30 November 2008

Our Ref: J28252–1 HH

Russell Hotel Pty Limited
143A George Street
SYDNEY, NSW, 2000

Email: info@therussell.com
Fax No: 9252 1652
Attention: Mr. Robert John Keyes

Dear Sir,

Re: Russell Hotel & Fortune of War Hotel
Performance Verification Assessment

Further to our recent engagement in respect of the aforementioned project, please find attached our completed Report.

Should you have any queries, please do not hesitate to contact the undersigned.

Yours faithfully,

Hayden L Howse
Managing Director
Trevor R. Howse & Associates Pty Limited

Encl.

Trevor R Howse & Associates Pty Ltd ABN 24 003 753 839
Suite 3, Level 1, 19 Harris Street, Pyrmont NSW 2009
Telephone +612 9518 6550 Facsimile +612 9518 6551 Email trh@trh.com.au www.trh.com.au
A member of Greencap Limited (ASX Code GCG)

Building Regulations
Fire Safety Engineering
Management Services

PERFORMANCE VERIFICATION ASSESSMENT

PREPARED FOR

Russell Hotel Pty Limited

REGARDING

Russell Hotel & Fortune of War Hotel

Trevor R Howse & Associates Pty Ltd ABN 24 003 753 839
Suite 3, Level 1, 19 Harris Street, Pyrmont NSW 2009
Telephone +612 9518 6550 Facsimile +612 9518 6551 Email trh@trh.com.au www.trh.com.au
A member of Greencap Limited (ASX Code GCG)

REPORT REGISTER

The following report register documents the development and issue of this report and project as undertaken by this office, in accordance with the *Quality Assurance* policy of **Trevor R Howse & Associates Pty Ltd**.

Our Reference	Issue No.	Remarks	Issue Date
J28252 HH	– 1	Completed report issued to client	30.11.2008

CONTENTS PAGE

EXECUTIVE SUMMARY

This Performance Verification Assessment report has been prepared at the request of Russell Hotel Pty Limited, and relates to the premises known as the Russell Hotel & Fortune of War Hotel.

The purpose of this assessment is to review certain prescriptive non-compliance identified within the building design, and verify the attainment of compliance with the relevant performance requirements of the Building Code of Australia (BCA).

Those particular aspects of non-compliance are summarised as follows: –

Russell Hotel

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT	REPORT REFERENCE
The intervening floors are of lathe & plaster lined timber construction, and do not achieve the BCA prescribed fire rating	Spec. C1.1, C2.9	CP1, CP2	Part 6 pp. 30-38
Internal walls bounding residential units extend only to the underside of the lathe & plaster ceilings, and not to a fire rated ceiling or roof covering	Spec. C1.1	CP2	Part 6 pp. 30-38
A portion of internal wall on the second floor is constructed of timber panelling, in lieu of 90-minute fire rated construction	Spec. C1.1	CP2	Part 6 pp. 30-38
Openings exist in the external wall on the western elevation that are unprotected, yet are located within 6-metres of the far side of the Nurses Walk (3.5-metres)	Clause C3.2	CP2	Part 7 pp. 39-40
The door sets to the residential units comprise door leafs of 20-45-mm thickness, in lieu of being 1-hour fire rated	Clause C3.11	CP2	Part 6 pp. 30-38
Various service penetrations exist through the intervening floors throughout the building that have not been appropriately fire sealed	Clause C3.12	CP8	Part 6 pp. 30-38
The unobstructed width of the following paths of travel is less than 1000-mm: – ❑ Stairway to kitchen (740-mm) ❑ Main stairway (800-mm) ❑ Stairway to roof void (570-mm)	Clause D1.6	DP6	Part 8 pp. 41-42

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT	REPORT REFERENCE
A beam across the main stairway reduces the head height to less than 2000-mm in a portion of the landing (1900-mm)	Clause D2.9	FP3.1	Part 9 pp. 43-44
Both the main stairway and the stairway to the roof incorporate winders in lieu of landings	Clause D2.13	DP2	Part 10 pp. 45-46
The following doorway openings contain a step at the threshold: – ❑ Residential units ❑ Light well to dining room ❑ Kitchen	Clause D2.15	DP2	Part 11 pp. 47-48
The exit door leafs from the hotel and restaurant areas on the ground floor swing inwards instead of in the direction of egress	Clause D2.20	DP2	Part 12 pp. 49-50

Fortune of War Hotel

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT	REPORT REFERENCE
The intervening floors are of lathe & plaster lined timber construction, and do not achieve the BCA prescribed fire rating	Spec. C1.1, C2.9	CP1, CP2	Part 6 pp. 30-38
A portion of the external wall facing the laneway contains combustible timber panelling	Spec. C1.1	CP1, CP2	Part 13 pp. 51-52
Internal walls within the ground floor extend only to the underside of the lathe & plaster ceilings, and not to a fire rated ceiling	Spec. C1.1	CP2	Part 6 pp. 30-38
The wall separating the stair flight descending from the level 1 residential space from the ground floor bar is of timber panelling, and does not achieve a 2-hour fire rating	Spec. C1.1, C2.9	CP1, CP2	Part 6 pp. 30-38
Various service penetrations exist through the intervening floors throughout the building that have not been appropriately fire sealed	Clause C3.12	CP8	Part 6 pp. 30-38

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT	REPORT REFERENCE
The unobstructed width of the following paths of travel is less than 1000-mm: – ❑ Stairway between bar and lounge (920-mm) ❑ Stairway from lounge bar to office (900-mm)	Clause D1.6	DP6	Part 8 pp. 15-21
The unobstructed width of each of the four (4) exit doorways from the bar to the roadway have an unobstructed width less than 1000-mm (900-mm)	Clause D1.6	DP6	Part 8 pp. 41-42
A beam across the stairway to the cellar reduces the head height to less than 2000-mm in a portion of the flight (1700-1900-mm)	Clause D2.9	FP3.1	Part 9 pp. 43-44
The doorway within the gateway to the office area contains a step at the threshold	Clause D2.15	DP2	Part 11 pp. 47-48
The exit doors from the bar to the roadway wing inwards and not in the direction of egress	Clause D2.20	DP2	Part 12 pp. 49-50
The ceiling height within the basement cellar is less than 2100-mm	Clause F3.1	FP3.1	Part 9 pp. 43-44
Storerooms have not been fire separated from the POPE by minimum 1-hour fire rated construction	Clause H101.16	CP2	Part 6 pp. 30-38

The assessment of this item has been performed in accordance with the International Fire Safety Engineering Guidelines (FSEG) and Clauses A0.5 and A0.9 of the BCA.

In terms of Specification C1.1 and Clauses C2.9, C3.11 and H101.16, it relies upon a combination of qualitative and quantitative analyses of the non-compliance for the purpose of demonstrating ‘absolute’ compliance with performance requirements CP1, CP2.

In terms of Clause C3.12, it relies upon a combination of qualitative and quantitative analyses of the non-compliance for the purpose of demonstrating ‘absolute’ compliance with performance requirement CP8.

In terms of Clauses C3.2, D2.9, D2.13, D2.15, D2.20 and F3.1 it relies upon a qualitative analysis of the non-compliance for the purpose of demonstrating ‘absolute’ compliance with performance requirements CP2, DP2 and FP3.1 respectively.

In terms of Clause D1.6, it relies upon a qualitative analysis of the non-compliance for the purpose of demonstrating that the standard of life safety is 'equivalent' to the deemed-to-satisfy provisions.

In terms of Clause F3.1, it relies upon a qualitative analysis of the non-compliance for the purpose of demonstrating 'absolute' compliance with performance requirement FP3.1.

With reference to the commentary contained within the conclusions of Part 6-14 of this report, and the Recommendations in Part 15, it has been concluded that: –

Russell Hotel

1. Specification C1.1 & Clause C2.9 – The non-compliant fire rating to the intervening floors and stairway is acceptable, subject to the provision of a fast-response sprinkler system;

2. Specification C1.1 – The walls bounding the residential units, as extend to the underside of a non-fire rated ceiling, are acceptable, subject to the provision of a fast-response sprinkler system;

3. Specification C1.1 – The presence of timber panelling in a portion of the bounding wall in the second floor is acceptable, subject to the provision of a fast-response sprinkler system;

4. Clause C3.2 – The presence of unprotected openings in the external wall of the building is acceptable;

5. Clause C3.11 – The presence of non-fire rated door sets to the residential units is acceptable, subject to the provision of a fast-response sprinkler system;

6. Clause C3.12 – The presence of non-fire rated service penetrations through the intervening floors is acceptable, subject to the provision of a fast-response sprinkler system;

7. Clause D1.6 – The reduced width of several paths of travel are acceptable;

8. Clause D2.9 – The reduced height to a portion of the main stairway is acceptable;

9. Clause D2.13 – The presence of winders in various stairways is acceptable, subject to the provision of warning signage and handrails to both sides of the stairways;

10. Clause D2.15 – The presence of steps at thresholds within the building is acceptable, subject to the provision of warning signage and hazard tape;

11. Clause D2.20 – The presence of inward swinging exit door leafs is acceptable, subject to the provision of hold open devices.

Fortune of War Hotel

12. Specification C1.1 & Clause C2.9 – The non-compliant fire rating to the intervening floors and stairway is acceptable, subject to the provision of a fast-response sprinkler system;

13. Specification C1.1 – The presence of combustible material in the external wall is acceptable, subject to the provision of intumescent paint coating;

14. Specification C1.1 – Having internal load bearing elements extending only to the underside of a non-fire rated ceiling is acceptable, subject to the provision of a fast-response sprinkler system;

15. Clause C3.12 – The presence of non-fire rated service penetrations through the intervening floors is acceptable, subject to the provision of a fast-response sprinkler system;

16. Clause D1.6 – The reduced width of several paths of travel, and reduced width of exit doorways are acceptable;

17. Clause D2.9 – The reduced ceiling height to a portion of the cellar stairway is acceptable;

18. Clause D2.15 – The presence of steps at thresholds within the building is acceptable, subject to the provision of warning signage and hazard tape;

19. Clause D2.20 – The presence of inward swinging exit door leafs is acceptable, subject to the provision of hold open devices;

20. Clause F3.1 – The reduced ceiling height within the basement area is acceptable;

21. Clause H101.16 – The absence of 1-hour fire separation to storerooms within the POPE is acceptable, subject to the provision of a fast-response sprinkler system.

Through the implementation of the recommendations contained within this report, the impact of the prescriptive non-compliance shall be obviated, and compliance with the BCA, as an *alternative building solution*, shall be achieved.

1.0 INTRODUCTION

1.1 GENERAL

This Performance Verification Assessment report has been prepared at the request of Russell Hotel Pty Limited, and relates to the premises known as the Russell Hotel & Fortune of War Hotel.

The purpose of this assessment is to review certain prescriptive non-compliance identified within the building design, and verify the attainment of compliance with the relevant performance requirements of the Building Code of Australia (BCA).

