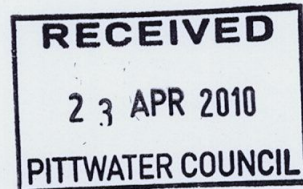


Job No: 2005/307

Wednesday, 21 April 2010

Pittwater Council  
P.O. Box 882  
Mona Vale NSW 1660



Attention: General Manager

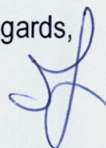
**RE: Interim Occupation Certificate No. 05/307/03  
Warriewood Aged Care Facility,  
6 – 14 Macpherson Street, Warriewood**

Please find attached a copy of Interim Occupation Certificate 05/307/03 and required attachments issued by Steve Watson & Partners for the above mentioned development in accordance with Section 109C(1)(c) and 109H of the Environmental Planning and Assessment Act 1979.

Please find attached a cheque in the amount of \$30.00 payable for the registration of the Occupation Certificate.

Can you please forward SWP a receipt for the acknowledgment of the lodgement cheque.

With regard to the attached certificate please do not hesitate to contact me should you have any queries or require any further information.

Regards,  


Tim Abovian  
Assistant Building Regulations Consultant  
Steve Watson & Partners Pty Ltd

*PRVC \$30 REC. 28/11/2010  
23/4/10*

# INTERIM OCCUPATION CERTIFICATE



**STEVE WATSON  
& PARTNERS**

BUILDING REGULATIONS CONSULTANTS AND CERTIFIERS  
FIRE SAFETY ENGINEERS

LEVEL 5, 432 KENT STREET, SYDNEY NSW 2000  
TEL +61 2 9283 6555 IFAX +61 2 9283 8500  
sydney@swpartners.com.au  
www.swpartners.com.au  
ABN 48 102 366 576

Issued under the Environmental Planning and Assessment Act 1979 Section 109C(1)(c) and 109H

## Interim Occupation Certificate No. 05/307/03

Steve Watson and Partners certify that:

- They have been appointed as the Principal Certifying Authority under section 109E.
- A Development Consent/Complying Development Certificate is in force with respect to the building.
- A Construction Certificate has been issued with respect to the plans and specifications for the building.
- The building is suitable for occupation or use in accordance with its classification under the Building Code of Australia.
- Where required, a Final Fire Safety Certificate has been issued for the building.
- Where required, a report from the Commissioner of Fire Brigades has been considered.

<b>Applicant</b>	Name: <b>Anglican Retirement Villages</b> Address: <b>P.O. Box 284</b> Suburb: <b>Castle Hill</b> State: <b>NSW</b> Postcode: <b>1765</b>
<b>Location of the Property</b>	Address: <b>6-14 McPherson Street</b> Suburb: <b>Warriewood</b> State: <b>NSW</b> Postcode: <b>2101</b> Real Property Description: <b>Lot B DP400488, Lot 22 DP5464, Lot B DP358765, Lot B DP345528, PT Lot 1 DP208149, PT Lot 3 DP579309, PT Lot 3 DP942319, PT Lot 4 DP579309</b>
<b>Building Description</b>	<b>Stage 2A RACF – Nursing Home and amenities including Fire Engineered Alternative Solution addressing fire rating construction, non-fire rated openings and non-fire rated external walls.</b>
<b>Building Code of Australia Classification</b>	<b>Class 5, 7a, 9b &amp; 9c</b>
<b>Date of Receipt</b>	Date Received: <b>31st March 2010</b>
<b>Determination</b>	<b>Approved</b> Date of Determination: <b>21st April 2010</b>
<b>Development Consent</b>	Development Consent Number: <b>N0102/05 &amp; S96 modifications</b> Council: <b>Pittwater Council</b> Date of Determination: <b>6th April 2006, 24th October 2007, 22nd December 2006, 8th January 2007, 24th October 2007 &amp; 23rd May 2008</b>
<b>Construction Certificate</b>	Construction Certificate Number: <b>05/307/03 ; 05/307/04 ; 05/307/06</b> Date of Determination: <b>30/01/08 ; 08/05/08 ; 10/12/08</b>

**Steve Watson**

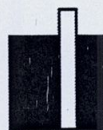
Accreditation Body: **BPB**

Accreditation No: **BPB0432**

Date of Endorsement: **Wednesday, 21 April 2010**

Documentation relied upon to issue Interim Occupation Certificate 05/307/03 for Warriewood Retirement Village.

Item No	Description	Date
1.	Mandatory inspection record (Final)	29.09.09
2.	Application for Occupation Certificate	31.03.10
3.	Final fire safety certificate	14.10.09
4.	Fire Safety Schedule	-
5.	Alternative Solution Report Ref: SY080105 R1.5 from Defire	MAR.2010



# STEVE WATSON & PARTNERS

BUILDING REGULATIONS CONSULTANTS AND CERTIFIERS  
FIRE SAFETY ENGINEERS

LEVEL 5, 432 KENT STREET, SYDNEY NSW 2000  
TEL +61 2 9283 6555 | FAX +61 2 9283 8500  
sydney@swpartners.com.au  
www.swpartners.com.au  
ABN 48 102 366 576

## S162B Site Inspection Record

Project Address	6-14 McPherson Street, Warriewood	Inspection record #	05/307/03 F
Inspector	Steve Watson	Accreditation #	BPB0432
DA ref	N0102/05 & S96 modifications	CC Ref	05/307/03 ; 05/307/04 ; 05/307/06
Date	29.09.09	Type	COMPLETION

### Checklist

Consistency with approved plans?	Yes	BCA compliance matters OK?	Yes
Pre OC DA Conditions? (see checklist attached)	N/A	Basix matters OK?	N/A

### Issues/Rectification works required

#	Issue	Comment/requirement	Action by
1.			

### Was the Inspection

- Satisfactory
- Satisfactory subject to resolution of the issues identified above
- Unsatisfactory

Signed

Inspector

29<sup>th</sup> September 2009

Date

# APPLICATION FOR OCCUPATION CERTIFICATE



**STEVE WATSON & PARTNERS**

BUILDING REGULATIONS CONSULTANTS AND CERTIFIERS  
FIRE SAFETY ENGINEERS

LEVEL 5, 432 KENT STREET, SYDNEY NSW 2000  
TEL +61 2 9283 6555 FAX +61 2 9283 8500  
sydney@swpartners.com.au  
www.swpartners.com.au  
ABN 48 102 366 576

## PART 1 Application and Site Details

**Type of Certificate Sought**  
*Tick appropriate boxes*

- Interim certificate
- Final certificate
- Change of building use of an existing building
- Occupation/use of a new building

**Applicant**

*It is important that we are able to contact you if we need more information.*

*Please give us as much detail as possible.*

Mr  Mrs  Miss  Ms  Other

Surname (or Company): Anglican Retirement Villages

Given names (or ABN): \_\_\_\_\_

Address: P.O. Box 284 Castle Hill

State: NSW Post Code: 1765

Phone: (02) 9241 5316

Fax: (02) 9421 2217

Mobile: 0449 904 902

E-mail: Michael.Viskovich@arv.org.au

**Location of the Property**

*We need this to correctly identify the land.*

Address: 6 - 14 McPherson Street Warriewood

State: NSW Post Code: 2101

Real Property Description: Lot B/DP400488 ; Lot 22/DP5464 ; Lot B/DP358765 ;  
(eg. Lot/DP/Section, etc) Lot B/DP345528 ; PT Lot 1/DP208149 ; PT Lot 3/DP579309 ;  
PT Lot 3/DP942319 ; PT Lot 4/DP 579309 .

*The real property description is mandatory, these details are shown on your rate notices, property deeds etc*

## PART 2 Work Description

**Development Consent or Complying Development Certificate**

Development Consent/Complying Development No: N0102/05 & S96 modifications

Date of Determination:

6/04/2006 ; 24/10/07 ; 22/12/06/  
08/01/07 ; 24/10/07 ; 23/05/08 .

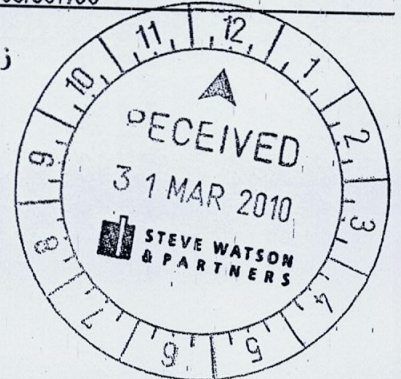
**Construction Certificate**

Construction Certificate No:

05/307/03 ; 05/307/04 ; 05/307/06

Date of Determination:

30/01/2008 ; 08/05/08 ;  
10/12/08 .



