engineering Report.

  » If the post-FEB detailed analysis and assessment shows that the proposed Alternative Solution (trial design) does not satisfy the agreed acceptance criteria then the FEB process should be re-visited.

  » Similarly, any significant proposed changes to the content of an agreed FEB should be referred back to the FEB stakeholders for consideration.

» In some cases a concept or preliminary design meeting between QFRS and stakeholders may also be of benefit, such as where the issues are considered to be complex or worthy of preliminary discussions. This would typically occur prior to the preparation of the FEB document and the FEB meeting, but it should not replace the FEB stage of the process.

» Relevant preliminary design drawings should be submitted to QFRS along with the FEB documentation.

» It is recommended that a draft FEB be submitted to QFRS at least five working days prior to the FEB meeting being held, thus allowing QFRS officers the opportunity to consider the proposals before the meeting. If the draft FEB is submitted less than five days before the meeting it may not be possible for QFRS to provide comprehensive advice during the meeting.

6.2 Fire Engineering Brief

» The FEB should be generally consistent with the framework and methodologies contained in the IFEG.

» The FEB should be presented in a logical, clear and concise format, and be written in such a manner that all stakeholders can understand and follow the contents.

» The FEB should be prepared generally in accordance with the recommendations outlined in the IFEG and would be expected to include the following key elements as appropriate to the issue(s) under consideration:

  ✓ Clear report identification, including building name, full address etc.

  ✓ Details of the fire engineer responsible for the project, including the fire engineer’s RPEQ registration or FSP licence number, as appropriate

  ✓ Introduction and scope of the project

  ✓ Relevant stakeholders

  ✓ Building description/characteristics

  ✓ Occupant characteristics

  ✓ Fire safety objectives

  ✓ Fire hazard assessment, literature review and statistical analysis

  ✓ Proposed deviations from BCA Deemed-to-Satisfy (DTS) provisions

  ✓ Proposed trial fire safety design, including all proposed Special Fire Services and other fire safety systems and installations

  ✓ Relevant Performance Requirements, determined in line with BCA Clause A0.10
Proposed methodology for achieving compliance with the BCA performance requirements, under BCA Clause A0.5

Proposed assessment method(s) under BCA Clause A0.9

Proposed methods of analysis e.g. comparative or absolute, qualitative or quantitative, deterministic or probabilistic, sensitivity analysis etc

Proposed fire engineering models and tools to be employed for analysis and relevant validation for their use

Acceptance criteria and factors of safety

Proposed fire scenario(s)

Proposed design fire(s), with full justification of proposals

Proposed standards of construction, installation, performance

Proposed inspection regime during construction and on completion

Proposed standards of commissioning, testing, management, use and maintenance. Proposed limitations and restrictions

Assumptions and limitations

Full details of supporting references

The contents of the FEB should be set out as clearly and logically as possible. A clear and consistent approach will minimise the potential for confusion, misunderstanding and possible delays in obtaining in-principle stakeholder acceptance of the proposals.

It is recognised that it may not be necessary for a FEB to cover all of the above areas in detail. This will depend on the particular Alternative Solution issue(s) under consideration.

6.3 Fire Engineering Models, Tools and Methodologies

It is very important that all fire engineering models, tools and methodologies to be used in the fire engineering analysis are fully explained, justified and validated for the specific application. Similarly, all inputs to the various models and tools etc should be fully detailed, discussed and justified.

6.4 Fire Engineering Brief Meeting

Relevant stakeholders in the project should attend the FEB meeting. Depending on the particular issue(s) under consideration, attendees would typically be expected to include (but not be limited to) some or all of the following:

- QFRS personnel
- Fire engineer (RPEQ or FSP)
- Building certifier
- Project manager
- Architect or building designer
- Structural and services engineers
- Building owner or representative
- Building manager or representative

It is considered essential that the building certifier, fire engineer and QFRS be present at the meeting, as a minimum.

A record (or minutes) of the FEB meeting should be provided to meeting attendees and other stakeholders for review as soon as possible after the meeting.