Those particular aspects of non-compliance are summarised as follows: –

Russell Hotel

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The intervening floors are of lathe & plaster lined timber construction, and do not achieve the BCA prescribed fire rating	Spec. C1.1, C2.9	CP1, CP2
Internal walls bounding residential units extend only to the underside of the lathe & plaster ceilings, and not to a fire rated ceiling or roof covering	Spec. C1.1	CP2
A portion of internal wall on the second floor is constructed of timber panelling, in lieu of 90-minute fire rated construction	Spec. C1.1	CP2
Openings exist in the external wall on the western elevation that are unprotected, yet are located within 6-metres of the far side of the Nurses Walk (3.5-metres)	Clause C3.2	CP2
The door sets to the residential units comprise door leafs of 20-45-mm thickness, in lieu of being 1-hour fire rated	Clause C3.11	CP2
Various service penetrations exist through the intervening floors throughout the building that have not been appropriately fire sealed	Clause C3.12	CP8

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The unobstructed width of the following paths of travel is less than 1000-mm: – ❑ Stairway to kitchen (740-mm) ❑ Main stairway (800-mm) ❑ Stairway to roof void (570-mm)	Clause D1.6	DP6
A beam across the main stairway reduces the head height to less than 2000-mm in a portion of the landing (1900-mm)	Clause D2.9	FP3.1
Both the main stairway and the stairway to the roof incorporate winders in lieu of landings	Clause D2.13	DP2
The following doorway openings contain a step at the threshold: – ❑ Residential units ❑ Light well to dining room ❑ Kitchen	Clause D2.15	DP2
The exit door leafs from the hotel and restaurant areas on the ground floor swing inwards instead of in the direction of egress	Clause D2.20	DP2

Fortune of War Hotel

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The intervening floors are of lathe & plaster lined timber construction, and do not achieve the BCA prescribed fire rating	Spec. C1.1, C2.9	CP1, CP2
A portion of the external wall facing the laneway contains combustible timber panelling	Spec. C1.1	CP1, CP2
Internal walls within the ground floor extend only to the underside of the lathe & plaster ceilings, and not to a fire rated ceiling	Spec. C1.1	CP2
The wall separating the stair flight descending from the level 1 residential space from the ground floor bar is of timber panelling, and does not achieve a 2-hour fire rating	Spec. C1.1, C2.9	CP1, CP2
Various service penetrations exist through the intervening floors throughout the building that have not been appropriately fire sealed	Clause C3.12	CP8

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The unobstructed width of the following paths of travel is less than 1000-mm: – ❑ Stairway between bar and lounge (920-mm) ❑ Stairway from lounge bar to office (900-mm)	Clause D1.6	DP6
The unobstructed width of each of the four (4) exit doorways from the bar to the roadway have an unobstructed width less than 1000-mm (900-mm)	Clause D1.6	DP6
A beam across the stairway to the cellar reduces the head height to less than 2000-mm in a portion of the flight (1700-1900-mm)	Clause D2.9	FP3.1
The doorway within the gateway to the office area contains a step at the threshold	Clause D2.15	DP2
The exit doors from the bar to the roadway wing inwards and not in the direction of egress	Clause D2.20	DP2
The ceiling height within the basement cellar is less than 2100-mm	Clause F3.1	FP3.1
Storerooms have not been fire separated from the POPE by minimum 1-hour fire rated construction	Clause H101.16	CP2

Trevor R. Howse & Associates Pty Limited is not aware of other alternative building solutions incorporated within this project design.

1.2 FIRE SAFETY ENGINEERING BRIEF

The preparation of a separate Fire Safety Engineering Brief (FSEB) has not been considered warranted for this project.

It is acknowledged that the FSEB process is more appropriate for complex projects to define fire scenarios for evaluation, fire models, levels of analysis, and acceptance criteria.

The content of this report however, addresses each of these elements within the assessment process as are applicable to the proposed design.

1.3 REPORT BASIS

The assessment contained within this report reflects –

(a) The principles and provisions of the Building Code of Australia 2008 edition, incorporating the New South Wales Variations;

(b) The principles and provisions of the International Fire Safety Engineering Guidelines 2005;

(c) BCA Compliance reports prepared by AE&D Pty Limited, dated December 2005 (Fortune of War Hotel and the Russell Hotel);

(d) Architectural documentation prepared by Madden Associates: –

Numbered	*Titled*	*Dated*
690-DA-130L	Proposed ground floor	May 2004
690-DA-131M	First & second floor plans	May 2004
690-DA-132J	Existing attic & roof space	May 2004
690-D-135	Proposed elevations	May 2006

1.4 SCOPE OF PROJECT

The Building Code of Australia, within Clause A0.5, provides that compliance with the applicable Performance requirements in a building design may occur through the "deemed-to-satisfy" provisions or as alternative building solutions.

It is intended that the proposed design of the subject premises in this instance incorporate a combination of prescriptive and Performance based compliance.

To this extent, this report has been prepared to identify and analysis the proposed alternative building solutions and demonstrate the acceptability of these designs to satisfy the Performance requirements of the BCA.

The parts of the building to which alternative building solutions are proposed relate to the following BCA provisions –

(a) ***Specification C1.1 – Fire resisting construction***
Clause C2.9 – Separation of classifications in different storeys

These prescriptive provisions of the BCA require that the intervening floors within the building achieve FRL's between 90 and 120-minutes.

Furthermore, that fire rated elements such as walls and columns extend to the underside of a fire rated floor or ceiling.

Also, that walls bounding the residential corridors achieve an FRL not less than – /60/60.

Lastly, that external wall is constructed of non-combustible material.

As existing, the floors are of timber construction and, whilst lined with ceiling linings having an *inherent* fire resistance level (lathe & plaster), do not achieve these FRL's.

A portion of a wall bounding the residential corridor on the second floor is also lined with timber panelling.

Externally, a portion of the outside wall contains timber panelling.

(b) ***Clause C3.2 – Protection of openings in external walls***

This prescriptive provision of the BCA requires that window openings in an external wall, where located less than 6-metres from the far side of a roadway, be fitted with Clause C3.4 compliant opening protectives.

As existing, unprotected window openings exist in the external wall that are only 3.5-metres from the far side of the Nurses Walk.

(c) ***Clause C3.11 – Bounding construction: Class 2, 3 and 4***

This prescriptive provision of the BCA requires that doorway openings to the residential units herein be fitted with self-closing, 1-hour fire rated door sets.

As existing, the residential doorways are fitted with timber door sets of varying thickness (20-45-mm).

(d) ***Clause C3.12 – Openings for service installations***

This prescriptive provision of the BCA requires that service penetrations through the intervening floors be appropriately fire sealed according to the (required) fire resistance level of the floor concerned

As existing, since the intervening floors do not achieve a prescribed fire resistance level, service penetrations therein are not fire sealed.

(e) ***Clause D1.6 – Dimensions of exits and paths of travel***

This prescriptive provision of the BCA requires that pathways have a minimum clear width of 1000-mm.

Furthermore, that exit doorways from a Place of Public Entertainment licensed portion of a building have an unobstructed opening not less than 1000-mm.

As existing, several paths of travel within the building have a width of only 570-920-mm. Additionally, the exit doors from the Fortune of War bar, where opening onto George Street, also have a clear opening of only 900-mm each.

(f) ***Clause D2.9 – Width of stairways***

This prescriptive provision of the BCA requires that a unobstructed height of 2000-mm be maintained above stair nosings.

As existing, a beam across a section of the main stairway and an overhead obstruction across the stairway to the cellar reduce the clear height beneath (that part) to only 1900-mm and 1700-1900-mm respectively.

(g) ***Clause D2.13 – Treads and risers***

This prescriptive provision of the BCA prohibits the use of winders in lieu of landings in the construction of required stairway.

As existing, the main stairway and the stairway to the roof contain winders in lieu of landings.

(h) ***Clause D2.15 – Thresholds***

This prescriptive provision of the BCA does not permit a step in the threshold of an internal doorway opening.

As existing, several internal doorway openings contain a step at a point closer to the doorway opening than the width of the door leaf.

(i) ***Clause D2.20 – Swinging doors***

This prescriptive provision of the BCA requires that exit door leafs swing in the direction of egress.

As existing, several of the exit door leafs opening to the George Street footpath swing inwards, and not in the direction of egress.

(j) ***Clause F3.1 – Height of rooms***

This prescriptive provision of the BCA requires that the ceiling height within the cellar space be not less than 2100-mm.

As existing, the ceiling height within the space varies between 2000-2100-mm depending upon the location of service pipes and other overhead obstructions.

(k) ***Clause H101.16 – Storerooms***

This prescriptive provision of the BCA is specific to Places of Public Entertainment (POPE) and requires that storerooms be separated from the POPE licensed areas by 1-hour fire rated construction.

As existing, storeroom spaces are separated by only non-combustible construction.

1.5 STAKEHOLDERS

The relevant stakeholders to the preparation and implementation of this report are: –

(a)	BCA Consultant	–	Trevor R. Howse & Associates Pty Ltd
(b)	Client	–	Russell Hotel Pty Ltd
(c)	Architect	–	Madden Associates
(d)	Consent Authority	–	Sydney Harbour Foreshore Authority

1.6 LIMITATIONS

The content of this report relates only to the non-compliance and subject building identified, and contained within the fee proposal A8902-11492 HH, prepared by Trevor R. Howse & Associates Pty Limited dated 12 September 2008.

All reasonable efforts and care have been taken in the assessment of documentation and information provided in the formulation of this alternative solution and preparation of this report.

The success of any alternative solution though, typically relies upon the implementation of recommendations provided, and maintenance of the building, fire systems, and assessment parameters nominated.

While this report assesses life safety conditions, in the event of a fire emergency, no guarantee is made that property damage shall not occur.

2.0 DEVELOPMENT DESCRIPTION

2.1 GENERAL

The subject property is known as the Russell Hotel and Fortune of War Hotel and they are located at 137-143 George Street, The Rocks.

In the context of this Performance Verification Assessment, the property may be described in terms of 'Building Characteristics' and 'Occupant Characteristics'.

2.2 BUILDING CHARACTERISTICS

(a) *Rise in storeys*

Having a rise in storeys of three (3).

(b) *Classification(s)*

Being of multiple classifications, namely: –

(i) Class 3 – residential
(ii) Class 6 – retail
(iii) Class 9b – assembly

(c) *Type of Construction*

Required to comply with the fire rating requirements for Type A Construction.

(d) *Effective height*

The effective height is less than 25-metres.

(e) *Fire compartment size limitations*

Based upon the classification and Type of Construction, the following floor area and volume limitations apply to individual fire compartments:–

(i) Type A Construction – Class 3

- Floor area – Not applicable
- Volume – Not applicable

(ii) Type A Construction – Class 6

- Floor area – 5,000 m^2
- Volume – 30,000 m^3

(iii) Type A Construction – Class 9b

- Floor area – 8,000 m^2
- Volume – 48,000 m^3

2.3 OCCUPANT CHARACTERISTICS

For buildings such as this, occupants may be grouped into two (2) primary groups.

The first group is comprised of staff, which may be either permanent or transient, but nonetheless are recognised as being more familiar with the layout of the building, fire safety systems and other characteristics.

These occupants are assumed to be: –

(a) of varying age groups

(b) alert and awake during their occupation of the building

(c) without physical or mental disabilities

(d) familiar with the building

The second group is comprised of members of the public (i.e. visitors and residents), which are typically transient and thus have significantly less familiarity with the building and characteristics.

The building occupants are assumed to be: –

(a) of varying age groups

(b) possibly asleep during their occupation of the building (i.e. residential units)

(c) possibly with physical or mental disabilities

(d) unfamiliar with the building

The proposed use of the building is not considered to attract either a certain gender mix or a proportion of persons with disabilities that would differ from the general community levels.

Additionally, in the context of occupant response, coping and evacuation capabilities, the characteristics of the occupants are taken to typically reflect that experienced within multi-use buildings.

3.0 OBJECTIVES & PERFORMANCE REQUIREMENTS

3.1 GENERAL

The BCA consists of Objectives, Function Statements, Performance Requirements, and Building Solutions.