### Building Details

*The building classification must be the same as that specified in the Complying Development Certificate or Construction Certificate*

If you are applying for an Occupation Certificate for part of the building, describe the part of the building:

Whole

Describe the proposed use of the building: Aged care facility

What is the classification of the building under the BCA: 5, 7a, 9b & 9c

#### Change In Classification

What is the existing classification of the building under the BCA:         

What is the new classification of the building under the BCA:         

### Attachments

The following information must accompany an application for an Occupation Certificate:

- A copy of Development Consent or Complying Development Certificate
- A copy of the Construction Certificate, where relevant
- A Final Fire Safety Certificate or Interim Fire Safety Certificate (not required for class 1a or 10 buildings).
- Other certificates or documentation relied on.

## PART 3 Declaration

### Declaration

*If the applicant is a company or strata title body corporate, a director or authorised delegate must sign this declaration.*

I declare that all the information in the application is, to the best of my knowledge, true and accurate.

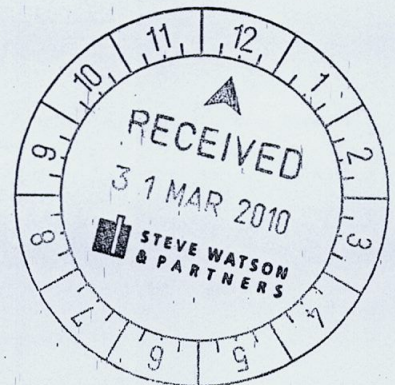
I also understand that if the information is incomplete the application may be delayed or rejected or more information may be requested. I acknowledge that if the information provided is misleading, any approval granted 'may be void'.

Signature: *[Handwritten Signature]*

Date: 30 / 3 / 10

Name, if you are not the applicant: \_\_\_\_\_

In what capacity are you signing if you are not the applicant: \_\_\_\_\_



# FIRE SAFETY CERTIFICATE

The owner of a building, or the owner's agent, needs to provide a fire safety certificate to the certifying authority (a council or a private certifier) with an application for an occupation certificate. You can use this form to do so. A copy of the certificate also needs to be given to the Commissioner of New South Wales Fire Brigades, and displayed in the building in a prominent position.

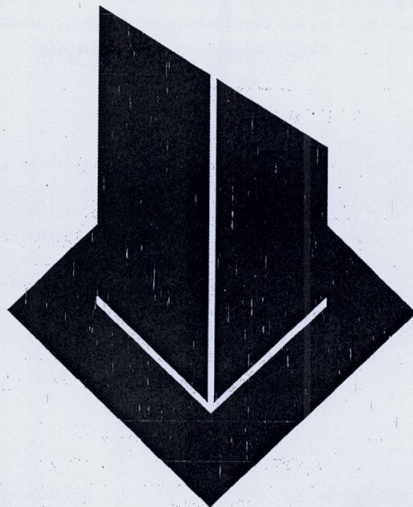
<b>1. Details of the Building being Certified</b>	
Name of the owner of the building or part of the building	
Full name/company name	Anglican Retirement Villages, Diocese of Sydney
Address of the building	
Flat/street no.	6-14
Street name	Macpherson Street
Suburb or town	Warriewood
Postcode	2101 2102
Nearest cross street	Boondah Road Brands Lane
This certificate is for: whole building	
All new work (entire building) - RACF	
<b>2. Type of Certificate</b>	
This is the: final fire safety certificate	
Date of this certificate	14 <sup>th</sup> October 2009
<b>3. Certification</b>	
I, <u>Greg Weeks</u> of <u>St Hilliers Contracting</u>	
being the owner of the building described above, or the agent of the owner, certify that:	
<ul style="list-style-type: none"> <li>each of the essential fire safety measures listed in part 7 has been assessed by a properly qualified person, and was found, when it was assessed by that person, to be capable of performing to at least the standard required by the current fire safety schedule for the building;</li> <li>the information contained in this statement is true and accurate to the best of my knowledge and belief.</li> </ul>	
<b>4. Information Attached to this Certificate</b>	
<input checked="" type="checkbox"/> The current fire safety schedule for the building	
<b>5. Signature</b>	
The owner of the building, or the owner's agent, must complete and sign the certificate.	
Signature	<u>Greg Weeks</u> Name <u>Greg Weeks</u>
Address	<u>88 Chamberland St The Rocks, NSW, 2000</u> The capacity in which you are signing if you are not the owner of the building <u>St Hilliers Project Manager</u>
<b>6. Privacy policy</b>	
You need to provide the information in this certificate to the certifying authority if you are applying for an occupation certificate. You also need to give the information to the council and the Commissioner of New South Wales Fire Brigades if a fire safety order has been made for the building once you have satisfied that order. If you do not supply a fire safety certificate as required, you will be in breach of the <i>Environmental Planning and Assessment Act 1979</i> and you could be found guilty of an offence and/or required to take further action. Please contact the council if the information you have provided in this certificate is incorrect or changes.	

7. Assessment of Fire Safety Measures		
Measure	Standard of performance required by the fire safety schedule	Date of assessment
Access panels, doors and hoppers to fire resisting shafts	BCA2007 Clause C3.13 and AS 1530.4	12/08/09
Automatic fall safe devices	Scheduled devices release upon trip of smoke detection, fire detection and sprinkler activation in accordance with BCA2007 clauses D2.19(b) and D2.21 (d) and/or AS 1670.1	06/08/09
Automatic fire detection and alarm system (smoke detection system)	BCA2007 Specification E2.2a and AS 1670.1 – 2004 (note Class 9c requires manual call points and mimic panels) (System monitoring in accordance with AS1670.3-2004)	06/08/09
Automatic fire suppression systems (Residential sprinkler system)	BCA2007 Specification E1.5 and AS2118.4 – 1995	06/08/09
Automatic fire suppression systems (Sprinklers in carpark only)	BCA2007 Specification E1.5 and AS 2118.1 – 1999	06/08/09
Emergency lighting	BCA2007 Clause E4.2, E4.4 and AS 2293.1 – 2005	24/07/09
Exit signs	BCA2007 Clause E4.5, NSW E4.6, E4.8 and AS 2293.1 – 2005	24/07/09
Fire dampers	BCA2007 Clause C3.15 and AS/NZS 1668.1 – 1998 (AS 1682.1-1990 and AS 1682.2-1990)	27/07/09
Fire doors	BCA2007 Specification C3.4 and AS 1905.1 – 2005	07/09/09
Fire hydrant system	BCA2007 Clause E1.3 and AS 2419.1 – 2005	20/07/09
Fire seals protecting openings in fire resisting components of the building- Joints, gaps and miscellaneous penetrations	BCA2007 Clause C3.15 and AS 1530.4 and AS 4072.1 and installed in accordance with the tested prototype.	17/07/09 27/07/09
Fire seals protecting openings in fire resisting components of the building- Electrical penetrations	BCA2007 Clause C3.15 and AS 1530.4 and AS 4072.1 and installed in accordance with the tested prototype.	24/07/09
Fire seals protecting openings in fire resisting components of the building- Plumbing and penetrations	BCA2007 Clause C3.15 and AS 1530.4 and AS 4072.1 and installed in accordance with the tested prototype.	20/07/09
Fire shutters	BCA2007 Specification C3.4 and AS 1905.2 – 2005	07/09/09
Hose reel systems	BCA2007 Clause E1.4 and AS 2441 – 2005	20/07/09
Lightweight construction (fire rated)	BCA2007 Specifications C1.8 and A2.3 and AS 1530.4	17/07/09 24/06/09
Mechanical air handling system (automatic shut down of air-handling system)	BCA2007 Clause E2.2 and AS/NZ 1668.1-1998	27/07/09
Portable fire extinguishers	BCA2007 Clause E1.6 and AS 2444 – 2001	17/09/09
Smoke dampers	AS/NZS 1668.1 – 1998 (AS 1682.1-1990 and AS 1682.2-1990)	30/07/09
Smoke detectors and heat detectors (detectors for the automatic closing operation of fire doors and fire shutters in fire walls)	BCA2007 Clause C3.5 and AS 1670.1 – 2004	06/08/09
Smoke detectors and heat detectors (detectors for the automatic closing operation of horizontal exits)	BCA2007 Clause C3.7 and AS 1670.1 – 2004	06/08/09
Smoke detectors and heat detectors (detectors for the automatic closing operation of smoke doors)	BCA2007 Specification C3.4 and AS 1670.1 – 2004	06/08/09
Smoke doors	BCA2007 Specifications C2.5 and C3.4 and AS 1288 – 2006	31/08/09
Warning and operational signs	BCA2007 Clauses D2.23, E1.4, E3.3	09/10/09
Alternative Solution: 1. Discharge of fire stairs; and 2. FRL's and type of construction	Fire Safety Engineering Report of Defire Ref. SY080105 dated June 2008.	14/10/09