It is strongly recommended that QFRS acceptance of the minutes and in-principle support of the issues discussed should be obtained prior to the fire engineer proceeding with the detailed fire engineering analysis and assessment, and preparation of the Fire Engineering Report.
7. THE FIRE ENGINEERING (ALTERNATIVE SOLUTION) REPORT

7.1 General

» The Fire Engineering Report (FER) should be generally consistent with the framework and methodologies contained in the IFEG.

» In order to avoid confusion and potential delays in the assessment, the final report should be presented in a logical, clear and concise format, and be written in such a manner that all relevant stakeholders can understand and follow the contents.

» In line with good report writing principles it should:
  » Be self-explanatory and transparent;
  » Use jargon only when it is explained;
  » Use diagrams and graphics where this may be helpful to the reader;
  » Clearly and fully explain the source(s) of information used, with references provided;
  » Justify assumptions and engineering judgement used;
  » Clearly and fully explain analysis methodologies utilised.

» Relevant design drawings should be provided along with the fire engineering report for reference purposes.

7.2 Content

» The FER should be structured generally in accordance with the recommendations outlined in the IFEG and would be expected to include the following information as appropriate:
  ✓ Clear report identification, including building name, full address etc.
  ✓ Details of the fire engineer responsible for the project, including the fire engineer’s RPEQ or FSP registration or licence number, as appropriate
  ✓ Executive summary
  ✓ Introduction and scope of the project
  ✓ Relevant stakeholders
  ✓ Building description/characteristics
  ✓ Occupant characteristics
  ✓ Fire safety objectives

✓ Fire hazard assessment, literature review and statistical analysis
✓ Proposed deviations from BCA Deemed-to-Satisfy (DTS) provisions
✓ Proposed trial fire safety design, including all proposed special fire services and other fire safety systems and measures
✓ Relevant Performance Requirements, determined in line with BCA Clause A0.10
✓ Methodology adopted for achieving compliance with the BCA Performance Requirements (BCA Clause A0.5)
✓ Assessment method(s) adopted (BCA Clause A0.9)
✓ Methods of analysis adopted e.g. comparative or absolute, qualitative or quantitative, deterministic or probabilistic, sensitivity analysis etc (including a detailed and clear explanation of the analysis methodology)
✓ Fire engineering models and tools employed for analysis, and relevant validation for their use
✓ Acceptance criteria and factors of safety
✓ Fire scenarios
✓ Design fires, with full justification provided
✓ Analysis input data, with justification of all inputs provided
✓ Collation and evaluation of the analysis results, including assessment against acceptance criteria and relevant Performance Requirements of the BCA
✓ Conclusions, including an opinion that the relevant Performance Requirements have been satisfied
✓ Requirements of the Alternative Solution including:
  ✓ Full details of all required fire safety related systems, design features, measures and installations
  ✓ Standards of construction, installation, performance
  ✓ Inspection regime during construction and on completion
Standards of commissioning and testing, ensuring all specific requirements are identified e.g. smoke testing

Ongoing maintenance, building management and building use restrictions, limitations, requirements, issues

Assumptions made and limitations applicable to the acceptability of the final Alternative Solution design

Documentation of the FEB process, including minutes of meetings

Sign-off of report by author, reviewer and approver of report as applicable

Full details of supporting references

It is recommended that the executive summary contain an overview of each Alternative Solution, ideally presented in tabular form for ease of reference. For example, the overview could include details of the Alternative Solution design and its requirements; the deviations from the DTS provisions of the BCA; the relevant Performance Requirements; and the type of fire engineering analysis and assessment undertaken to justify the Alternative Solution.

It is also recommended that the FER provides a concise description of each Alternative Solution and all applicable requirements in a format that can be easily transferred to the Certificate of Classification for the building. Note that the Building Act 1975 now requires that Certificates of Classification contain details of the Alternative Solution(s) and be displayed at the main entrance of the building.

Again, it is requested that the contents of the FER be set out as clearly as possible. A report that is confusing, unclear or difficult to follow may significantly lengthen the overall processing time for the advice application, due to the likelihood of additional comments/queries being generated by the review and the time associated with resulting communications, discussions and/or negotiations etc.

It is recognised that it may not be necessary for a FER to cover all of the above areas in detail, depending on the particular Alternative Solutions under consideration.

It is recommended that analysis results be clearly summarised in the body of the FER, with the detailed results included in the appendices of the report.