While Clause A0.4 of the Code states that *"a Building Solution will comply with the BCA if it satisfies the Performance Requirements"*, figure A0.3 illustrates that compliance with the Performance Requirements is achieved through either: –

(a) Deemed-to-satisfy Building Solutions; or

(b) Alternative Building Solutions; or

(c) A combination of either Deemed-to-satisfy or Alternative Building Solutions.

It is understood that the subject building shall incorporate a combination of Deemed-to-satisfy and Alternative Building Solutions, with this report relating only to the Alternative Building Solutions listed within item 1.1 above.

3.2 DESIGN OBJECTIVES

The formulation and analysis of the proposed Alternative Building Solutions requires the establishment of Design Objectives against which the proposal can be globally measured. Design Objectives can directly influence building layout, fire safety systems, and other design characteristics employed, and are typically derived from: –

(a) The Building Code of Australia;

(b) The client / building owner;

(c) The general community.

This assessment considers BCA related objectives only – no client / owner or community objectives have been advised at the time of this report.

The principal Objective of the BCA is the life safety of the building occupants and, allied with this, the safety of any attending emergency services personnel such as the Fire Brigades.

As applicable to this assessment, Objectives CO1, DO1, and FO2 state as follows: –

CO1 The Objective of this Section is to: –

(a) Safeguard people from illness or injury due to a fire in a building;
(b) Safeguard occupants from illness or injury while evacuating a building during a fire;
(c) …….;
(d) Avoid the spread of fire between buildings;
(e) ……..

DO1 The Objective of this Section is to: –

(a) ……..;
(b) Safeguard occupants from illness or injury while evacuating in an emergency.

FO3 The Objective of this Part is to safeguard occupants from injury or less of amenity caused by inadequate height of a room or space.

3.3 PERFORMANCE REQUIREMENTS

As contained within items 1.4 and 3.1 of this report, the subject building shall incorporate a combination of Deemed-to-satisfy and Alternative Building Solutions.

The stakeholders nominated within item 1.5 have advised of the following Deemed-to-satisfy non-compliance for which an Alternative Building Solution is proposed: –

Russell Hotel

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The intervening floors are of lathe & plaster lined timber construction, and do not achieve the BCA prescribed fire rating	Spec. C1.1, C2.9	CP1, CP2
Internal walls bounding residential units extend only to the underside of the lathe & plaster ceilings, and not to a fire rated ceiling or roof covering	Spec. C1.1	CP2
A portion of internal wall on the second floor is constructed of timber panelling, in lieu of 90-minute fire rated construction	Spec. C1.1	CP2
Openings exist in the external wall on the western elevation that are unprotected, yet are located within 6-metres of the far side of the Nurses Walk (3.5-metres)	Clause C3.2	CP2

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The door sets to the residential units comprise door leafs of 20-45-mm thickness, in lieu of being 1-hour fire rated	Clause C3.11	CP2
Various service penetrations exist through the intervening floors throughout the building that have not been appropriately fire sealed	Clause C3.12	CP8
The unobstructed width of the following paths of travel is less than 1000-mm: – ❑ Stairway to kitchen (740-mm) ❑ Main stairway (800-mm) ❑ Stairway to roof void (570-mm)	Clause D1.6	DP6
A beam across the main stairway reduces the head height to less than 2000-mm in a portion of the landing (1900-mm)	Clause D2.9	FP3.1
Both the main stairway and the stairway to the roof incorporate winders in lieu of landings	Clause D2.13	DP2
The following doorway openings contain a step at the threshold: – ❑ Residential units ❑ Light well to dining room ❑ Kitchen	Clause D2.15	DP2
The exit door leafs from the hotel and restaurant areas on the ground floor swing inwards instead of in the direction of egress	Clause D2.20	DP2

Fortune of War Hotel

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The intervening floors are of lathe & plaster lined timber construction, and do not achieve the BCA prescribed fire rating	Spec. C1.1, C2.9	CP1, CP2
A portion of the external wall facing the laneway contains combustible timber panelling	Spec. C1.1	CP1, CP2
Internal walls within the ground floor extend only to the underside of the lathe & plaster ceilings, and not to a fire rated ceiling	Spec. C1.1	CP2

ISSUE	BCA CLAUSE	BCA PERFORMANCE REQUIREMENT
The wall separating the stair flight descending from the level 1 residential space from the ground floor bar is of timber panelling, and does not achieve a 2-hour fire rating	Spec. C1.1, C2.9	CP1, CP2
Various service penetrations exist through the intervening floors throughout the building that have not been appropriately fire sealed	Clause C3.12	CP8
The unobstructed width of the following paths of travel is less than 1000-mm: – ❑ Stairway between bar and lounge (920-mm) ❑ Stairway from lounge bar to office (900-mm)	Clause D1.6	DP6
The unobstructed width of each of the four (4) exit doorways from the bar to the roadway have an unobstructed width less than 1000-mm (900-mm)	Clause D1.6	DP6
A beam across the stairway to the cellar reduces the head height to less than 2000-mm in a portion of the flight (1700-1900-mm)	Clause D2.9	FP3.1
The doorway within the gateway to the office area contains a step at the threshold	Clause D2.15	DP2
The exit doors from the bar to the roadway wing inwards and not in the direction of egress	Clause D2.20	DP2
The ceiling height within the basement cellar is less than 2100-mm	Clause F3.1	FP3.1
Storerooms have not been fire separated from the POPE by minimum 1-hour fire rated construction	Clause H101.16	CP2

Performance Requirement CP1 states as follows: –

CP1 A building must have elements which will, to the degree necessary, maintain structural stability during a fire appropriate to: –

(a) The function or use of the building
(b) The fire load
(c) The potential fire intensity
(d) The fire hazard
(e) The height of the building

(f) Its proximity to other property
(g) Any active fire safety systems installed in the building
(h) The size of any fire compartment
(i) Fire Brigade intervention
(j) Other elements they support
(k) The evacuation time

Performance Requirement CP2 states as follows: –

CP2 A building must have elements which will, to the degree necessary, avoid the spread of fire: –

(a) …….;
(b) …….;
(c) between buildings; and
(d) in a building,

Appropriate to: –

(i) The function or use of the building
(ii) The fire load
(iii) The potential fire intensity
(iv) The fire hazard
(v) The number of storeys in the building
(vi) Its proximity to other property
(vii) Any active fire safety systems installed in the building
(viii) The size of any fire compartment
(ix) Fire Brigade intervention
(x) Other elements they support
(xi) The evacuation time

Performance Requirement CP8 states as follows: –

CP8 Any building element provided to resist the spread of fire must be protected, to the degree necessary, so that an adequate level of performance is maintained: –

(a) where openings, construction joints and the like occur; and
(b) where penetrations occur for building services.

Performance Requirement DP2 states as follows: –

DP2 So that people can move safely to and within a building it must have: –

(a) …….;
(b) any doors installed to avoid the risk of occupants: –
  (i) having their egress impeded; and
  (ii) being trapped in the building; and
(c) …….

Performance Requirement DP6 states as follows: –

DP6 So that occupants can safely evacuate the building, paths of travel to exits must have dimensions appropriate to: –

(a) the number, mobility and other characteristics of occupants
(b) the function or use of the building

Performance Requirement FP3.1 states as follows: –

FP3.1 A habitable room or space must have sufficient height that does not unduly interfere with its intended function.

3.4 'DESIGN OBJECTIVES' & 'DEEMED-TO-SATISFY' PROVISIONS – COMPARISON

In accordance with Clause A0.7 of the BCA, *"a Building Solution which complies with the deemed-to-satisfy provisions is deemed to comply with the performance requirements"*.

Compliance with the performance requirements, through either a Deemed-to-satisfy or alternative building solution, is considered to meet the relevant BCA Objectives.

Historically, the Deemed-to-satisfy provisions of the BCA are founded upon a combination of research data, fire tests and, to a lesser extent, theoretical considerations or expert judgment. Consequently, the relationship between an individual provision and the performance of such within a global fire safety design is known.

It is on this basis that the Performance Requirements of the BCA have been designed, and the Deemed-to-satisfy provisions accepted as attaining compliance.

This applies notwithstanding that, in some circumstances and building designs, through scientific analysis the level of life safety provided by the Deemed-to-satisfy provisions can be questioned on the extent to which satisfaction of the applicable Performance Requirement occurs.

Where other Design Objectives are established by a client / owner or the community, compliance with the Deemed-to-satisfy or performance requirements of the BCA does not necessarily guarantee that the nominated (non-BCA) Objective is met.

4.0 HAZARDS & MITIGATING MEASURES

4.1 GENERAL

The potential fire hazard to a building and the occupants therein associated with a fire outbreak is governed by various factors. Principally, these factors can be divided into two categories, namely those contributing to a potential fire outbreak, and those mitigating the hazard.

Those factors forming part of the first category include, for example, the nature and availability of fuel and the materials of construction used in the construction and fit out of the building.

In respect of the second category, relevant factors include the nature and extent of active and passive fire safety systems, the effectiveness of management procedures, and the quality of way-finding characteristics.

It is noted that factors within these categories can overlap. This is evident with 'materials of construction', which can both contribute to the fire hazard, and mitigate such, depending upon the materials chosen and locations employed.

For the subject building, a combination of active and passive 'fire safety systems' shall exist contributing to hazard mitigation.

In the context of the performance expectations held for the global fire safety design, the individual fire safety systems and building features within can be categorised according to their function or intended purpose. These categories include: –

(a) Tenability related features

(b) Fire detection features

(c) Fire suppression features

(d) Compartmentation features

(e) Structural features

In many instances, individual fire safety systems and design characteristics can overlap multiple categories.

4.2 MATERIALS OF CONSTRUCTION & CONTENT

The materials of construction employed within the construction of the building are of importance to the fire safety design due to the potential: –

(a) contribution to a fire outbreak; and

(b) response to a fire outbreak.

Where materials of construction are of a combustible nature, the rate of fire spread and heat release (HRR) can be greatly enhanced. The enhanced heat release rate can result in a corresponding decrease in the effectiveness of active systems designed to intervene in the development of a fire (ie. sprinkler systems).

Irrespective of the combustible nature of materials however, the response of an element to the impact of fire is of critical importance in the areas of structural adequacy and thermal insulation.

Low thermal insulation qualities facilitate conductive and radiant heat transfer that can precipitate fire spread to other areas within a building. Where used in confined areas such as ceiling spaces, the time associated with the confirmation of fire may be long thus delaying the commencement of occupant evacuation and manual intervention.

Structural elements with low fire resistance may collapse prior to the complete evacuation of the building occupants or during Fire Brigade activities due to the attainment of a low 'critical failure temperature' in the material.

This report assumes that any furnishings, equipment or the like to be provided within the premises over the building life shall be typical with that associated with an assembly use and that no unique or exceptional circumstances shall exist.

4.3 FIRE SAFETY SYSTEMS

4.3.1 Fire safety schedule

Tables 4.3.1.1 and 4.3.1.2 below provide a copy of the Fire Safety Schedule associated with the 'existing' building, and that which shall apply subsequent to the implementation of the parameters / recommendations contained within this report.