# Fire Safety Schedule

1.	Access panels, doors and hoppers to fire resisting shafts	BCA2007 Clause C3.13 and AS 1530.4
2.	Automatic fail safe devices	Scheduled devices release upon trip of smoke detection, fire detection and sprinkler activation in accordance with BCA2007 clauses D2.19(b) and D2.21 (d) and/or AS 1670.1
3.	Automatic fire detection and alarm system ( <i>smoke detection system</i> )	BCA2007 Specification E2.2a and AS 1670.1 – 2004 (note Class 9c requires manual call points and mimic panels) (System monitoring in accordance with AS1670.3-2004)
4.	Automatic fire suppression systems ( <i>Residential sprinkler system</i> )	BCA2007 Specification E1.5 and AS2118.4 – 1995
5.	Automatic fire suppression systems ( <i>Sprinklers in carpark only</i> )	BCA2007 Specification E1.5 and AS 2118.1 – 1999
6.	Emergency lighting	BCA2007 Clause E4.2, E4.4 and AS 2293.1 – 2005
7.	Exit signs	BCA2007 Clause E4.5, NSW E4.6, E4.8 and AS 2293.1 – 2005
8.	Fire dampers	BCA2007 Clause C3.15 and AS/NZS 1668.1 – 1998 (AS 1682.1-1990 and AS 1682.2-1990)
9.	Fire doors	BCA2007 Specification C3.4 and AS 1905.1 – 2005
10.	Fire hydrant system	BCA2007 Clause E1.3 and AS 2419.1 – 2005
11.	Fire seals protecting openings in fire resisting components of the building- Joints, gaps and miscellaneous penetrations	BCA2007 Clause C3.15 and AS 1530.4 and AS 4072.1 and installed in accordance with the tested prototype.
12.	Fire seals protecting openings in fire resisting components of the building- Electrical penetrations	BCA2007 Clause C3.15 and AS 1530.4 and AS 4072.1 and installed in accordance with the tested prototype.
13.	Fire seals protecting openings in fire resisting components of the building- Plumbing and penetrations	BCA2007 Clause C3.15 and AS 1530.4 and AS 4072.1 and installed in accordance with the tested prototype.
14.	Fire shutters	BCA2007 Specification C3.4 and AS 1905.2 – 2005
15.	Hose reel systems	BCA2007 Clause E1.4 and AS 2441 – 2005
16.	Lightweight construction (fire rated)	BCA2007 Specifications C1.8 and A2.3 and AS 1530.4
17.	Mechanical air handling system ( <i>automatic shut down of air-handling system</i> )	BCA2007 Clause E2.2 and AS/NZ 1668.1-1998
18.	Portable fire extinguishers	BCA2007 Clause E1.6 and AS 2444 – 2001
19.	Smoke dampers	AS/NZS 1668.1 – 1998 (AS 1682.1-1990 and AS 1682.2-1990)
20.	Smoke detectors and heat detectors ( <i>detectors for the automatic closing operation of fire doors and fire shutters in fire walls</i> )	BCA2007 Clause C3.5 and AS 1670.1 – 2004
21.	Smoke detectors and heat detectors ( <i>detectors for the automatic closing operation of horizontal exits</i> )	BCA2007 Clause C3.7 and AS 1670.1 – 2004
22.	Smoke detectors and heat detectors ( <i>detectors for the automatic closing operation of smoke doors</i> )	BCA2007 Specification C3.4 and AS 1670.1 – 2004
23.	Smoke doors	BCA2007 Specifications C2.5 and C3.4 and AS 1288 – 2006
24.	Warning and operational signs	BCA2007 Clauses D2.23, E1.4, E3.3
25.	Alternative Solution:  1. Discharge of fire stairs; and  2. FRL's and type of construction  3. Non-fire rated walls and discharge from fire isolated stairways.	Fire Safety Engineering Report of Defire Ref. SY080105 dated June 2008.          Fire Safety Engineering Report of Defire Ref. SY080105 Rev1.5 dated March 2010.



# Defire

## Alternative solution report

Warriewood Valley RACF – Stage 2a

**Client** Anglican Retirement Villages

**Report number** SY080105

**Revision** R1.5

**Report issued** March 2010

Defire (NSW) Pty Ltd | ABN 30 099 090 089 | T 2 9211 4333 | F 2 9211 4366  
Suite 3, Level 4, 83-97 Kippax Street, Surry Hills

## Executive summary

This alternative solution report documents the findings of a fire safety engineering assessment undertaken to determine whether the proposed Warriewood Valley RACF – stage 2a complies with the relevant performance requirements of the Building Code of Australia 2007 (BCA). Defire undertook the assessment in accordance with the International Fire Engineering Guidelines at the request of Anglican Retirement Villages.

The project is a two storey aged care building. The south-east wing of building also contains administration and assembly areas. The building is located above a single storey basement carpark.

The building is to be provided with a sprinkler system in accordance with specification E1.5 of the BCA and AS 2118.4 and 6 – 1995.

The design of the building includes areas which do not comply with the deemed-to-satisfy (DTS) provisions of the BCA. Table 1 describes the BCA requirements associated with the alternative solutions.

No	Description of alternative solutions	DTS provision	Performance requirements (A0.10)	Method of meeting performance requirements (A0.5)	Assessment method (A0.9)
1.	The fire rating of the construction is proposed to be reduced to be consistent with the requirements for a type C construction.	Clause C1.1 and specification C1.1.	CP1 and CP2	Equivalent to DTS A0.5(b)(ii)	Verification method A0.9(c)
2.	Openings within 6m of external path of travel from a fire isolated stair are not proposed to be protected in accordance with clause C3.4 of the BCA.	Clause D1.7	CP2 and DP5	Complies with performance requirements A0.5(b)(i)	Verification method A0.9(b)(ii)
3.	Non-fire rated external walls and unprotected openings are proposed in the separation of the external walls in different fire compartments.	Clauses C3.3	CP2	Complies with performance requirements A0.5(b)(i)	Verification method A0.9(b)(ii)

**Table 1 BCA requirements associated with the alternative solutions**

The fire safety engineering assessment undertaken found that the design of the building achieves compliance with performance requirements CP1, CP2 and DP5 of the BCA, subject to the following recommendations:

- This report and the fire safety measures listed in section 5 must be identified on the fire safety schedule for the building. They must be maintained and certified in accordance with the Environmental Planning and Assessment Regulations, 2000 and relevant Australian standards.
- If there are building alterations or additions, a change in use or changes to the fire safety system in the future, a reassessment will be needed to verify consistency with the assessment contained in this report.

## 1. Introduction

This alternative solution report documents the findings of a fire safety engineering assessment undertaken to determine whether the proposed Warriewood Valley RACF – stage 2a complies with the relevant performance requirements of the Building Code of Australia 2007 (BCA)<sup>1</sup>. Defire undertook the assessment in accordance with the International Fire Engineering Guidelines<sup>2</sup> at the request of Anglican Retirement Villages.

## 2. Fire engineering brief

A formal fire engineering brief (FEB) meeting was not held before the preparation of the draft report because the alternative solution relates to only minor departures from the deemed-to-satisfy (DTS) provisions of the BCA. The stakeholders were provided with the opportunity to comment on the proposed design, performance requirements identified, assessment methodology and fire safety measures when the draft alternative solution report was issued. Comments were received from Blackett Maguire + Goldsmith on version R1.0 and report amended to address these comments. The main areas raised were to address reduced fire rating in lieu of change of type of construction and all areas of the building being used by the age care residents. Comments were received on version 1.1 by Steve Watson and Partners clarifying that all of the south-east wing of the ground floor has been classified as class 5/9b. This is considered to fulfil the FEB process for the relatively simple issues associated with the project.

If any of the stakeholders identified in Table 2 believe a formal FEB meeting is required please contact Christian Kenneby of Defire to arrange on 02 9211 4333.

Name	Role	Organisation	Contact details
Michael Lockwood	Client	Anglican Retirement Villages	02 9421 5333
Greg Weeks	Builder	St Hilliers	02 9259 5319
Darren Jeffs	Architect	Merrin & Cranston Architects	07 3840 3920
David Blackett	BCA consultant	Blackett Maguire & Goldsmith	02 9211 7777
Steve Watson	Private Certifier	Steve Watson & Partners	02 9283 6555
Christian Kenneby	Fire safety engineer	Defire	02 9211 4333

**Table 2 Stakeholders**

Revision R1.5 was undertaken to incorporate additional alternative solution in relation to separation of fire compartments. The issue was discussed with Darren Jeffs of Merrin & Cranston Architects and it was agreed that the proposed design and alternative solution were suitable for detailed analysis

## 3. Description of the building and alternative solutions

### 3.1 Building description

The project comprises the construction of Warriewood Valley RACF – stage 2a.

The project is a two storey aged care building. The south-east wing of building also contains administration and assembly areas. The building is located above a single storey basement carpark.

<sup>1</sup> Building Code of Australia 2007, Australian Building Codes Board, Australia, 2007.

<sup>2</sup> International Fire Engineering Guidelines – Edition 2005, Australian Building Codes Board, Australia, 2005.

### 3.3 Alternative solutions

The design of the building includes areas that do not comply with the DTS provisions of the BCA. We intend to use a performance-based fire safety engineering approach to develop alternative solutions to the DTS provisions of the BCA. Table 6 describes the BCA requirements associated with the alternative solutions.