7.3 Review of the Fire Engineering Report

Under the legislated building approvals process the building certifier is the approval body and the QFRS is a referral (advice) agency. As the building certifier is ultimately responsible for ensuring that the design proposals satisfy the Performance Requirements of the BCA, it is the expectation of the QFRS that the relevant building certifier will satisfy him/herself that the FER is satisfactory in this regard, prior to the final version of the report being submitted to QFRS.

Section 282 of the Sustainable Planning Act 2009 requires that: “Each referral agency must, within the limits of its jurisdiction, assess the application against the laws that are administered by, and the policies that are reasonably identifiable as policies applied by, the referral agency;”. Accordingly, as a referral (advice) agency, QFRS will assess proposed Alternative Solutions in line with relevant legislation, taking into consideration the information outlined in this guide and other relevant guidance documents.

In some instances QFRS may request that the FER be subject to a third party peer review by an independent suitably qualified person. Further information on this process is provided in Section 8.

Under the SPA process QFRS is required to provide advice within 15 working days of receipt of a formal application. However, the fire engineering process can be lengthy and sometimes QFRS receives a formal application for advice even though the fire engineering process remains incomplete at the time of this application. In this situation QFRS will typically provide advice within the 15 day period to the effect that the application is incomplete and is therefore considered unacceptable at that time. Ideally, the fire engineering process should be completed prior to submission of a formal application for advice.

The FER should be provided to all relevant parties for review, such as the project manager, design team, owner etc., as well as to those parties responsible for installing, commissioning and maintaining the building’s passive and active fire safety features, systems and essential services. This is intended to help ensure that all Alternative Solution requirements are adequately communicated to relevant stakeholders and are therefore satisfactorily implemented on site.

Any conditions relating to the approval of the FER also need to be provided to relevant parties.
8. INDEPENDENT THIRD PARTY REVIEW

8.1 General

» In some instances the stakeholder group may consider that the proposed Alternative Solution(s) and supporting fire engineering analysis should be subject to a third party peer review by an independent suitably qualified and experienced fire engineer.

» It is the opinion of QFRS that an independent third party peer review should be considered as a constructive process that will support the fire engineering design and assessment process and assist relevant stakeholders to make a decision about the suitability of Alternative Solution(s).

» Guidance on the third party peer review of fire engineering reports can be found in a number of documents, including the following:

  » International Fire Engineering Guidelines (IFEG)

  » The SFPE Code Official’s Guide to Performance-Based Design Review\(^{16}\)

  » Guidelines for Peer Review in the Fire Protection Design Process\(^{17}\)

» The IFEG state that the term ‘third party review’ encompasses both peer review and specialist review, which are defined as follows:

  » Peer review: a third party review undertaken by a person accredited as a fire engineer or a person with the equivalent competencies and experience.

  » Specialist review: a third party review limited to a consideration of particular aspects of a fire engineering evaluation and carried out by a person with appropriate specialist knowledge.

» QFRS supports the use of third party review where warranted, but it is stressed that the use of third party review does not relieve QFRS of its legislative obligation to provide advice on Alternative Solutions. However, a quality third party review, carried out by a reviewer agreed by all parties, does assist QFRS (in its advisory capacity) to be reasonably assured that the analysis has been undertaken correctly and that the Alternative Solution(s) will comply with the BCA, relevant legislation, codes and standards.

8.2 When is a Third Party Review Necessary?

» The need for a third party peer review should be determined on a project-specific basis. However, examples of where it may be considered appropriate could include (but not be limited to) situations where:

  » An unusual or innovative fire engineering analysis methodology has been proposed, where specialist advice is considered necessary;

  » A very complex fire engineering analysis has been undertaken involving multiple inter-related proposed departures from the DTS provisions;

  » A radical departure from the DTS provisions has been proposed, relating to a critical life safety feature in a high-occupancy building;

  » A serious difference of opinion has arisen and an additional independent expert opinion may assist with issue resolution.

» In line with the IFEG it is recognised that in some cases it may only be necessary to undertake a review of limited aspects of a fire engineering design and/or analysis. However, in these instances it is important that the person undertaking the third party review has an adequate understanding of the design proposals for the overall project, so that he/she can holistically consider specific issues in the context of the whole.