Figure 4.1.3.1 – Existing fire safety schedule

Fire Safety Measure	Installed	Standard of Performance
Fire rated access panels & doors		
Automatic fail safe devices		
Automatic fire detection & alarm	Yes	AS 1670
Automatic fire suppression systems	Yes	AS 2118.1
Emergency lifts		
Emergency lighting	Yes	AS 2293.1
EWIS		
Exit signs	Yes	AS 2293.1
Fire control centres & rooms		
Fire dampers		
Fire doors	Yes	AS 1905.1
Fire hydrant systems		
Fire seals		
Fire shutters		

Fire Safety Measure	Installed	Standard of Performance
Fire windows		
Hose reel systems	Yes	AS 2441
Lightweight construction		
Mechanical air handling systems.		
Perimeter emergency vehicle access		
Portable fire extinguishers	Yes	AS 2444
Safety curtain in proscenium opening		
Smoke & heat vents		
Smoke dampers		
Smoke detectors & heat detectors		
Smoke doors		
Solid core doors		
Standby power systems		
Wall-wetting sprinkler / drenchers		
Warning & operational signs	Yes	BCA Clause D2.23
OTHER: –		

Figure 4.1.3.2 – Proposed fire safety schedule

Fire Safety Measure	Installed	Standard of Performance
Fire rated access panels & doors		
Automatic fail safe devices		
Automatic fire detection & alarm	Yes	Unchanged
Automatic fire suppression systems	Yes	AS 2118.1 TRH report J28252-1
Emergency lifts		
Emergency lighting	Yes	Unchanged
EWIS		
Exit signs	Yes	Unchanged
Fire control centres & rooms		
Fire dampers		
Fire doors	Yes	Unchanged
Fire hydrant systems		
Fire seals	Yes	BCA C3.12, C3.15 TRH report J28252-1
Fire shutters		
Fire windows		
Hose reel systems	Yes	Unchanged
Lightweight construction		
Mechanical air handling systems.		
Perimeter emergency vehicle access		
Portable fire extinguishers	Yes	Unchanged
Safety curtain in proscenium opening		
Smoke & heat vents		
Smoke dampers		
Smoke detectors & heat detectors		
Smoke doors		
Solid core doors		
Standby power systems		
Wall-wetting sprinkler / drenchers		
Warning & operational signs	Yes	Unchanged

Fire Safety Measure	Installed	Standard of Performance
OTHER: –		
❑ Emergency evacuation plan	Yes	AS 3745 TRH report J28252-1
❑ Self-closing devices	Yes	TRH report J28252-1
❑ Automatic sprinkler system in opposing building	Yes	TRH report J28252-1
❑ Hazard tape	Yes	TRH report J28252-1
❑ Handrails	Yes	TRH report J28252-1
❑ Signage	Yes	TRH report J28252-1
❑ Hold open devices	Yes	TRH report J28252-1

5.0 ACCEPTANCE CRITERIA

5.1 GENERAL

For the fire & life safety 'Design Objectives' for the project, Acceptance Criteria derived from traditional sources such as the Fire Engineering Guidelines are employed.

For each Alternative Building Solution proposed within this assessment, the Acceptance Criteria represent benchmarks for measuring compliance.

The Acceptance Criteria must relate directly to each 'Design Objective' to ensure that the attainment of the benchmarks is truly representative of compliance with the 'Design Objective' and Building Code of Australia.

5.2 METHOD OF ANALYSIS

In terms of Specification C1.1 and Clauses C2.9, C3.11 and H101.16, it relies upon a combination of qualitative and quantitative analyses of the non-compliance for the purpose of demonstrating 'absolute' compliance with performance requirements CP1, CP2.

The qualitative analysis is used to determine appropriate fire scenarios for assessment, while the quantitative analysis involves sprinkler activation and fire plume temperature calculations.

In terms of Clause C3.12, it relies upon a combination of qualitative and quantitative analyses of the non-compliance for the purpose of demonstrating 'absolute' compliance with performance requirement CP8.

The qualitative analysis is used to determine appropriate fire scenarios for assessment, while the quantitative analysis involves sprinkler activation and fire plume temperature calculations.

In terms of Clauses C3.2, D2.13, D2.15, D2.20 and F3.1 it relies upon a qualitative analysis of the non-compliance for the purpose of demonstrating 'absolute' compliance with performance requirements CP2, DP2 and FP3.1 respectively.

In terms of Clause D1.6, it relies upon a qualitative analysis of the non-compliance for the purpose of demonstrating that the standard of life safety is 'equivalent' to the deemed-to-satisfy provisions.

In terms of Clause F3.1, it relies upon a qualitative analysis of the non-compliance for the purpose of demonstrating 'absolute' compliance with performance requirement FP3.1.

5.3 'RUSSELL HOTEL & FORTUNE OF WAR HOTEL' ACCEPTANCE CRITERIA

For the Alternative Building Solution proposed within the subject premises, with recognition of the nature and location of prescriptive non-compliance, the following Acceptance Criteria is established: –

(a) **Specification C1.1 – Fire resisting construction (Table 3)**
Clause C2.9 – Separation of classifications in different storeys
Clause C3.11 – Bounding construction: Class 2, 3 and 4
Clause C3.12 – Openings for service installations
Clause H101.16 – Storerooms

Each of these prescriptive provisions of the BCA require that key elements of the building structure be appropriately fire rated, and penetrations through be fire sealed, all for the purpose of preventing the spread of fire.

With recognition of this, the proposed Alternative Building Solution satisfies performance requirements CP1 and CP2 where it is illustrated that, notwithstanding the absence of prescriptively compliant fire rating, adequate provision nonetheless exists to prevent the spread of fire.

(b) **Clause C3.2 – Protection of openings in external walls**

In accordance with the prescriptive provisions of this Clause of the BCA, openings in fire rated external walls, where located less than 6-meters to the far side of a roadway, must be provided with a protective measure [(*)].

In the rear elevation of the building, as abuts the Nurses Walk, various unprotected window openings exist in the ground, first and second floors.

It is not intended that protective measures be installed to any of these openings in the first and second floors.

As contained within the BCA Objective CO1 referenced previously, preventing the spread of fire between buildings is not for the purpose of property protection, but for the purpose of protecting the occupants of the building.

With recognition of this, the proposed Alternative Building Solution satisfies performance requirement CP2 where it is illustrated that the occupants in the building remain adequately protected from the affects of any fire outbreak in the building on the opposing side of the Nurses Walk.

[(*)] A concession exists though, to not have to protect external wall openings that are located or near ground level.

(c) **Specification C1.1 – Fire resisting construction (Clause 3.1)**

The requirement of this provision, that external walls be constructed of non-combustible material, reflects the consideration that combustible materials can ignite and contribute to the development and spread of fire across a building.

On this basis, the proposed Alternative Building Solution satisfies performance requirement CP2 where it is illustrated that the potential for the existing timber paneling to facilitate this outcome is negated.

(d) **Clause D1.6 – Dimensions of exits and paths of travel to exits**

The prescriptive requirement to provide an unobstructed pathway and exit door width of 1000-mm is designed to accommodate a population flow of up to 100 persons per floor.

Within the areas nominated in item 1.1 above, a pathway width of between 570-920-mm exists, whilst the four (4) exit doors to George Street have a clear width of 900-mm each.

Notwithstanding these reductions, and importantly to this assessment, the ***actual*** population flow in each area is also less than the allowance under the prescriptive provisions.

While a reduction in the width of pathways and exits would typically result in an increase in occupant congestion and evacuation time, the reduced population load will certainly provide some compensation for the reduced (exit) width.

The proposed Alternative Building Solution therefore satisfies performance requirement DP6 where the ability to evacuate the ***actual*** population load is equal to, or better than, the time to evacuate 100 occupants in a prescriptively compliant circumstance.

(e) **Clause D2.9 – Width of stairways**
Clause F3.1 – Height of rooms

These provisions of the BCA specify minimum ceiling height requirements for certain room and space types within the different building classifications for the purpose of ensuring functionality and a (perceived) standard of amenity for the occupants of the spaces.

Where the nature of the use of the space, coupled with the periods of occupation, occupant loads, and other building design characteristics do not detrimentally impact upon the occupant amenity or intended use, the proposed Alternative Building Solution satisfies performance requirement FP3.1.

(f) **Clause D2.13 – Treads and risers**

This provision of the BCA specifies stair tread and riser dimensions for the purpose of *facilitating* the safe evacuation of building occupants.

Stairways with winders in lieu of landings can be a trip hazard, reduce the movement speed, and / or impede the evacuation of occupants.

With recognition of this, the proposed Alternative Building Solution satisfies performance requirement DP2 where it is illustrated that the existing stairways are neither unsafe nor impede the evacuation of occupants within the building.

(g) **Clause D2.15 – Thresholds**

With reference to the Australian Building Code Board publication, Guide to the BCA 2008, the *intent* of this prescriptive provision is: –

> *"To reduce the risk of a person tripping on an unseen step in a doorway"*

Accepting the premise that the occupiers of the building would be familiar with their surroundings, the proposed Alternative Building Solution satisfies performance requirement DP2 where the increased *risk* of tripping, by virtue of the step location, is negated.

(h) **Clause D2.20 – Swinging doors**

The *intent* of having exit door leafs that swing in the direction of egress is:–

"To minimize the risk that a door may obstruct a person evacuating"

In addition to the above comments regarding the impact that inward swinging door leafs may have on evacuation, it is highlighted that this prescriptive provision *does* permit inward swinging doors under certain conditions.

Where a building or portion thereof served by an exit door has a floor area of less than 200 m^2, and the door leaf is fitted with a hold open device, the door leaf may swing inwards.

The basis of this concession relates to the number of persons likely to be relying upon the exit door. With a limit of 200 m^2, and using the person per m^2 ratios contained within Table D1.13 of the BCA, a maximum population of 200 persons would be anticipated.

On the basis of the above, the Alternative Building Solution satisfies performance requirement DP2 where it is illustrated that the population load on inward swinging exit doors does not exceed the aforementioned potential load otherwise accepted by the BCA for inward swinging doors.

6.0 PERFORMANCE VERIFICATION ASSESSMENT

6.1 PRESCRIPTIVE NON-COMPLIANCE – SPEC. C1.1, CLAUSE C2.9, C3.11, C3.12 & H101.16

6.1.1 Preamble

The prescriptive non-compliance with BCA Specification C1.1 and Clauses C2.9, C3.11, C3.12 and H101.16 shall be assessed using both qualitative and quantitative analysis techniques, incorporating sprinkler activation and ceiling jet temperature calculations.

The purpose of this analysis is to demonstrate that sprinkler protection will control the development and temperatures from a fire so as not to cause failure of the existing materials of construction and therefore spread of fire.

In this respect, the following assessment will analyze the fire resisting qualities of the existing materials of construction, and the fire plume temperatures generated by a 'sprinkler controlled' fire outbreak.

The assessment considers a single fire source / outbreak only and, like the prescriptive provisions of the BCA, does not consider deliberate acts of vandalism or arson.

6.1.2 Materials of construction

As contained within Part 1 of this report, several different material types are employed within the walls bounding residential areas, and the intervening floors and storeroom enclosures.

Furthermore, the door sets to residential units are fitted with panel type door leafs of 20-40-mm thickness.

In those instances where the materials of construction do not achieve the fire rating levels prescribed by the BCA, they nonetheless possess inherent fire-resisting qualities.

Whilst a variety of publications exist that identify the inherent FRL and / or failure temperature of these materials, the following are adopted for the purpose of this report: –

(a) Timber wall panelling = approx. 300ºC [1]

(b) Lathe & plaster ceiling linings = 22 minutes [2]

(c) Timber panel door leafs = 14 minutes [3]

[1] **Timber Development Association** – Ignition temperatures of different timbers
[2] **NSW Heritage Council** – The fire resistance of ceiling / floor systems commonly found in heritage buildings (technical information sheet 2002)

Converting these maximum time periods in items (b) and (c) to a maximum fire temperature is achieved by applying the following equation: –

$$T = 345 \log_{10} (8t + 1) + 20$$ [4]

Lathe & plaster ceiling failure temperature = *795ºC*

Timber panel door leaf failure temperature = *728ºC*

6.1.3 Sprinkler activation calculations

Calculation of the time to activation of the sprinkler system is necessary to enable calculation of the maximum ceiling jet temperature that will be generated by a fire outbreak and impressed upon the ceiling lining.