No	Description of alternative solutions	DTS provision	Performance requirements (A0.10)	Method of meeting performance requirements (A0.5)	Assessment method (A0.9)
1.	The fire rating of the construction is proposed to be reduced to be consistent with the requirements for a type C construction.	Clause C1.1 and specification C1.1.	CP1 and CP2	Equivalent to DTS A0.5(b)(ii)	Verification method A0.9(c)
2.	Openings within 6m of external path of travel from a fire isolated stair are not proposed to be protected in accordance with clause C3.4 of the BCA.	Clause D1.7	CP2 and DP5	Complies with performance requirements A0.5(b)(i)	Verification method A0.9(b)(ii)
3.	Non-fire rated external walls and unprotected openings are proposed in the separation of the external walls in different fire compartments.	Clauses C3.3	CP2	Complies with performance requirements A0.5(b)(i)	Verification method A0.9(b)(ii)

Table 6 BCA requirements associated with the alternative solutions

## 4. Scope, limitations and assumptions

### 4.1 Scope and limitations

- This report is limited to the alternative solutions described in section 3.3.
- This report is limited to compliance with the fire safety aspect of the performance requirements of the BCA. Matters such as property protection (other than protection of adjoining property), business interruption, public perception, environmental impacts and broader community issues – such as loss of a major employer and impact on tourism – have not been considered as they are outside the scope of the BCA.
- This report considers single point arson as a source of ignition. Arson involving accelerants or multiple ignition sources is not considered in this assessment as it is outside the scope of the BCA.
- The scope of our works is limited to considering evacuation and fire safety issues for people with disabilities to the same degree as the DTS provisions of the BCA. Specifically, consideration of evacuation from the building by people with disabilities under the provisions of the Disability Discrimination Act 1992 is excluded.
- If there are building alterations or additions, a change in use or changes to the fire safety systems in the future, a reassessment will be needed to verify consistency with the assessment in this report.
- The data, methodologies, calculations and conclusions documented within this report specifically relate to the building and must not be used for any other purpose.

## 5. Fire safety measures

The fire safety engineering assessment undertaken found that the design of the building achieves compliance with the relevant performance requirements of the BCA, subject to the following recommendations:

### 5.1 General

1. The design must comply with the current DTS provisions of the BCA unless specifically mentioned. This section does not provide a comprehensive list of fire safety measures required by the DTS provisions of the BCA. The fire safety measures listed within this section relate only to the alternative solutions. The fire safety measures must be read in conjunction with the DTS provisions of the BCA.
2. This report and the requirements listed in this section must be identified on the fire safety schedule for the building. They must be maintained and certified in accordance with the Environmental Planning and Assessment Regulations, 2000 and relevant Australian standards.
3. If there are building alterations or additions, a change in use or changes to the fire safety measures in the future, a reassessment will be needed to verify consistency with the assessment in this report.

### 5.2 Structural fire resistance

4. The fire resistance levels (FRLs) of the building elements are to be reduced to be consistent with type C construction – including external walls located further than 3m from a fire-source feature are not required to be fire-rated and external load-bearing walls are not required to be of non-combustible construction.

### 5.3 Fire compartmentation

5. Carpark to be separated from ground floor with a separation achieving an FRL of 90/90/90 if load-bearing and -/90/90 if non load-bearing.
6. Class 5/9b portion to be separated from class 9c portion with a separation achieving an FRL of 90/90/90 if load-bearing and -/90/90 if non load-bearing and with any doors being -/90/30 fire doors.
7. Fire and smoke compartments to comply with clause C2.5 of the BCA in the class 9c portion, including separation of north-west wing and north-east wing as shown in Figure 4 and Figure 5.
8. The separation between the fire compartments shown in Figure 1 to Figure 3 are not required to be protected in accordance with clause C3.3 of the BCA and are not required to achieve an FRL of 60/60/60 and the openings are not required to be protected in accordance with clause C3.4 of the BCA.