» It is strongly recommended that the need for a third party peer review and the person to carry out the review be agreed by relevant stakeholders either before or during the early stages of the FEB process.

8.3 Third Party Reviewer

» It is extremely important that the fire engineer appointed to carry out the third party peer review (hereafter called ‘the peer reviewer’) is completely independent of the design team. The peer reviewer must have no conflict of interest, or he/she must declare any such conflict or perceived conflict so that it can be considered by the stakeholder group.

» The peer reviewer must be both appropriately qualified and experienced for the specific Alternative Solution(s) under
consideration. For example, a fire engineer who is a Registered Professional Engineer Queensland (RPEQ) in the appropriate area of engineering, and who is suitably experienced for the particular type of project and the Alternative Solution(s) being proposed may be an acceptable person to carry out the third party peer review. However, both experience and qualifications must be considered.

- Consideration needs to be given to the following questions:
  - Does the proposed peer reviewer possess the registration or licence required under relevant legislation e.g. RPEQ?
  - Does the proposed peer reviewer hold suitable fire engineering or other relevant qualifications for the specific issues under consideration e.g. relevant qualifications to review a complex structural fire resistance issue?
  - Does the proposed peer reviewer have sufficient experience in relation to the specific issues under consideration, gained on projects of a similar type and scale?
  - The peer reviewer should be agreed by all relevant stakeholders (including QFRS) during, or prior to, the FEB stage of the process. Agreement of the peer reviewer selection is extremely important, otherwise the review outcomes may not be accepted by all stakeholders.

8.4 Scope and Process

- The specific scope of the third party peer review should be explicitly identified and agreed by the stakeholder group on a project-by-project basis. This would normally occur prior to or during the FEB process.

However, the QFRS will typically request a comprehensive, detailed and robust review of all key aspects of the Alternative Solution(s), the supporting analysis and relevant associated design documentation. An exception to this is where a specialist review is considered necessary, where stakeholders may agree on a more limited scope for the review.

- The peer reviewer should be involved throughout the fire engineering process, including the FEB stage. In some instances it may also be appropriate for the peer reviewer to be involved in the inspection, testing and commissioning stages of the project. For example, this may be very beneficial on large and complex projects.

- The review should be a transparent process and the peer reviewer should ensure that the project stakeholders, including QFRS, are kept fully informed of the review process being undertaken, such as by ensuring that stakeholders are provided with copies of all relevant review correspondence, reports and certification, and by providing periodic status reports to the stakeholder group.

- It is also important that the stakeholder group agree on the reporting processes to be followed and the reports/documentation to be produced by the peer reviewer during and on completion of the review. For example, this would typically include periodic review reports and a final report confirming that the Alternative Solutions meet the BCA Performance Requirements.

- The above items should be clearly documented and agreed by relevant stakeholders, prior to the commencement of the review.

**Suggested Process**

1. Stakeholders identify the need for a third party peer review.
2. Stakeholders agree on the independent person/party selected to conduct the third party peer review (i.e. agree on who will be the peer reviewer).
3. Stakeholders agree on the scope of the third party peer review, including the extent and depth of review and the documentation to be reviewed etc.
4. Stakeholders agree on the reporting processes, ensuring that all relevant stakeholders (including QFRS) are kept fully informed throughout the process.
5. Stakeholders agree on the reports/documentation to be provided by the peer reviewer, both during the review process and on completion.
6. The above items are documented and agreed by relevant stakeholders, prior to commencement of the review.
9. **INSPECTION, TESTING & COMMISSIONING PHASE**

9.1 General

» During final building inspections, building certifiers, fire engineers, QFRS personnel and other parties may find that important Alternative Solution requirements have not been provided in the as-constructed building. This can result in costly and disruptive rectification works having to be undertaken in the final stages of the project, when the building contractor may be under pressure to complete the project on schedule.

» This situation may be caused by a variety of factors, such as a lack of adequate communication of Alternative Solution requirements to the contractor or sub-contractor; an inadequate inspection regime by the responsible parties; site-specific construction problems encountered; or a lack of understanding of specific Alternative Solution design, installation or construction requirements.