This recognizes that when the sprinklers are activated by the temperature effects of the fire, a water spray is emitted through the ceiling jet and smoke layer and onto, or around, the base of the fire.

By emitting a water spray through the ceiling jet and smoke layer, while the fire may not be extinguished and only prevented from further growth, the jet and layer temperatures are reduced.

In a worst-case scenario where the water spray cannot reach the base of the fire, the ceiling jet and smoke layer may only remain static.

Either way, whether the temperature is taken immediately prior to sprinkler activation, or is considered to be static thereafter, the point in time at which activation of the sprinklers occurs is necessary to calculate the maximum ceiling jet temperature exposure on the floor.

For the purpose of this assessment, the time to activation of the sprinkler heads is calculated using Program "Sprinkler" from the FireWind suite of computer fire modeling programs.

These calculations are based upon the sprinkler system having fast-response sprinkler heads with the following characteristics: –

(a) Activation temperature = 68°C

(b) Response time index = 35 $M^{1/2}$ / $sec^{1/2}$

(c) Conductivity = 0.65 $M^{1/2}$ / $sec^{1/2}$

Recognizing that the time to activation is directly influenced by the heat release rate of an actual fire outbreak, calculations are performed against different fire growth rates, including: –

[3] **NSW Heritage Council** –Technical Notes for Doors and Ceilings
[4] **Standards Australia** – AS1530.4 – Methods for fire tests on building materials, components and structures, Clause 2.9.1.2, 1997.

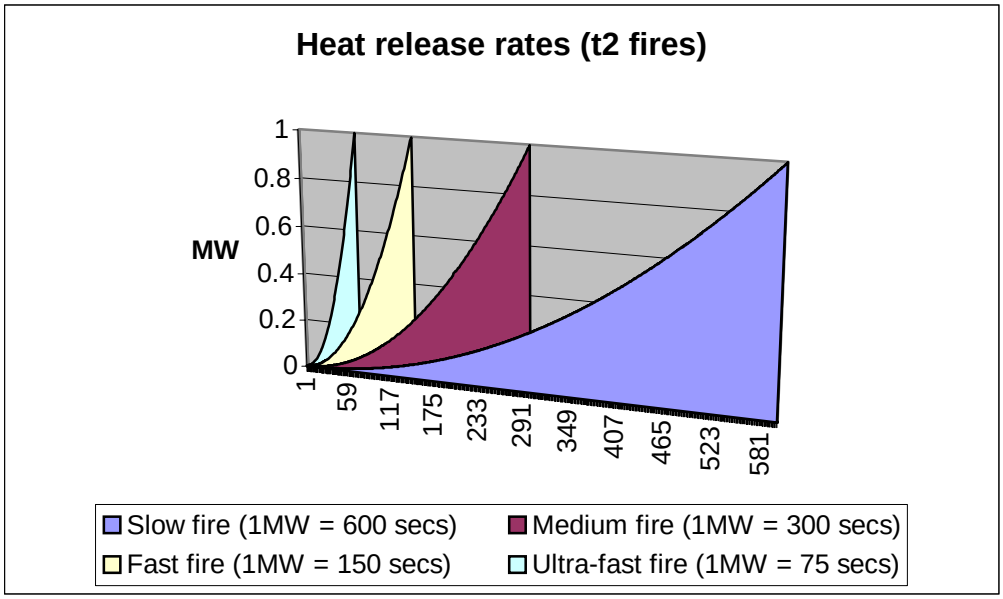
(a) Medium "t^2" design fire;

(b) Fast "t^2" design fire; and

(c) Ultra-fast "t^2" design fire.

These design fire scenarios have been derived from substantial laboratory and field studies, and are defined by the time taken to achieve a heat release rate of 1 MW.

Figure 6.1.3.1 – "t^2" Design fires



The following Table identifies each of the locations within the building that are considered in this assessment, and the particular fire scenarios applied: –

Table 6.1.3.1 – Locations & fire scenarios

	Medium "t2" fire	Fast "t2" fire	Ultra-fast "t2" fire
Basement		✓ (Scenario B1)	✓ (Scenario B2)
Ground		✓ (Scenario G1)	✓ (Scenario G2)
First floor	✓ (Scenario F1)	✓ (Scenario F2)	
Second floor	✓ (Scenario S1)	✓ (Scenario S2)	

The results of these calculations are depicted in Figures 6.1.3.2 – 6.1.3.9 below

Figure 6.1.3.2 – Time to activation of sprinklers – SCENARIO B1

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	131 seconds
H.R.R AT SPRINKLER ACTIVATION:	762 kW

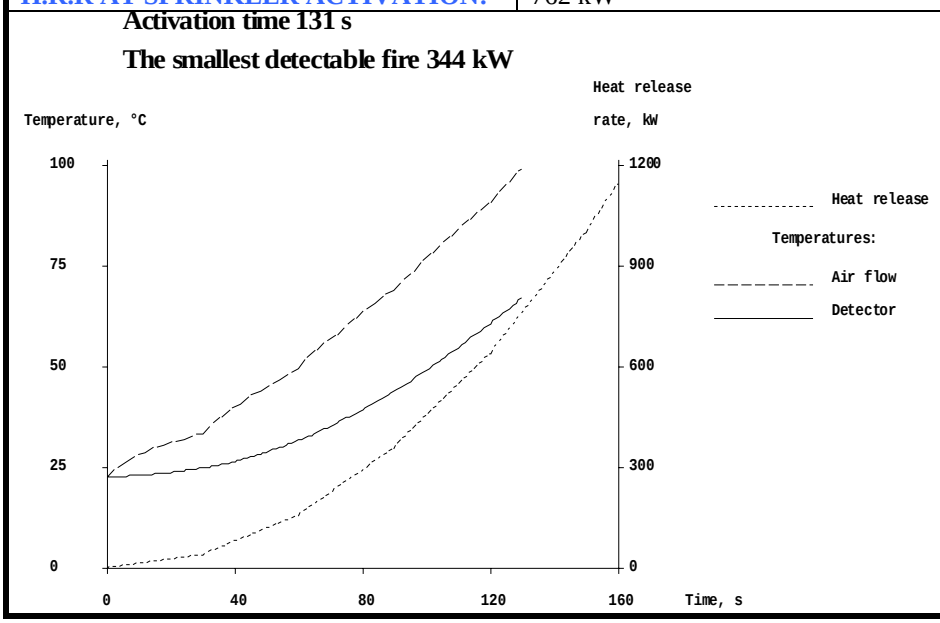


Figure 6.1.3.3 – Time to activation of sprinklers – SCENARIO B2

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	77 seconds
H.R.R AT SPRINKLER ACTIVATION:	1000 kW

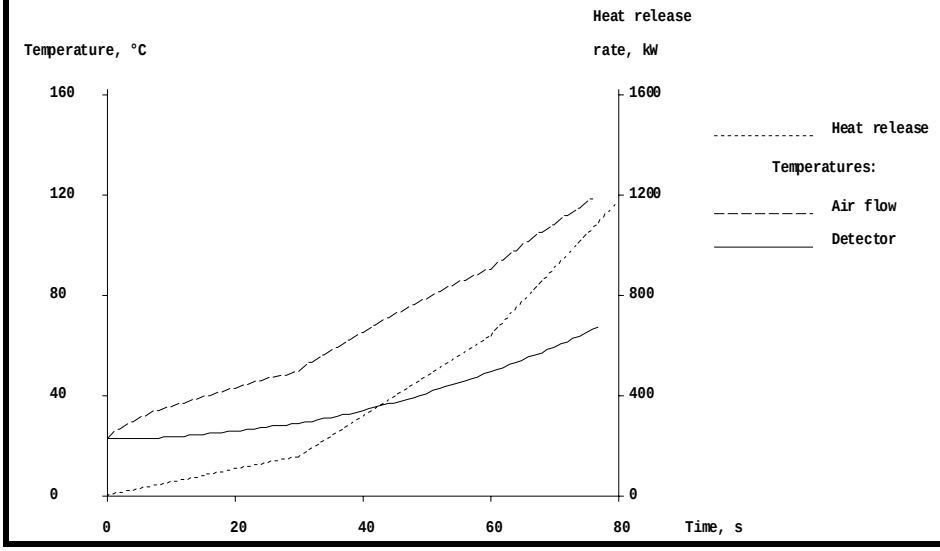


Figure 6.1.3.4 – Time to activation of sprinklers – SCENARIO G1

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	159 seconds
H.R.R AT SPRINKLER ACTIVATION:	1120 kW

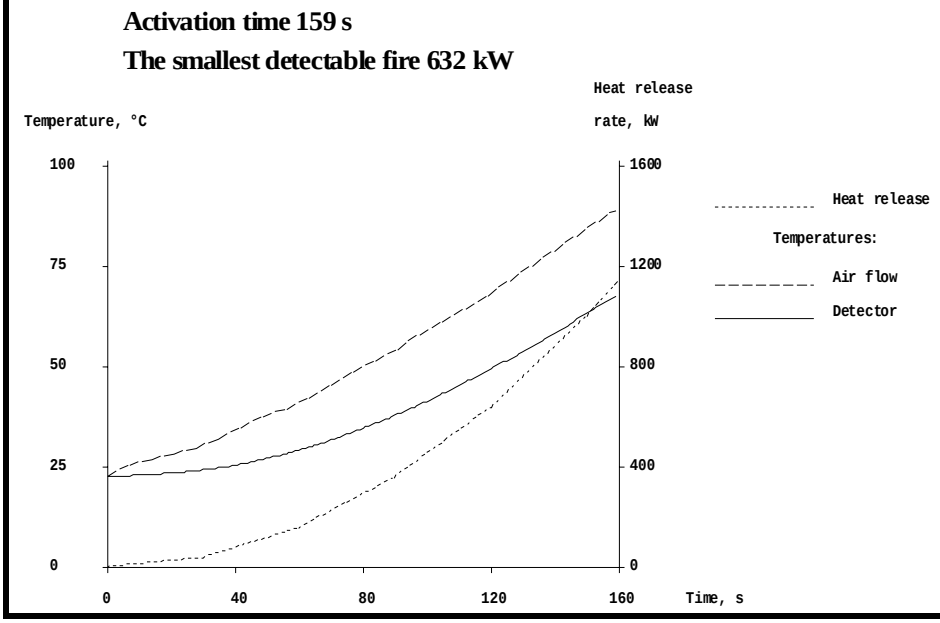


Figure 6.1.3.5 – Time to activation of sprinklers – SCENARIO G2

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	92 seconds
H.R.R AT SPRINKLER ACTIVATION:	1500 kW