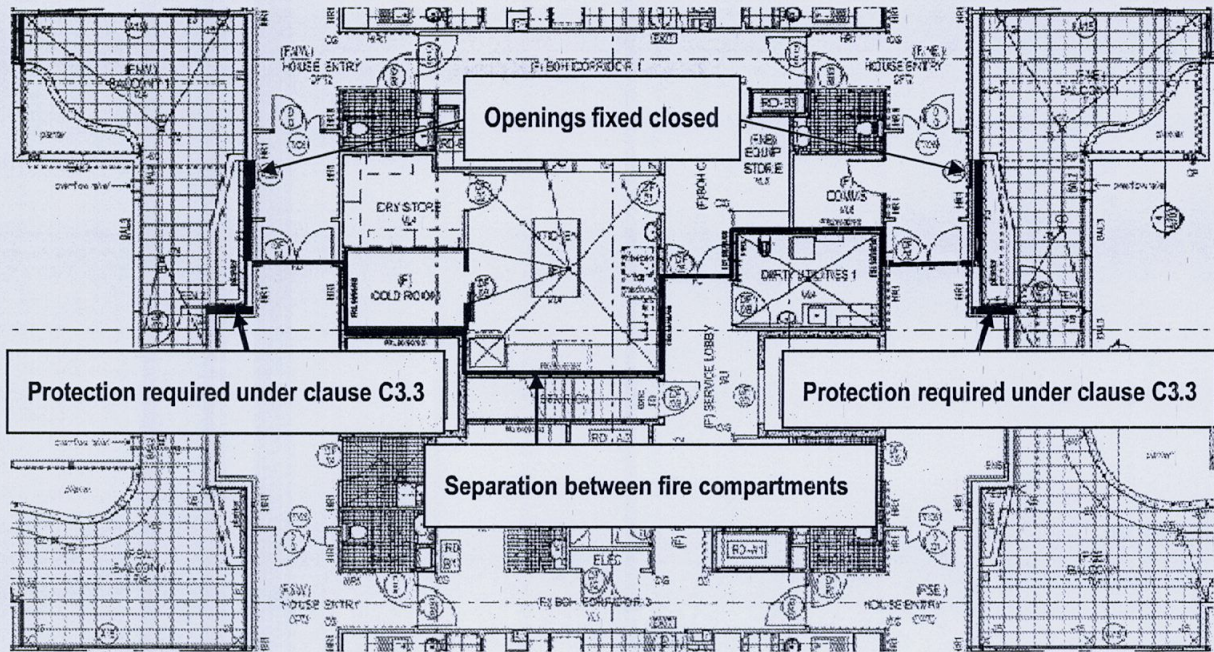


Figure 3 First floor

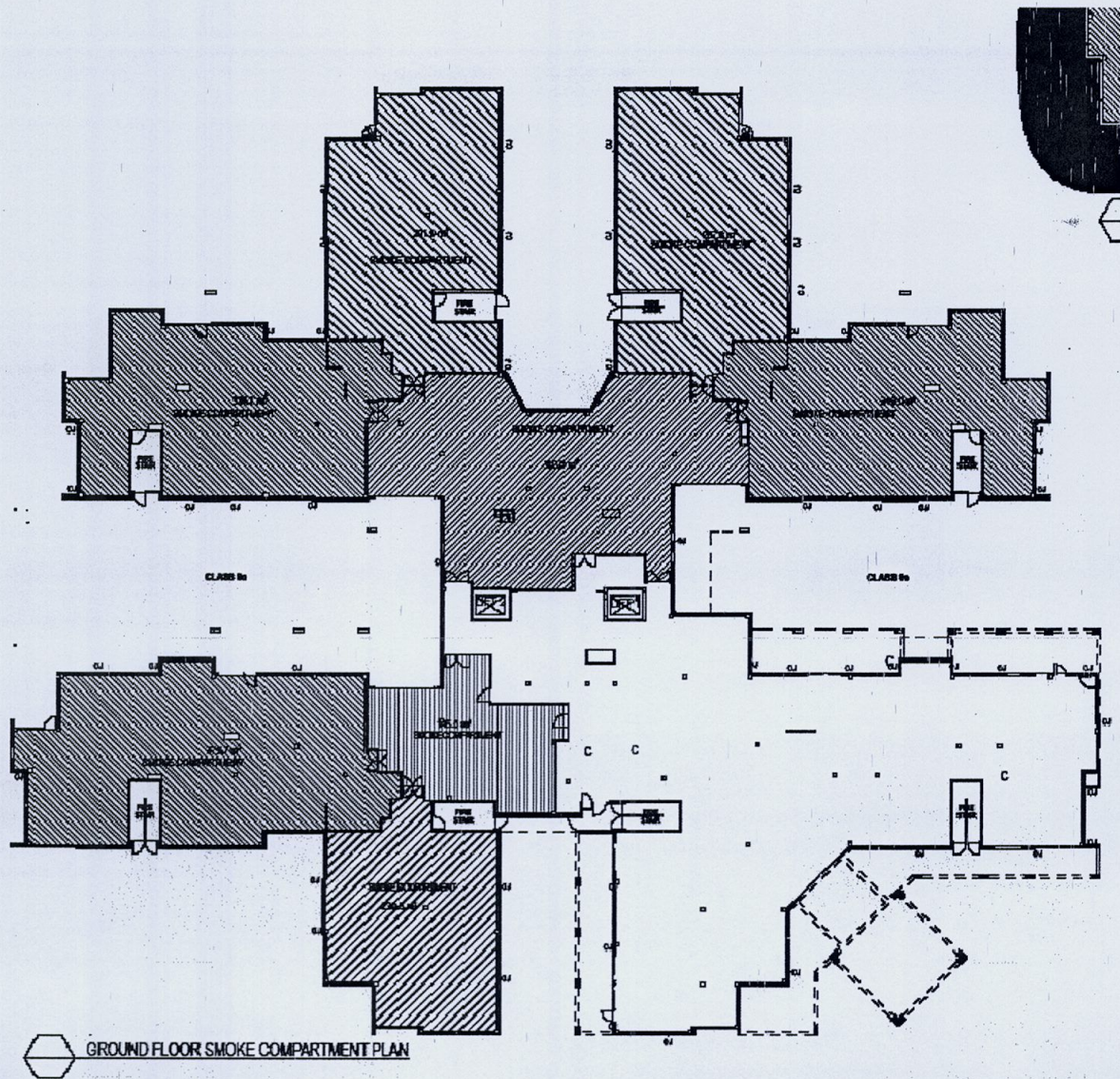


Figure 5 Ground floor smoke compartment plan

#### 5.4 Protection of openings

9. Openings within 6m of the path of travel from the discharge of the fire isolated stairs (NW) stair 1, (NE) stair 1, (SE) stair 2, (SW) stair 2, (SW) stair 1 and (G.SE) stair 1 – refer to Figure 6 to Figure 9 – need not be protected in accordance with clause D1.7 and C3.4 of the BCA.
10. Openings within 6m of the path of travel from the discharge of the fire isolated stairs (NW) stair 2 – refer Figure 10 – must be protected in accordance with clause D1.7 and C3.4 of the BCA.