» Clearly this is an undesirable situation for all stakeholders and QFRS advocates the implementation of a structured document review, inspection and ‘sign-off’ regime to ensure that all Alternative Solution requirements are satisfactorily implemented on site. It is envisaged that the fire engineer would play a key role in this process, in support of the relevant building certifier and QFRS.

9.2 Document Review and Inspection Regime

» The Engineers Australia Society of Fire Safety (Queensland Branch) recommends the adoption of a risk-based documentation review and on-site inspection regime, such as that outlined in the paper ‘Performance Based Design – Putting It Together on Site’. QFRS supports this type of approach.

» In line with this type of approach, to ensure that all Alternative Solution requirements are satisfactorily implemented on site it is recommended that:

» The fire engineer obtains written confirmation from the relevant members of the design team that they have incorporated all of the fire safety measures required by the final FER; or

» The fire engineer checks relevant design consultants’ building approval drawings and specifications to ensure that all of the fire safety measures required by the final FER have been incorporated.

Also, the fire engineer responsible for the Alternative Solution(s) should be involved in the construction, testing, commissioning and final inspection stages of the building project to the extent necessary to verify that the construction of the building is in accordance with all requirements of the FER and that any conditions applied to the building approval that relate to the Alternative Solution(s) have been satisfied. It is recommended that the fire engineer and other relevant stakeholders develop a suitable inspection, testing and commissioning plan to facilitate this process.

9.3 QFRS Inspection Report

» Prior to QFRS issuing a final inspection report, QFRS may request that the building certifier obtain and provide QFRS with suitable certification or written confirmation from the fire engineer confirming that:

» The construction of the building is generally consistent with the design and assumptions detailed in the FER;

» The fire safety measures stipulated in the FER have been constructed, installed, tested and commissioned satisfactorily, and are in accordance with the requirements of the FER and any conditions applied to the approval of the Alternative Solution(s);

» The final FER has been supplied to the parties responsible for the ongoing fire safety management of the building;

» All required management in use requirements (e.g. specific management procedures, restrictions and/or limitations on use) and the maintenance regime for the building have been properly documented and have been provided to the building owner and/or manager etc as necessary.
9.4 Smoke Testing

» In some cases QFRS may provide advice that a smoke test should be conducted as part of the testing and commissioning procedures for the Alternative Solution(s) and relevant fire safety measures.

» Smoke testing may take the form of a ‘warm’ smoke test, such as could be used to verify that fire systems are operating properly and are correctly interfaced. However, in some cases, a hot smoke test in accordance with AS 4391:19 may be considered appropriate, such as to assess and confirm the performance of a building or structure’s smoke management system.

» The need for specific inspection, testing and commissioning procedures should be agreed by stakeholders during the FEB process.

» It is very important that relevant stakeholders agree the testing procedures and acceptance criteria for smoke tests, prior to the tests being conducted. It is also recommended that the building insurer be consulted on the proposals.
10. POST-CONSTRUCTION PHASE

10.1 General

This section provides a brief summary of legislative requirements and general guidance in relation the following:

- Inclusion of Alternative Solution requirements, limitations and restrictions on the Certificate of Classification for the building;
- Maintenance of prescribed fire safety installations required as part of any Alternative Solution;
- Incorporation of Alternative Solution requirements into the fire and evacuation plan for the building;
- The need for awareness and communication of Alternative Solution requirements to parties with responsibility for fire safety management.
- Management-in-Use (MIU) plans.

10.2 Certificate of Classification

The Building Act 1975 requires that a Certificate of Classification for a building include details of Alternative Solutions. It states that:

“A certificate of classification must—

(e) if the development uses a building solution under the BCA and the solution restricts the use or occupation of the building—state the restriction; and

(f) if the development uses alternative solutions—state the materials, systems, methods of building, procedures, specifications and other things required under the alternative solutions.”

Section 103 of the Act provides a list of examples of possible Alternative Solution requirements relating to systems, materials and procedures.

The Building Act also requires that the Certificate of Classification be displayed as near as practicable to the building’s main entrance.

Additionally, the Building Act states that the building owner must ensure that a requirement or restriction stated on the Certificate of Classification is complied with. This includes Alternative Solution requirements.