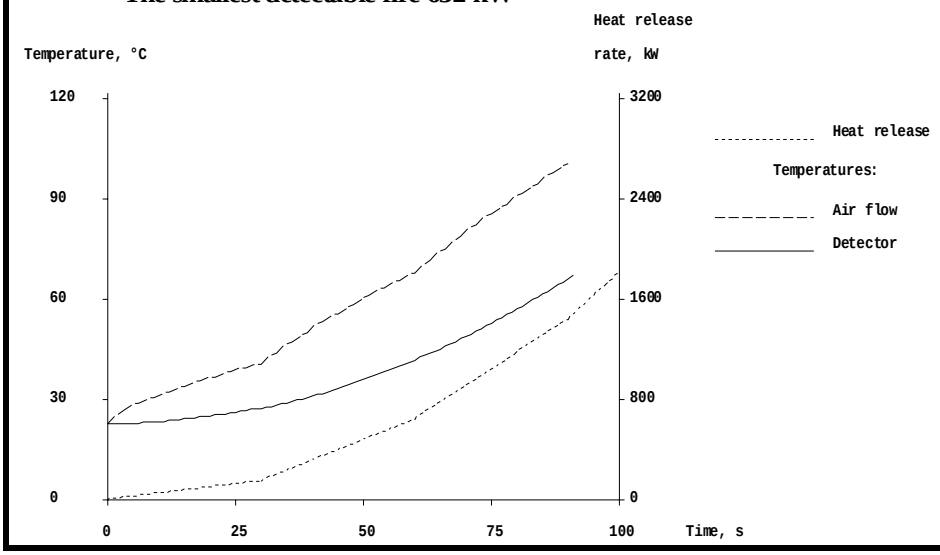


Figure 6.1.3.6 – Time to activation of sprinklers – SCENARIO F1

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	253 seconds
H.R.R AT SPRINKLER ACTIVATION:	711 kW

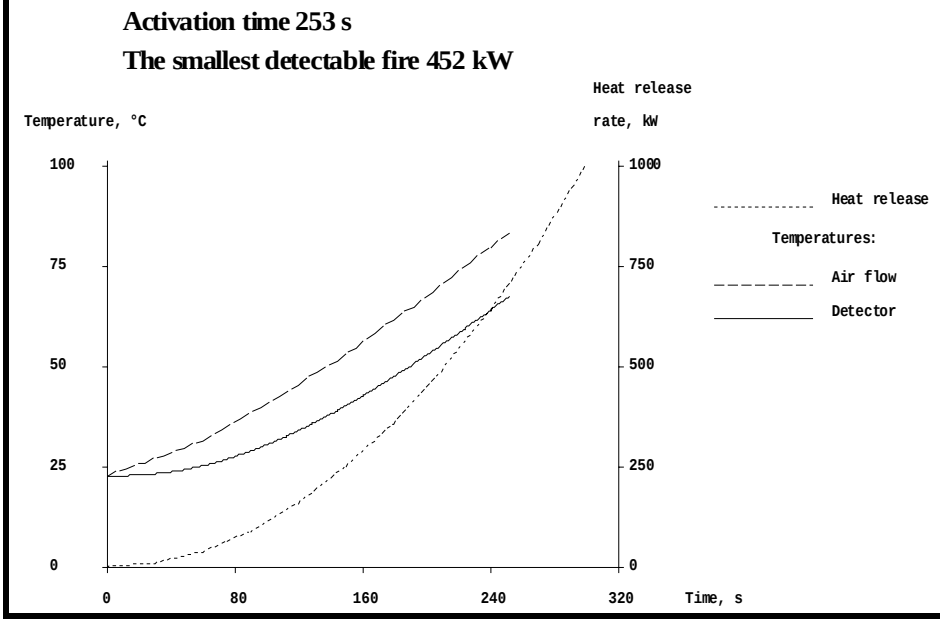


Figure 6.1.3.7 – Time to activation of sprinklers – SCENARIO F2

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	142 seconds
H.R.R AT SPRINKLER ACTIVATION:	896 kW

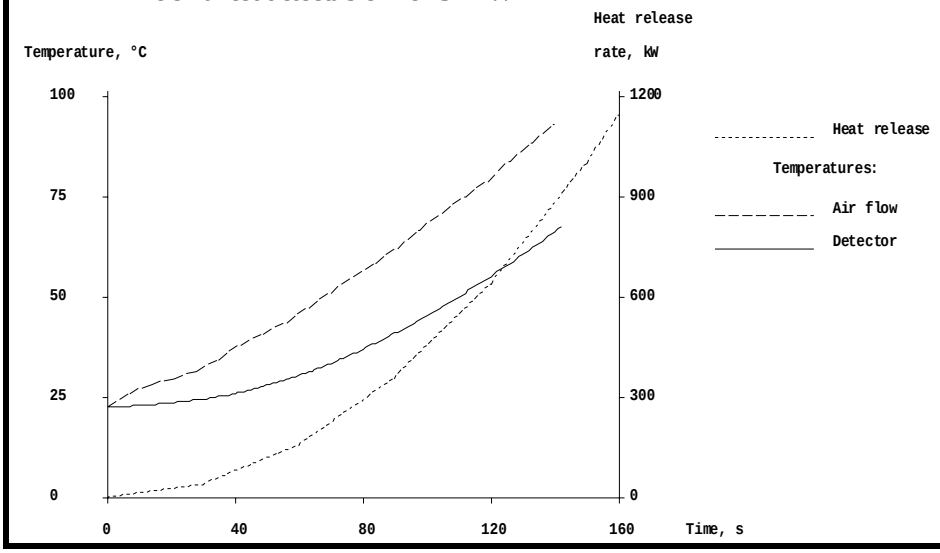


Figure 6.1.3.8 – Time to activation of sprinklers – SCENARIO S1

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	253 seconds
H.R.R AT SPRINKLER ACTIVATION:	711 kW

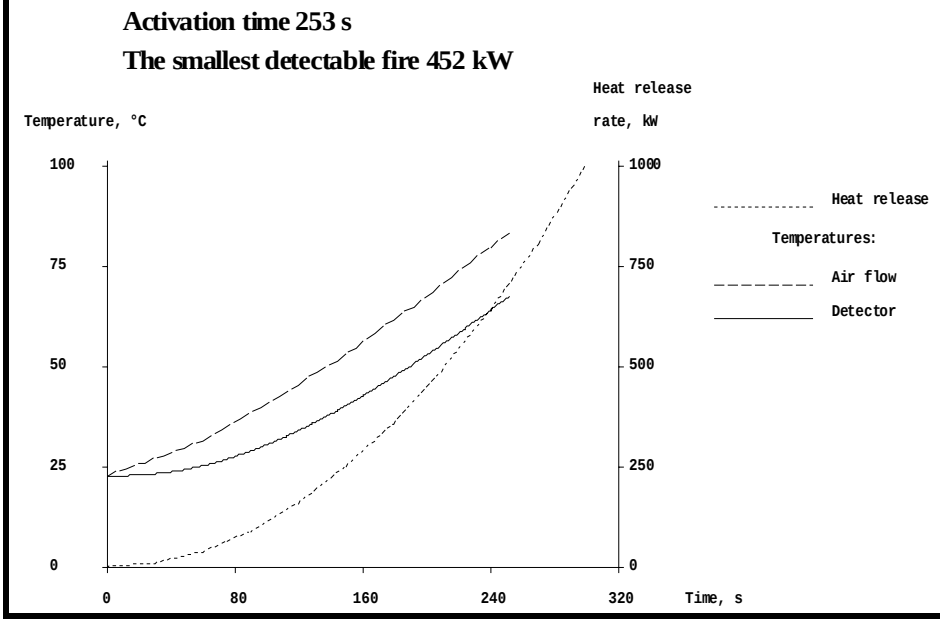
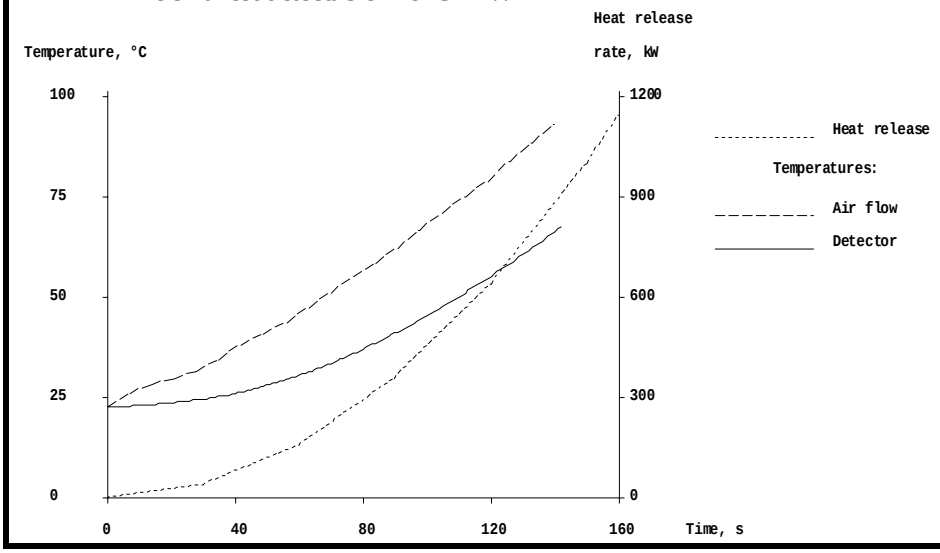


Figure 6.1.3.8 – Time to activation of sprinklers – SCENARIO S2

MODEL:	Program Sprinkler
TIME TO ACTIVATION:	142 seconds
H.R.R AT SPRINKLER ACTIVATION:	896 kW



6.1.4 Ceiling Jet Temperature calculations

Calculation of the maximum ceiling jet temperature at the time of activation of the sprinklers is necessary to verify that the failure temperature for the floor material is not achieved prior to activation of the sprinklers.

The ceiling jet temperature is determined, based upon the heat release rates at the time sprinkler activation in figures 6.1.3.2 – 6.1.3.4 above, through the application of "Alpert's equations".

These equations calculate the temperature of fire plumes / ceiling jets at any specified distance above and radially from a fire.

$$\mathbf{T = 5.38\ (Q/r)^{2/3} / H} \qquad \textbf{where r > 0.18 H}$$

$$\mathbf{T = 16.9\ Q^{2/3} / H^{5/3}} \qquad \textbf{where r < 0.18 H}$$

Of the two versions of Alperts equation above, the worst case scenario is taken as r < 0.18 H, as this considers the temperatures immediately above the fire and not at some radial distance where the temperature would decrease.

T = temperature in Celsius

Q = convective heat release rate (70% of total HRR)

H = height above the floor

From the maximum heat release rates calculated in Figures 6.1.3.2 – 6.1.3.9 above, the following fire plume temperatures are determined: –

Table 6.1.4.1 – Maximum fire plume temperatures

	Medium "t2" fire	Fast "t2" fire	Ultra-fast "t2" fire
Basement		350°C	420°C
Ground		230°C	279°C
First floor	246°C	287°C	
Second floor	246°C	287°C	

6.1.5 Conclusion

As existing, several elements of non-compliant fire rating have been identified within the building, namely: –

(a) Timber paneling installed to a portion of wall in the second floor, and to the stairway connecting the ground and first floors, does not achieve the BCA prescribed FRL of 1.5-hours and 2-hours respectively;

(b) The intervening floors do not achieve the BCA prescribed FRL of 1-hour, 1.5-hours or 2-hours (depending upon the location);

(c) Service penetrations through these floors are subsequently not fire sealed;

(d) The door leafs to the residential units do not achieve the BCA prescribed FRL of 1-hour.

Despite these deficiencies, an inherent fire resistance of 300 ºC – 795ºC is achieved.