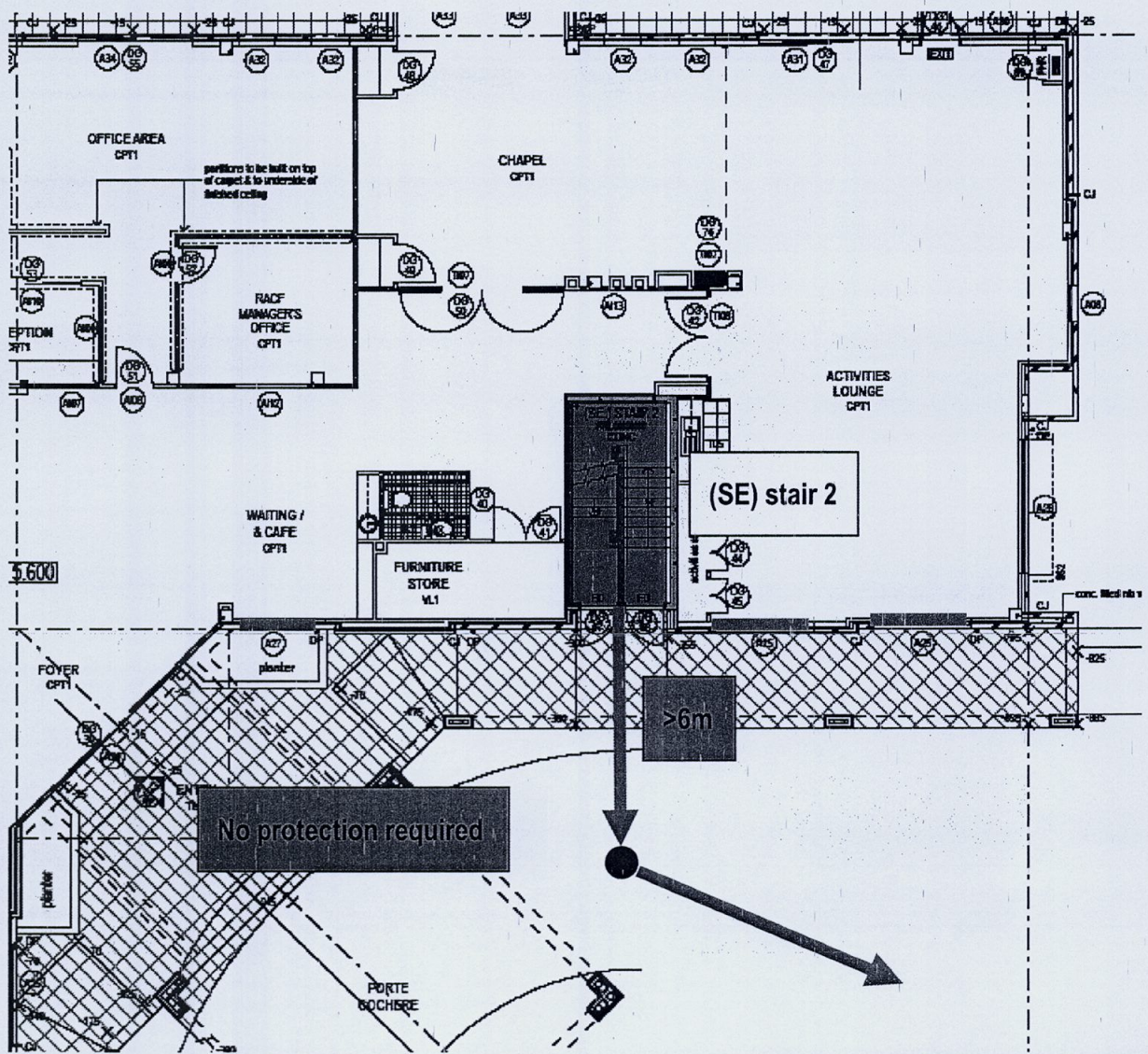


Figure 7 Discharge from (SE) stair 2

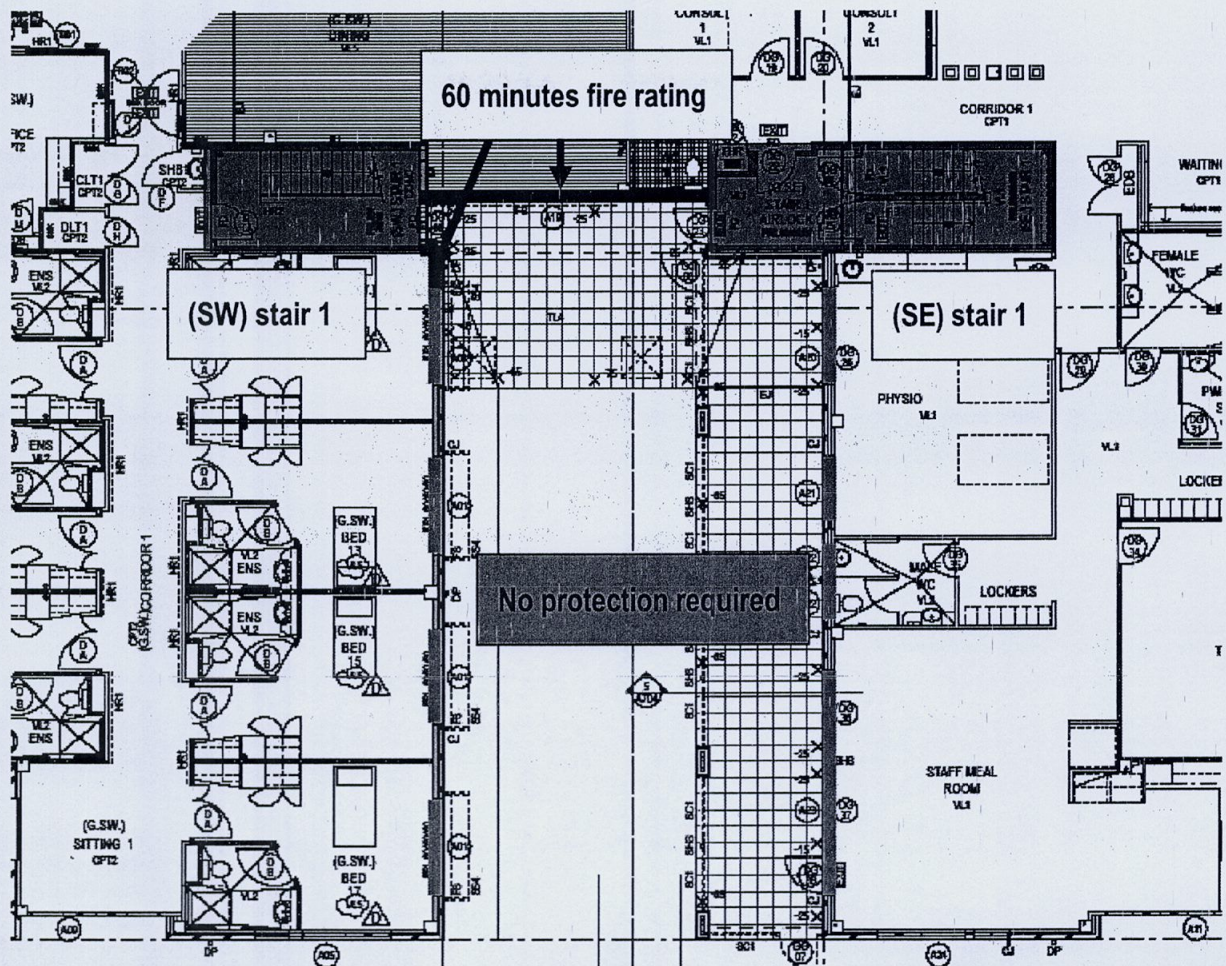


Figure 9 Discharge (SW) stair 1 and (G.SE) stair 1

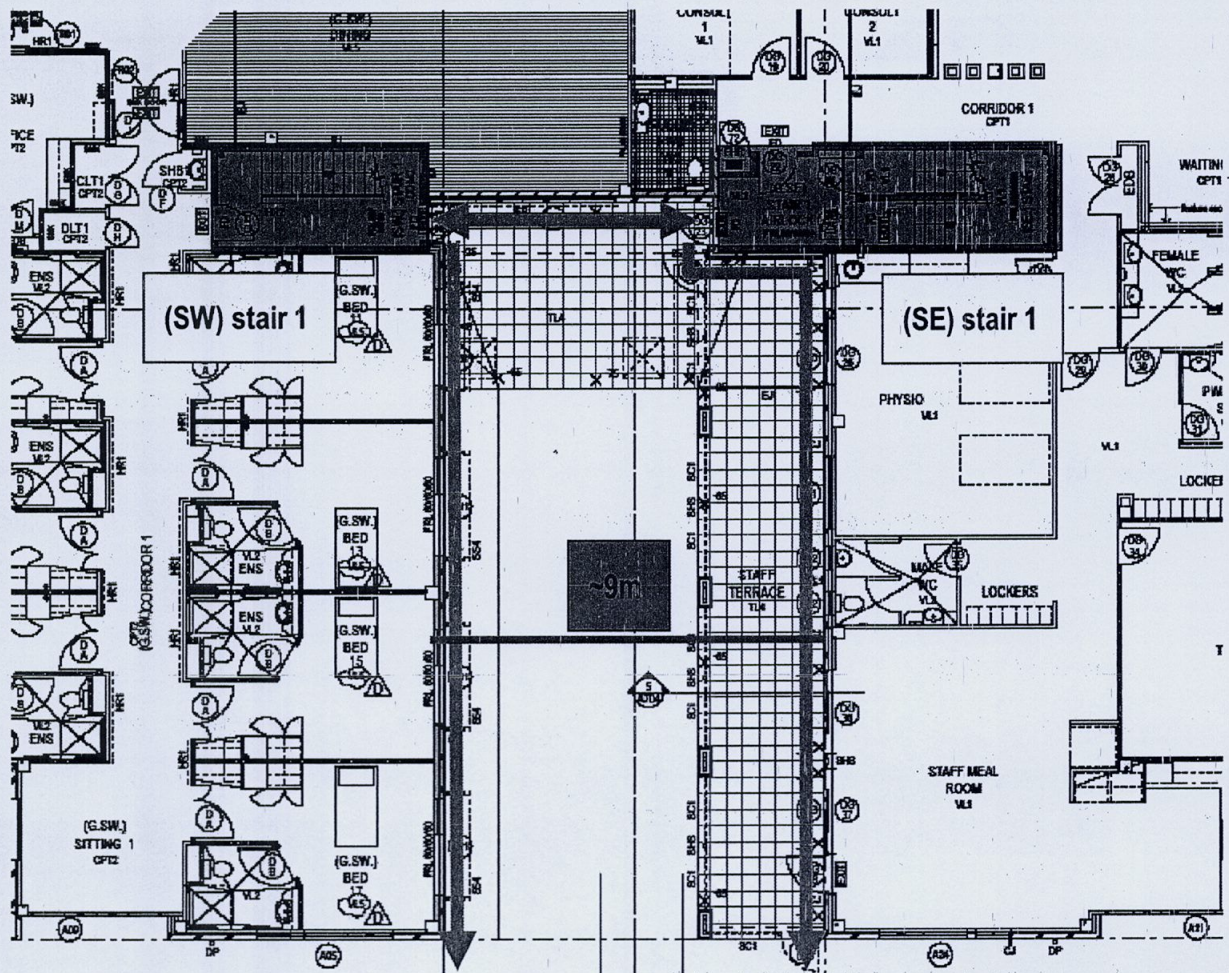


Figure 11 Path of travel to open space

## 5.6 Smoke detection and alarm

15. A detection system must be installed throughout ground floor and level 1 of the building in accordance with clause 4 of specification E2.2a of the BCA.

## 5.7 Fire suppression systems

16. A sprinkler system in accordance with the requirements of specification E1.5 of the BCA and AS 2118.4 and 6-1995 must be provided throughout the building.

The Guide to the BCA<sup>5</sup> says that the intent of clause C1.5 is 'to grant concessions for low-rise Class 2 and Class 3 buildings provided with a good means of egress and sprinkler protected Class 9c aged care buildings.' The guide expands further that 'the concession for Class 9c buildings recognises the benefits of sprinkler systems and differences between Types A, B and C construction. It must be remembered that the Class 9c building must comply with all the other BCA provisions, including the floor area limitations contained in Table C2.2'.

## 6.4 Acceptance criteria

The assessment is to show that the hazard associated with the proposed design is no greater than for a two storey class 9c building which would be allowed to be constructed out of type C construction. This is to be demonstrated by assessing the following:

- Carpark is adequately separated from levels above and is not expected to affect the performance of the levels above. This is to be demonstrated by showing that the carpark is separated to a degree at least equivalent to that required for a Type B construction.
- The hazard associated with the ground and first floor is no higher than for a two storey aged care building. The use, the fire load, the population and the mobility of the occupants is to be considered.

## 6.5 Impact of sprinklers

### 6.5.1 Sprinkler reliability

Research conducted in Australia estimates the reliability of automatic sprinklers to be approximately 95%<sup>6,7</sup>.

### 6.5.2 Impact of sprinklers on fire spread

Full-scale experimental measurements demonstrated that sprinklers provide superior protection to compartmentation in reducing the hazards<sup>8</sup>. Sprinklers provide a higher level of life safety and property protection than an idealised compartment system because sprinklers address the fire hazard more fundamentally: 'Sprinklers limit the fire spread and when successfully activated and prevent fully developed flashover fires, compartmentation limits the fire's effect. Sprinklers protect, to a degree, the room of fire origin and those people in the room not intimately involved in the fire, compartmentation does not protect the room of origin'.

The successful activation of the sprinklers can therefore be considered to control or extinguish the fire, limiting the spread of fire to the area of fire origin and mitigate the risk of fire spread to adjoining fire compartments.

### 6.5.3 Impact of sprinklers on fire intensity

In the absence of directly relevant data, it is generally assumed that the successful activation of sprinklers has the following impact on compartment temperatures during a fire<sup>9,10,11</sup>:

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<sup>5</sup> Guide to the BCA 2007, Australian Building Codes Board, Australia, 2007.

<sup>6</sup> Fire Safety Engineering Guidelines – Edition 2001, Australian Building Codes Board, Australia, November 2001.

<sup>7</sup> Bukowski R.W. et Al., Estimates of the Operational Reliability of Fire Protection Systems, International Conference on Fire Research and Engineering, US 1999.

<sup>8</sup> Madrzykowski, D., The Reduction in Fire Hazard in Corridors and Areas Adjoining Corridors Provided by Sprinklers, NISTIR 4631, NIST, Gaithersburg, MD 20899, July 1991.

<sup>9</sup> England, J.P., Young, S.A., Hui, M.C. & Kurban, N., Guide for the Design of Fire Resistant Barriers and Structures, Warrington Fire Research (Aust) Pty Ltd & Building Control Commission, Victoria, August 2000.

<sup>10</sup> Design of Sprinklered Shopping Centre Buildings, published by OneSteel – Market Mills.