As noted in Section 7.2 above, QFRS recommends that the FER provides full details of the Alternative Solution in a format that can be easily transferred to the Certificate of Classification. This will assist the building certifier to prepare the Certificate of Classification and should ensure that all the information required by the Building Act is included.

Reference should be made to the Building Act 1975 and the guidance document produced by the Department of Infrastructure and Planning titled ‘Guideline - Certificates of Classification’ for more comprehensive details.

10.3 Permanent Notice

QFRS also recommends that a permanent notice be provided adjacent to the Fire Indicator Panel (FIP) or in the fire control room advising that the building is subject to an Alternative Solution, with a clear description of the extent of the Alternative Solution(s) provided on the notice/sign. However, this may not be necessary when the FIP is located adjacent to the building’s main entrance, as the Certificate of Classification needs to be displayed there.

10.4 Maintenance of Alternative Solution Requirements

Under the Fire and Rescue Service Act 1990 it is a legislative requirement to adequately maintain all prescribed fire safety installations.

The definition of fire safety installation includes the following statement:

“Also, if an alternative solution to a performance requirement under the BCA relating to the fire safety system has been used for a building or structure, a fire safety installation, for the building or structure, includes any thing required to comply with the alternative solution.” (bold emphasis added).

The Building Fire Safety Regulation 2008 requires that the maintenance of prescribed fire safety installation and fire safety installation are defined in the Fire and Rescue Service Act 1990 and the Building Act 1975 respectively.
fire safety installations be carried out in accordance with the QDC MP6.1 – Maintenance of Fire Safety Installations.

» QDC MP6.122 sets out an Acceptable Solution (A1) for the maintenance of prescribed fire safety installations, including in relation to any specific Alternative Solution requirements.

» Accordingly, all prescribed fire safety installations must be maintained in accordance with the requirements of QDC MP6.1.

» It is also important for fire engineers to be aware that the MP6.1 Acceptable Solution A1 differs from the requirements of AS 1851.2005 - Maintenance of Fire Protection Systems and Equipment23 with respect to the maintenance of prescribed passive fire safety installations, insofar as it does not contain specific maintenance requirements for a number of important passive installations e.g. fire-resistant walls and floors etc.

» However, sections A1(a)(iv) and A1(b)(iii) of MP6.1 state that all prescribed fire safety installations that are required as part of an Alternative Solution must be maintained in accordance with any specific maintenance criteria requirements of that Alternative Solution, to the extent of any inconsistency with sections A1(a)(i) to (iii) and A1(b)(i) and (ii) of MP6.1. In other words, if the Alternative Solution specifies additional maintenance requirements (from those set out in MP6.1) then those requirements must be complied with.

» QFRS strongly recommends that the fire engineer give careful consideration to the level of maintenance considered necessary to maintain the Alternative Solution’s required level of performance for the lifetime of the building, and that this be clearly and unambiguously detailed in the Fire Engineering Report. This is particularly important where the adequacy of any Alternative Solution is reliant on the ongoing performance of passive fire safety installations that are not specifically covered by the maintenance requirements in MP6.1.

10.5 Fire & Evacuation Plan

» Under the Fire and Rescue Service Act 1990 it is a legislative requirement for the occupier of a building to maintain a fire and evacuation plan and to provide adequate instructions to persons in the building concerning the action to be taken by them in the event of fire.

» The Building Fire Safety Regulation 2008 sets out the requirements for a fire and evacuation plan. These include specific requirements for situations where the building work has involved an Alternative Solution that includes a fire safety management procedure as a condition of the occupation and use of the building. In this situation the building occupier must ensure that:

» A record of the fire safety management procedure is included in the building’s fire and evacuation plan; and

» The plan adequately reflects the procedure.