Through calculation of the time to activation of the sprinkler system under a variety of fire scenarios, it has been determined that the following maximum fire plume temperatures would be achieved in each floor: –

(a) Basement – 420°C

(b) Ground – 279°C

(c) First floor – 287°C

(d) Second floor – 287°C

Since this temperature is less than that able to be withstood by the structure, the objective of preventing the spread of fire, and therefore compliance with performance requirements CP1 and CP2, is achieved.

7.0 PERFORMANCE VERIFICATION ASSESSMENT

7.1 PRESCRIPTIVE NON-COMPLIANCE – CLAUSE C3.2

7.1.1 Preamble

The prescriptive non-compliance with BCA Clause C3.2 shall be assessed using qualitative analysis techniques.

The purpose of this analysis is to demonstrate that, notwithstanding the absence of protective measures to openings in the external wall facing the Nurses Walk, the occupants within remain adequately protected from the affects of fie from the building on the opposing site.

The assessment considers a single fire source / outbreak only and, like the prescriptive provisions of the BCA, does not consider deliberate acts of vandalism or arson.

7.1.2 Analysis

As contained within Part 1 of this report above, the openings in the external wall of the subject building, at each of the ground, first and second floors, are not fitted with protective measures where located less than 6-metres from the far side of the Nurses Walk.

Arising from the assessment undertaken by AE&D Pty Limited, the openings are located approximately 3.5-metres from the far side.

With reference to the Australian Building Codes Board publication, "Guide to the BCA 2008", the *objective* of the BCA in requiring protective measures is stated as follows: –

> *"…to prevent the spread of fire from the boundary of an allotment…"*

As illustrated by verification methods CV1 and CV2, the BCA considers that spread of fire 'occurs' once a certain level of radiant heat flux is <u>received</u> from a building containing a fire outbreak.

While the *actual* level of radiant heat flux needed to cause fire spread is difficult to accurately determine, and is influenced by a wide number of variables that change between individual buildings, both these verification methods infer that a radiant heat flux in excess of 10 kW/m^2 is needed.

Under this (Clause C3.2) prescriptive provision of the BCA, by simply providing external wall-wetting sprinklers over fixed or automatic closing windows, prevention of the spread of fire is considered to be achieved.

Interestingly, this outcome is considered to occur irrespective of any differences in the variables that facilitate spread of fire: for instance, building type, window sizes, fuel loads, fire severity or the like.

Accepting this principle though, that the provision of sprinklers achieves an adequate degree of protection, attention is drawn to the fire safety measures installed within *both* the subject building and that located on the opposing side of the Nurses Walk.

Whilst many different systems are contained within both buildings, particular attention is drawn to the respective automatic sprinkler systems.

As stated within the fire safety schedules attached to both buildings, these systems accord with Australian Standard 2118.1, with the system within the subject building to incorporate fast-response sprinkler heads (see Part 6 of this report).

The system to the opposing building also incorporates external wall-wetting sprinklers over those openings facing into the Nurses Walk and therefore at the subject building.

By virtue of the presence of sprinkler protection within the opposing building, in the event of a fire outbreak therein, such shall be controlled, and ultimately suppressed. Even under the assumption that suppression does not occur, basic intervention to an outbreak minimizes the peak heat release rate, and prevents the emission of radiant heat flux through the window openings to the degree necessary to facilitate fire spread.

7.1.3 Conclusion

The prescriptive provisions of the BCA rely upon the provision of sprinkler protection over window openings to prevent the entry of fire.

By having sprinkler protection *within* the building on the opposing side of the Nurses Walk, fire spread <u>out of</u> that premises is instead prevented.

The presence of external wall-wetting sprinklers over the openings to that building also serve to act as an added layer of fire protection; whilst their activation would not be supported by a glazing panel on which to create a water film (assuming their breakage), their spray will attenuate any radiant heat nonetheless emitted through those openings.

An added benefit exists in the building alarm that will activate when the sprinkler system in the opposing building is operating.

This alarm will cause an automatic signal to the sent to the NSW fire brigade, and will alert neighboring buildings to the presence of an emergency.

By virtue of these characteristics, fire spread into the subject building is prevented and compliance with performance requirement CP2 achieved.

8.0 PERFORMANCE VERIFICATION ASSESSMENT

8.1 PRESCRIPTIVE NON-COMPLIANCE – CLAUSE D1.6

8.1.1 Preamble

The prescriptive non-compliance with BCA Clause D1.6 shall be assessed using qualitative analysis techniques.

The purpose of such analysis is to demonstrate that the reduced pathway and exit door widths do not compromise the standard of occupant life safety.

The assessment considers a single fire source / outbreak only and, like the prescriptive provisions of the BCA, does not consider deliberate acts of vandalism or arson.

8.1.2 Analysis

As contained within Part 1 of this report above, the following areas do not achieve an unobstructed width of 1000-mm: –

Russell Hotel

(a) Stairway to kitchen – an unobstructed width of 740-mm;

(b) Main stairway – an unobstructed width of 800-mm;

(c) Stairway to roof void – an unobstructed width of 570-mm;

Fortune of War Hotel

(a) Stairway between bar and lounge – an unobstructed width of 920-mm;

(b) Stairway from lounge bar to office – an unobstructed width of 900-mm;

(c) Exit doors to George Street (x 4) – an unobstructed width of 900-mm each.

Noting that a pathway width is designed to accommodate a population load of up to 100 persons, through interpolation, each of these *actual* widths still accommodates an occupant load of: –

(a) Stairway to kitchen – 74 persons;

(b) Main stairway – 80 persons per floor;

(c) Stairway to roof void – 57 persons;

(d) Stairway between bar and lounge – 92 persons;

(e) Stairway from lounge bar to office – 90 persons;

(f) Exit doors to George Street (x 4) – 90 persons each.

In reality though, these widths only need to serve a population load of: –

(a) Stairway to kitchen – up to 10 persons;

(b) Main stairway – up to 50 persons per floor;

(c) Stairway to roof void – up to 20 persons;

(d) Stairway between bar and lounge – up to 75 persons;

(e) Stairway from lounge bar to office – up to 5 persons;

(f) Exit doors to George Street (x 4) – up to 75 persons each.

Based upon such a reduced population load, it is apparent that each of the *actual* widths would not restrict the flow of occupant moving through the spaces.

Indeed, in each of the principal evacuation pathways, the actual width still exceeds the 750-mm width prescribed by the BCA for doorway openings; openings that still accommodate an occupant load of up to 100 persons.

8.1.3 Conclusion

Whilst the building contains these reduced, non-compliant pathway and exit door widths, the occupant load being placed upon area is far less than that for which prescriptively compliant widths are designed (by the BCA) to accommodate.

Consequently, since the occupant load is reduced (at least) proportionally to the reduced width, an occupant flow rate not less than that achieved in a compliant design would occur.

Compliance is therefore achieved with performance requirement DP6.

9.0 PERFORMANCE VERIFICATION ASSESSMENT

9.1 PRESCRIPTIVE NON-COMPLIANCE – CLAUSE D2.9 & F3.1

9.1.1 Preamble

The prescriptive non-compliance with BCA Clause D2.9 and F3.1 shall be assessed using qualitative analysis techniques, and expert judgment.

The purpose of such analysis is to demonstrate that the reduced ceiling height does not detrimentally impact upon the standard of amenity experienced by the occupants, nor unreasonably restricts the use of the space.

This assessment relates only to the impact of ceiling heights, with no assessment made of other factors such as use, noise and environmental conditions, as may impact upon occupant amenity.

9.1.2 Occupant amenity analysis

With reference to item 1.3 of this report, the areas of non-compliant ceiling height exist within the: –

(a) Main stairway beneath the existing beam;

(b) Stairway to the cellar space; and

(c) Cellar basement.

The prescriptive provisions of the BCA specify minimum ceiling height requirements for certain room and space types within the different building classifications for the purpose of ensuring a (perceived) standard of amenity for the occupants therein, and to permit the use of the space for its intended design purpose.

The BCA specifies minimum ceiling heights without any recognition of the periods of time for which a space may be occupied, thereby ignoring the valid consideration that ‘amenity’ is a reflection of both design characteristics and the period of time over which occupation occurs, and not the use alone.

For the subject areas the periods of occupation are not indefinite and, in many instances, reflect the transient nature of occupants in such an environment.

Furthermore, the occupant loads would be extremely low, with a typical population ratio of one (1) – two (2) persons in the affected areas and, in peak periods, a maximum of three (3) persons may be experienced.

The “interfering with a room or space intended function” can only be assessed on the human reaction to a certain area.

Two (2) of the most commonly used documents by architects around the world on human anthropometrics are "ERNST NEUFORT – ARCHITECTS' Data" and the "AJ Metric Handbook" which is a British Document, and details statistics specific to certain human positions, that may be incurred in everyday life.

In taking a worst case scenario, Men and Women aged 18 to 40, that made up 5% of the population (95% percentile band) had a standing height of –

Male	Female
1846mm	1742mm

Adding the height of clothing and shoes, the standing levels are still comparable with the reduced heights.

In addition to this, the building is provided with a combination of mechanical and natural ventilation. This ventilation ensures a constant airflow within the building, removing air contaminants and introducing clean, fresh air.

In terms of occupant amenity, the presence of ventilation obviates the negative impact of having a layer of reduced air quality at a lower level than would otherwise be experienced with a higher, and compliant, ceiling design.

9.1.3 Conclusion

As evident by the aforementioned assessment, the reduced ceiling height in the stairways and cellar space does not have a detrimental impact upon the amenity of the occupants, nor restrict the use.

Notwithstanding this, to minimise the extent to which occupants may come into contact with the overhead obstructions, it is recommended that the ability to identify their presence be improved.

This can be achieved through either repainting the surfaces with a contrasting colour, applying a hazard tape type material, or similar.

10.0 PERFORMANCE VERIFICATION ASSESSMENT

10.1 PRESCRIPTIVE NON-COMPLIANCE – CLAUSE D2.13

10.1.1 Preamble

The prescriptive non-compliance with BCA Clause D2.13 shall be assessed using qualitative analysis techniques, and expert judgment.

The purpose of such analysis is to demonstrate that the impact of having winders within the main stairway and the stairway to the roof can be obviated by other building characteristics.

10.1.2 Assessment

As contained within Part 1 of this report above, both the main stairway connecting the ground, 1st and 2nd floors, and the stairway leading to the roof area, contain winders in lieu of a landing.

With reference to the Australian Building Codes Board publication, 'Guide to the BCA 2008', the *intent* of the BCA in prohibiting winders is stated as follows: –

> *"To enable the safe movement of people using stairways."*

In reality, achieving this outcome – the 'safe movement of persons using stairways' – is influenced by many more characteristics than simply the prohibition of winders in a stair flight.

In terms of 'building characteristics', these include: –

(a) the presence or absence of a handrail to the side of a flight,;

(b) the compliance or non-compliance of going and riser dimensions;

(c) the degree of slip resistance to the tread surface;

(d) the presence or absence of non-slip nosings.

Separate to this, yet equally relevant, are the characteristics of the occupants concerned: for instance, whether they have a form of disability, their age, the number of occupants simultaneously traversing the stair, and even the type of footwear being worn.

Whilst the occupant characteristics cannot be regulated, those that are associated with the built-form can be modified to improve the circumstance and negate the impact of having winders.

In this respect, particular attention is drawn to item (a) above: the presence of handrails.

In a prescriptively compliant design, a handrail is provided to one side of the stairway for the purpose of allowing users to steady and support themselves whilst traversing each flight.

On the premise that users do not require such support whilst on a landing, the requirement for handrails does not extend to such horizontal areas.

Since the Code recognizes handrail installations as a tool by which occupants can steady themselves when traversing a stair, it is recommended that such be installed to ***both*** sides of the flight where the winders exist.