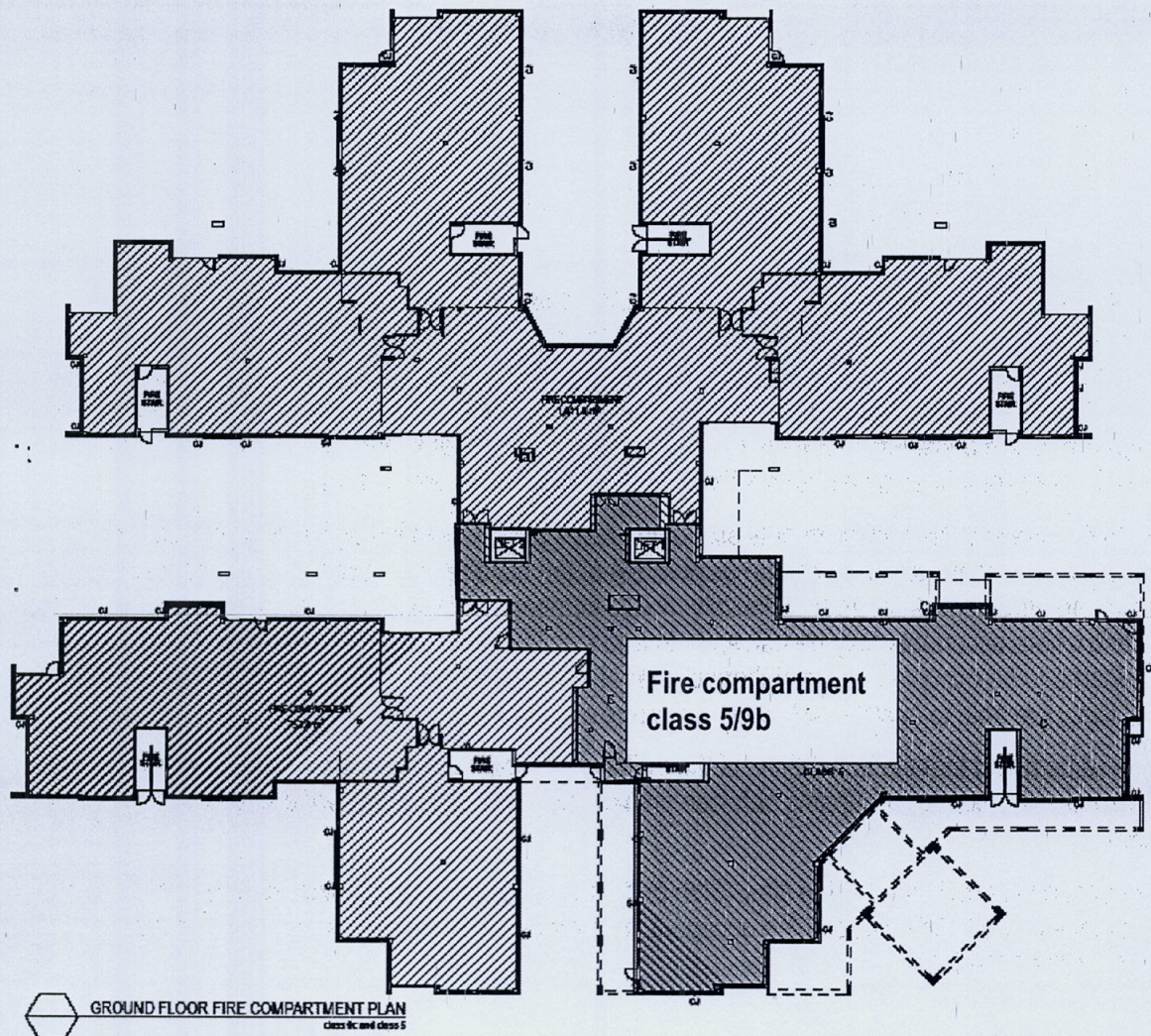


Figure 12 Ground floor – fire compartment class 5/9b

### 6.7.2 Fire load

The class 5 portion of the building is not considered to have a higher fire-load than the class 9c portions of the building. The fuel load within the waiting room and foyer is expected to be low with a limited amount of chairs, couches and the like. The area is not expected to have a significant amount of storage of combustible materials and the chapel are assumed to be provided with chairs, couches and the like – ie similar fire-load as for the 9c portion with furniture, beds and other combustibles.

It is considered that the concession allowing reduction of type of construction of a two storey aged care is mainly associated with the fact that aged care buildings are required to be sprinkler protected. The building is to be provided with a sprinkler system throughout in accordance with specification E1.5 of the BCA. The benefits of a sprinkler system are discussed within 6.5.1.

### 6.7.3 Population and mobility

The mobility of occupants and the population will impact on the time required for safe evacuation and for fire brigades to undertake search and rescue. As discussed the characteristics of occupants in the portion classified as class 5/9b is expected to be the same as for the class 9c portion.

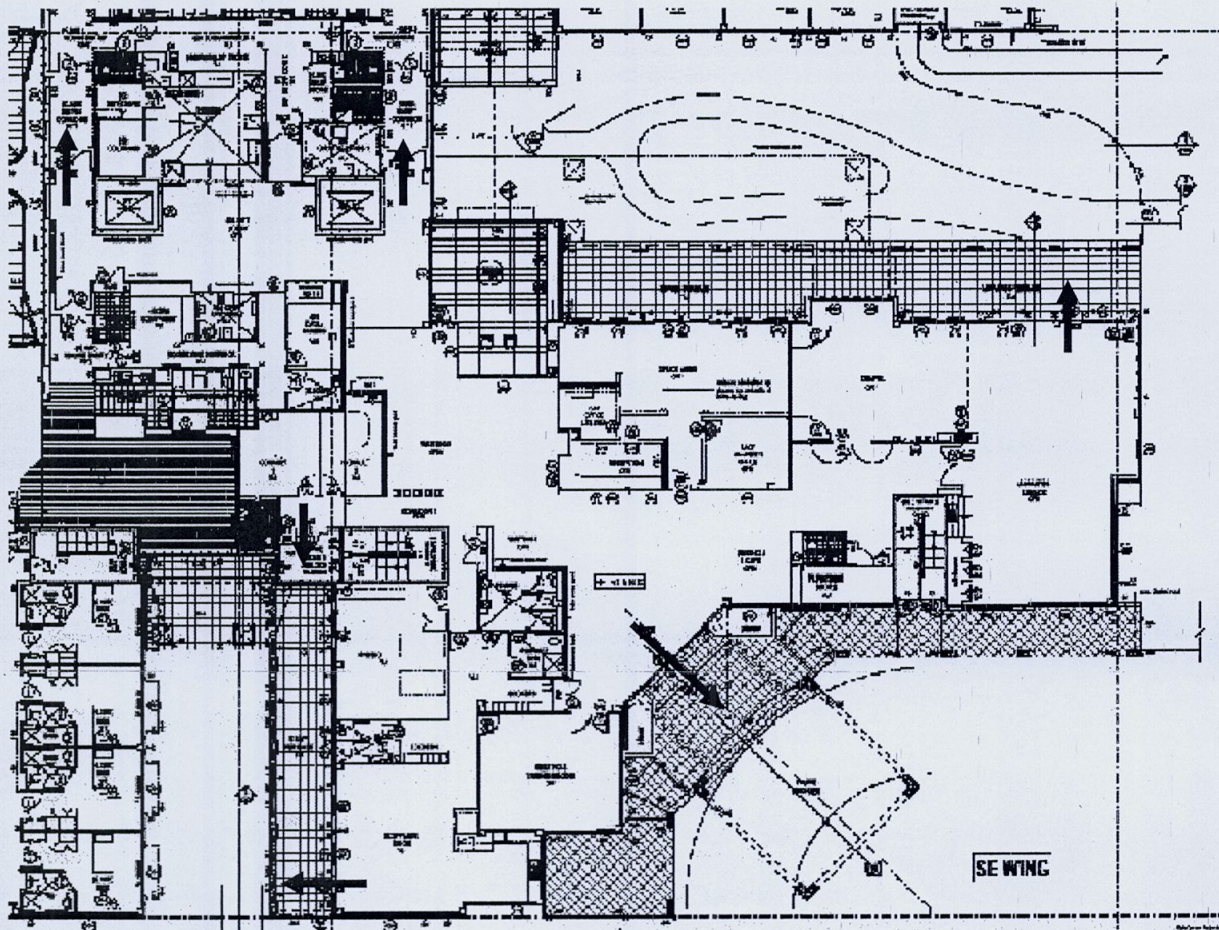


Figure 13 Exits from the class 5/9b area

## 6.8 Fire brigade intervention

The temperatures described above for a sprinkler controlled fire are below the tenability limits for attending fire-fighters<sup>13</sup> – heat radiation of 3kW/m<sup>2</sup> and convected heat of 120°C at 1.5m above floor level – except in the localised area of the fire. The provision of a sprinkler system within the building is considered to significantly improve conditions for fire brigade intervention by controlling fire spread and maintaining low compartment temperatures. It has been demonstrated that the fire hazards associated with the building are not higher than for a building which would be allowed to be constructed out of type C construction and as such fire brigade intervention is also facilitated to the same degree.

## 6.9 Conclusion

The assessment undertaken for the proposed design demonstrates that the proposed design is equivalent to a DTS compliant design due to the benefits of sprinkler system, the use of the building and the 90 minute fire-rating. The proposed design of the building is therefore considered to achieve compliance with performance requirements CP1 and CP2 of the BCA, subject to compliance with the fire safety measures given in section 5.