» Section 24 of the Regulation provides the following list of examples of fire safety management procedures in relation to these requirements:

“Examples of fire safety management procedures—

» a limitation on the use of finishes with fire hazard properties defined under the BCA

» a prohibition on storing hazardous materials above a stated height

» a limitation on storing or using stated materials

» a requirement that all of a building’s final exit doors be unlocked before it is occupied on the start of any day

» a requirement to implement stated evacuation strategies or procedures

» a restriction on the number and the distribution of a building’s occupants

» a requirement that evacuation routes be kept clear of fittings and furnishings or be kept sterile

» a prohibition on carrying out any hazardous processes or storage mentioned in BCA, part E1.5, table E1.5, note 3, paragraph (a)”

(b) Acceptable Solution is defined in the QDC MP6.1 - Maintenance of Fire Safety Installations.
The Building Fire Safety Regulation also requires the occupier of a building to keep a copy of the relevant approval documents for the building with the building’s fire and evacuation plan. A relevant approval document includes any approval document for the building that is relevant to a matter included in the fire and evacuation plan for the building. This would include details of any Alternative Solution, where the Alternative Solution is relevant to any matter that is included in the fire and evacuation plan for the building. For example, this would apply to situations where the Alternative Solution includes a fire safety management procedure as a condition of building occupation or use.

Section 25 of the Regulation provides the following examples of relevant approval documents in relation to these requirements:

“Examples of relevant approval documents for a building—

» a list of required fire safety installations for the building and required special fire services applying to the building work

» a statement under the Building Act, section 68A or other supporting document for a building development application, about an alternative solution that includes a condition for occupation and use of the building”

Where appropriate, the occupier of the building should consult the fire engineer to ensure that all relevant Alternative Solution requirements are adequately addressed by the building’s fire and evacuation plan.

In summary, where an Alternative Solution utilises a fire safety management procedure, it must be ensured that this procedure is included and reflected in the building’s fire and evacuation plan. Additionally, a copy of relevant approval documents must be kept in the building with the building’s fire and evacuation plan.

10.6 Communication of Alternative Solution Requirements

It is essential that all parties that have responsibility for the ongoing fire safety management of a building are aware of the existence of any Alternative Solution in the building and the requirements of the Alternative Solution. This would typically include (but not be limited to) parties including:

» The building owner, occupier and manager;

» The Fire Safety Adviser (FSA) for the building;

» Persons responsible for development of the fire and evacuation plan, the evacuation coordination procedures and the like;

» Property and/or facilities management;

» Fire safety and other maintenance contractors;

» Persons carrying out works or installing services or equipment that could affect any fire safety measures.

Relevant parties also need to clearly understand that these requirements come in different forms, and that they include such things as the physical structure of the building and the installed fire safety systems, but also specific building management procedures, enhanced and/or bespoke maintenance regimes, and restrictions and limitations on the building use etc.

It is therefore imperative that all necessary details of any Alternative Solution are adequately communicated and explained to the building owner/occupier, building manager and other relevant parties, and that all parties understand their specific obligations under applicable legislation (such as the Fire and Rescue Service Act 1990 and the Building Fire Safety Regulation 2008).

It is also essential that the building owner/occupier, building manager and other relevant parties be provided with all relevant documentation. This is necessary to ensure that they are fully conversant with the Alternative Solution(s), the ongoing maintenance and management requirements, and any limitations and/or restrictions on use that may apply to the building.
A handover of the *Alternative Solution(s)* to the building owner, building occupier and other relevant parties is recommended. This provides the fire engineer with the opportunity to clearly explain the *Alternative Solution(s)*, including relevant design assumptions and limitations, the ongoing design requirements, relevant maintenance and management requirements, applicable limitations and restrictions on occupation and use etc.

10.7 **Management-in-Use Plan**

It is recommended that a ‘Management-in-Use’ (MIU) or similar document to be produced. This would supplement the information provided on the Certificate of Classification and provide additional valuable guidance to building management and other parties. A MIU document might include:

- Full details of the overall fire safety design of the building (including all applicable DTS and *Alternative Solution* requirements);
- Assumptions that were made in the assessment of the *Alternative Solution(s)*;
- Limitations that apply to the acceptability of the *Alternative Solution(s)*;
- Procedures and processes that must be adhered to during the ongoing management and use of the building;
- Detailed maintenance requirements for the fire safety design elements, especially where ‘non-standard’ components have been used in the design.
11. REFERENCES

2. Building Code of Australia - Class 2 to Class 9 Buildings - Volume 1, Australian Building Codes Board.
9. AS 1670.1-2004 Fire detection, warning, control and intercom systems – System design, installation and commissioning, Standards Australia.
13. Queensland Building Services Authority Regulation 2003, Queensland Government