10.1.3 Conclusion

Although a minor and localized reduction in the stairway widths would result from the installation of dual handrails, users will have a greater ability to steady themselves while traversing the winders, which in turn will negate any 'human mechanic' impact caused by their presence.

Consequently, compliance with performance requirement DP2 will be achieved.

11.0 PERFORMANCE VERIFICATION ASSESSMENT

11.1 PRESCRIPTIVE NON-COMPLIANCE – CLAUSE D2.15

11.1.1 Preamble

The prescriptive non-compliance with BCA Clause D2.15 shall be assessed using qualitative analysis techniques, and expert judgment.

The purpose of such analysis is to demonstrate that the familiarity of the building occupants negates any enhanced risk of having a step at the various doorways within the building.

11.1.2 Assessment

With reference to item 1.4 above, this prescriptive provision of the Building Code of Australia only permits, for the subject building, a step at a doorway threshold where: –

(a) the doorway opens to a road, open space, external stair landing or external balcony; and

(b) the door sill is not more than 190-mm (for non-POPE areas) or 50-mm (for POPE areas) above the finished surface of the ground, balcony or the like, to which the doorway opens.

This permission is not in recognition of the risk of tripping being less at an external doorway, but that the absence of a step may allow the ingress of storm water (and the like) into the building, and facilitate subsequent internal damage.

When compared to the *risk* of occupants tripping, the potential damage to internal areas is deemed to be of greater importance and potential consequence.

Acknowledging that the *risk* of occupants tripping over a step at a doorway threshold can never be entirely obviated, it is nonetheless recognized that a direct relationship exists between the ‘potential for occurrence’ and the ‘familiarity of occupants with the building’.

11.1.3 Conclusion

While the areas containing the threshold steps are accessible to both staff and patrons, as they are contained within a well-lit environment, it is considered that they do not automatically (and unacceptably) increase the risk of tripping.

As an added precaution though, it is recommended that the visual identification of each step be improved for persons approaching from either side.

This improvement can be achieved by the installation of signage on both sides of each doorway opening, and a hazard tape or similar material of colour that contrasts with the adjoining surface be applied to the nosing of the step

Through the implementation of these recommendations, compliance with performance requirement DP2 will be achieved.

12.0 PERFORMANCE VERIFICATION ASSESSMENT

12.1 PRESCRIPTIVE NON-COMPLIANCE – CLAUSE D2.20

12.1.1 Preamble

The prescriptive non-compliance with BCA Clause D2.20 shall be assessed using qualitative analysis techniques.

The purpose of this analysis is to demonstrate that the standard of life safety achieved in the building with inward swinging exit doors is at least "equivalent" to that achieved in a prescriptively compliant building.

The assessment considers a single fire source / outbreak only and, like the prescriptive provisions of the BCA, does not consider deliberate acts of vandalism or arson.

12.1.2 Assessment

As contained within Part 1 of this report, this prescriptive provision of the BCA requires that exit door leafs in the ground floor of the building swing in the direction of egress.

The *intent* of the Code in requiring this characteristic is purely to facilitate the evacuation of building occupants, and limit the extent to which the 'operation' of the door leafs inhibits this activity and creates congestion.

Importantly, and as expressed within item 5.3 above, the Code permits the inward swing of exit doors under certain design conditions.

Where the floor area of the building or part served by the exit door is less than 200 m^2, and the door leaf is fitted with a hold open device, it is permissible that exit doors swing inwards.

It is noted that, in respect of the hold open device, such is not an automatic device, nor is it a mandatory requirement that such be employed whenever the building is occupied.

In the event of a building evacuation, the BCA provides a hold-open device so that the first evacuee may manually latch the exit door in the open position. All subsequent evacuees are therefore able to move through the exit doorway opening without being inhibited by the door leaf.

While the floor area of the buildings / portions served by the inward swinging exit doors exceed 200 m^2, it is acknowledged that the population load affected in each instance is less than that which may exist under a prescriptive compliant circumstance.

With reference to the person per m^2 ratios contained within Table D1.13 of the BCA, a building, or portion thereof, of 200 m^2 can potentially accommodate a population load of up to 200 persons.

Under the aforementioned prescriptively compliant circumstance of inward swinging doors, this population is accepted as being at a level where inward swinging doors, and the extra time taken to open, does not compromise the standard of safety.

Recognizing this, for each of the doorways within the ground floor the population load is well under the 200-person limit.

Indeed, in the worst-case scenario, *each* of the inward swinging exit doorways would serve a population load of 50-75 persons.

12.1.3 Conclusion

From the assessment performed in item 12.1.2 above, it has been evidenced that the BCA permits inward swinging exit doors to service population loads of (potentially) up to 200 persons.

However, such doors must be fitted with a manual hold-open device such as a 'parrot-beek'.

While the ground floor exceeds the 200 m^2 limitation for inward swinging doors under the prescriptive provisions, the population load on each doorway is substantially less than that potentially accommodated by (BCA compliant) inward swinging doors.

Consequently, a standard of life safety equivalent to that of a deemed-to-satisfy design, and therefore compliance with performance requirement DP2, will be achieved.

13.0 PERFORMANCE VERIFICATION ASSESSMENT

13.1 PRESCRIPTIVE NON-COMPLIANCE – SPECIFICATION C1.1 (CLAUSE 3.1)

13.1.1 Preamble

The prescriptive non-compliance with BCA Specification C1.1 shall be assessed using qualitative analysis techniques.

The purpose of this analysis is to demonstrate that the presence of combustible material in the external wall of the building does not increase the overall *fire hazard* to occupants therein.

The assessment considers a single fire source / outbreak only and, like the prescriptive provisions of the BCA, does not consider deliberate acts of vandalism or arson.

13.1.2 Assessment

As contained within Part 1 of this report, a portion of the external wall, where facing the laneway, contains timber paneling.

The requirement of the BCA that external wall materials be non-combustible is intended purely to ensure that they do not *facilitate* the spread and development of fire across and into a building.

With reference to Clause A1.1 of the Code, a non-combustible material is defined as follows: –

> *"Not deemed combustible as determined by Australian Standard 1530.1 – Combustibility tests for materials"*

Under the testing regime contained within this Standard, and in broad terms, a material is classified as "non-combustible" where it is placed into the furnace and it: –

(a) Does not ignite;

(b) Does not cause a rise in the preset temperature within the furnace;

(c) Does not cause a temperature rise in the material itself.

If placed within an AS 1530.1 test situation, it is accepted that the timber paneling installed on the external wall in this instance would fail ***all*** of these criteria.

However, it is also considered that the "fire hazard" that this material represents can still be negated without having to replace each panel.

For instance, by applying intumescent paint to the surface of the timber paneling, ignition of the (external wall) material as a consequence of its exposure to a fire outbreak in the opposing building could be prevented.

Indeed, by applying such a product, the paneling would attain the status of 'fire rated'; a standard of performance, in terms of resistance to the spread and development of fire, above the prescribed and desired standard of "non-combustible".

While the thickness of the paint coating determines the fire resistance level of the substrate, by applying sufficient paint to result in an FRL of 30-minutes, the desired standard of performance – at least equivalent in performance to a non-combustible material – would be achieved.

13.1.3 Conclusion

The existing timber paneling on a portion of the external wall facing the laneway is combustible and *may* contribute to the development and spread of fire into the subject building in the event of an outbreak in the opposing property.

By applying intumescent paint to the timber surface, although the 'combustible' status technically remains, the *actual* standard of performance for the material if exposed to fire would be superior.

On this basis, compliance with performance requirement CP2 will be achieved.

14.0 DISABLED ACCESS & ENERGY EFFICIENCY

14.1 GENERAL

As contained within item 1.1 above, the purpose of this report is to review certain prescriptive non-compliance identified within the building design, and verify the attainment of compliance with the relevant performance requirements of the Building Code of Australia (BCA).

In addition to this activity though, in view of the an impending Development Application in regards to a variety of general building alterations and additions, it has been requested that comment also be made in regards to the areas of 'disabled access' and 'energy efficiency'.

14.2 DISABLED ACCESS

As existing, limited disabled access is provided into and through the building.

The building regulations applicable at the date of original construction did not contain disabled access requirements, whilst the heritage value has precluded the undertaking of those activities necessary to achieve compliance, in all respects, with the current building code.

Recognizing the importance of achieving a level of disabled access into and through a building, the following actions, being derived from recommendations applied to similar heritage-type buildings, are recommended: –

(a) Install removable ramps to the front entry of the building;

(b) Install AS 1428.1 compliant International Symbols of Access to denote the front and rear entries of the building that permit disabled access;

(c) Install a platform lift within the Fortune of War Hotel to allow access to the raised area at the rear of the building, and subsequent access into the rear of the Russell Hotel;

(d) Install an AS 1428.1 compliant disabled toilet within the ground floor;

(e) Install AS 1428.4 compliant tactile indicators to the top and bottom of internal stairways.

14.3 ENERGY EFFICIENCY

In accordance with section 145 of the Environmental Planning & Assessment Regulation 2000, all proposed works must comply with the relevant provisions of Section J of the BCA.

15.0 CONCLUSION & RECOMMENDATIONS

15.1 GENERAL

The foregoing assessment has addressed the non-compliance identified within item 1.4 of this report, and has verified that compliance with the nominated performance requirement is achieved.

The effectiveness and compliance of the Alternative Building Solution is contingent upon the implementation of the recommendations nominated below and the maintenance of the building and systems therein.

15.2 RECOMMENDATIONS

The following recommendations are derived through the assessment performed, and are made to ensure that the effectiveness of the Alternative Building Solution.

General

(a) Maintain ongoing house keeping during occupation to eliminate the accumulation of combustible materials throughout the building.

(b) Maintain the usage and building, occupant, and assessment characteristics as contained within / relied upon in the preparation of this report.

(c) Formulate and implement an AS 3745 compliant Emergency Evacuation & Management Procedures manual, documenting the results and limitations associated with this assessment.

Specification C1.1 & Clauses C2.9, C3.11, C3.12 and H101.16

(a) Install fast-response sprinkler heads to the existing automatic sprinkler system;

(b) Obtain certification from a hydraulic engineer confirming that the existing sprinkler system complies with Australian Standard 2118.1, and upgrade where deficient;

(c) Seal service penetrations through the intervening floors with plaster or similar material having an inherent fire resistance so as to ensure that the gap between ceiling linings and the penetrating service is closed to the entry of fire;

(d) Ensure the installation of fully operational self-closing devices to each door leaf opening to the residential corridors.

Clause C3.2

Re-visit the need to protect openings in the external wall facing the Nurses Walk in the event of change to the use and fire safety measures installed in the opposing building.

Clause D1.6

Implement the other recommendations of this report.

Clause D2.9 & Clause F3.1

Applying a contrasting colour or hazard tape style material to the overhead obstructions in the two (2) stairways and cellar, to enhance visual identification as persons traverse the areas.

Clause D2.13

Install handrails to both sides of the two (2) stairways where the winders exist.

Clause D2.15

(a) Install signage on both sides of each doorway containing a step at the threshold, advising the user of the presence of a step and to take appropriate care when using the door facility.

(b) Apply coloured paint or similar to the doorway threshold so as to enhance the visual identification of the step.

Clause D2.20

Install a hold-open device such as a 'parrot-beek' to each of the inward opening exit door leafs.

Author

Hayden L Howse
Managing Director
Grade 1 Accredited Certifier / PCA
Trevor R Howse & Associates Pty Limited