<sup>13</sup> Australian Fire Authorities Council, *Fire Brigade Intervention Model V2.2*, October 2004.

## **7. Alternative solution 2 – Discharge of fire-isolated exits**

### **7.1 Introduction**

According to clause D1.7 of the BCA if a path of travel from the point of discharge of a fire isolated exit necessitates passing within 6m of any part of an opening of the same building measured horizontally at right angles requires openings to be protected in accordance with clause C3.4 of the BCA.

The proposed design includes openings in the external wall within 6m of an external path of travel that are not proposed to be protected for stairs (NW) stair 1, (NE) stair 1, (SW) stair 1 and (G.SE) stair 1. Other openings are to be protected as required under the DTS provisions of the BCA.

This alternative solution aims to demonstrate that the building design provides occupants with a safe means of evacuation to the degree necessary to comply with performance requirements CP2 and DP5 of the BCA.

### **7.2 Methodology**

The assessment undertaken for the building was a qualitative absolute assessment involving the following sub-systems:

- Sub-system C – Fire spread and impact and control
- Sub-system D – Fire detection, warning and suppression
- Sub-system E – Occupant evacuation and control

### **7.3 Intent of the BCA**

To assess whether the design complies with performance requirements CP2 and DP5 of the BCA, the intent of clause D1.7 must be understood. The Guide to the BCA <sup>14</sup> says that the intent of clause D1.7 is 'to enable occupants to safely enter a fire-isolated exit which discharges to a safe location.'

### **7.4 Acceptance criteria**

The acceptance criterion for the assessment is that fire-isolated exits discharge to a point from which a safe path of travel to open space is provided.

### **7.5 Assessment**

The two stairs (NW) stair 1 and (NE) stair 1 do both discharge into the northern courtyard – refer to Figure 14. The NW wing and NE wing are separate smoke compartments.

The two stairs (SW) stair 1 and (G.SE) stair 1 discharge into area between the SW wing and the SE wing – refer to Figure 16. The SW and SE wing are separate fire compartments.

It is considered that the risk that occupants will be exposed to untenable levels of radiation from openings in these wings to their path of travel is negated by the ability to move away from the fire affected wing.

Whilst a bedroom on the ground floor at the point of discharge could be on fire and venting to the outside, it is unlikely that two bedrooms on either side of the external area are on fire concurrently from inception or that a fire would develop significantly enough in one of the wings to spread to adjoining

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<sup>14</sup> Guide to the BCA 2007, Australian Building Codes Board, Australia, 2007.

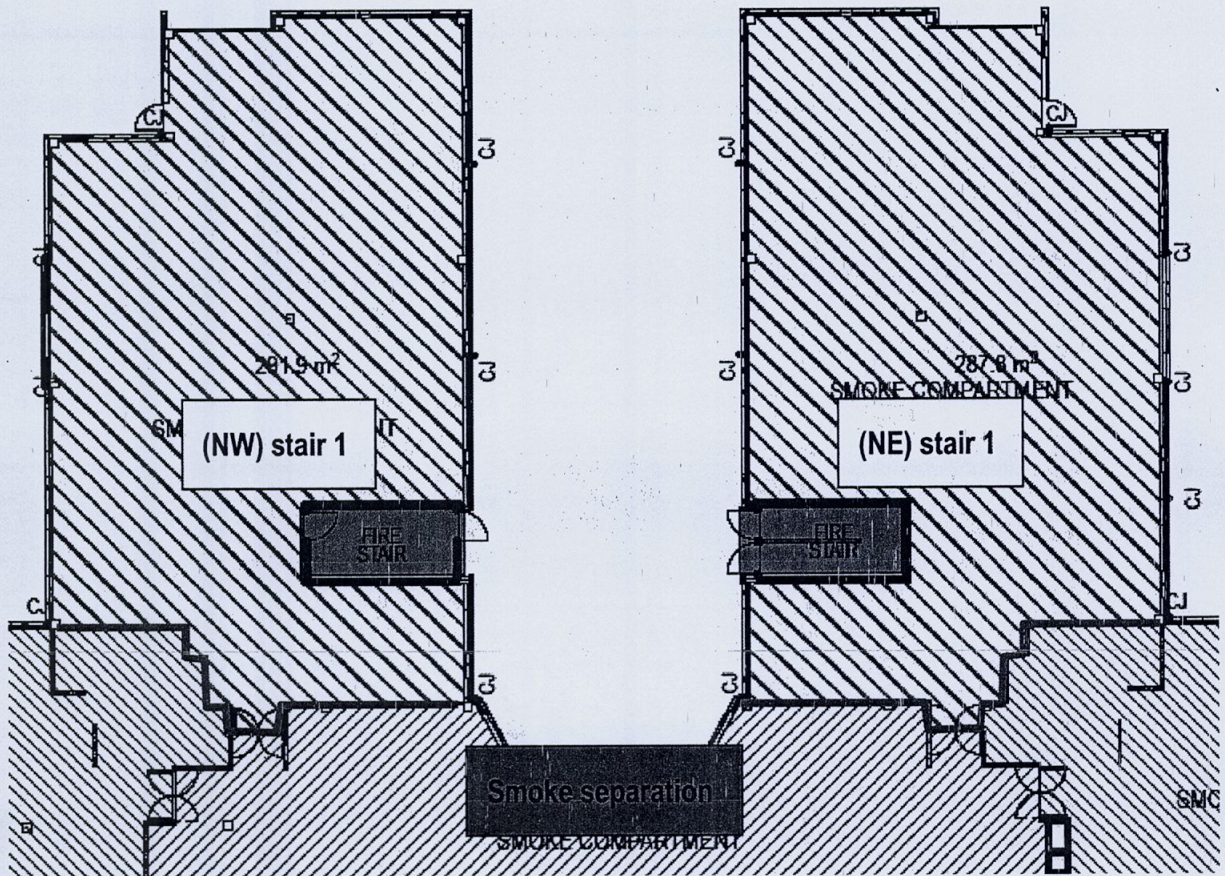


Figure 15 Smoke separation between NW and NE wings – ground floor



## 7.6 Conclusion

The assessment undertaken for the proposed design demonstrates that the provision of alternative paths of travel from the point of discharge of the fire-isolated stairs (NW) stair 1, (NE) stair 1, (SW) stair 1 and (G.SE) stair 1, enables occupants to evacuate safely to open space without protecting openings in the external wall. The proposed design of the building is therefore considered to achieve compliance with performance requirements CP2 and DP5 of the BCA, subject to compliance with the fire safety measures given in section 5.

## 7.7 Compliance with the performance requirements

A summary of the assessment showing compliance with the relevant performance requirements of the BCA is listed as follows.

- CP2** A building must have elements which will, to the degree necessary, avoid the spread of fire—  
to exits; and  
to sole-occupancy units and public corridors; and  
between buildings; and  
in a building  
(b) Avoidance of the spread of fire referred to in (a) must be appropriate to—

Criteria	Compliance
(i) the function or use of the building; and	The project is a two storey aged care building. The south-east wing of building also contains administration and assembly areas.
(ii) the fire load; and	The provision of alternative paths of travel at the discharge point is considered to prevent occupants from having to evacuate within 6m of any fire affected bedroom. The design of the discharge locations is therefore considered to protect occupants to the degree necessary.
(iii) the potential fire intensity; and	
(iv) the fire hazard; and	A fully developed fire within one of the bedrooms adjacent to the discharge point of the fire isolated exits serving the building.
(v) the number of storeys in the building; and	The building has a rise in storeys of two.
(vi) its proximity to other property; and	The distance to adjacent property does comply with the provisions of the BCA.
(vii) any active fire safety systems installed in the building; and	The building is protected with a sprinkler system in accordance to specification E1.5 throughout and provided with a smoke detection system in accordance with clause 4 of specification E2.2a of the BCA.
(viii) the size of any fire compartment; and	The size of the fire compartments is to comply with the provisions of the BCA.
(ix) fire brigade intervention; and	The location of openings in the building is not considered to impact upon fire brigade intervention.
(x) other elements they support; and	Supporting elements are not considered to be affected by the openings within the building.
(xi) the evacuation time.	The evacuation time is considered to be consistent with that of a typical low-rise aged care building.

- DP5** To protect evacuating occupants from a fire in the building exits must be fire isolated, to the degree necessary, appropriate to—

Criteria	Compliance
(a) the number of storeys connected by the exits; and	Three.

## 8. Alternative solution 3 – Separation of fire compartments

### 8.1 Introduction

Clause C3.3 of the BCA states that ‘the distance between parts of external walls and any openings within them in different fire compartments separated by a fire wall must not be less than that set out in Table C3.3, unless—

- (a) those parts of each wall have an FRL not less than 60/60/60; and
- (b) any openings protected in accordance with C3.4.

Table 3.3 requires a minimum distance of protection of 4m where openings or external walls in different fire compartments are at right angles.

The design incorporates areas where the external wall is not achieving the required fire rating and openings are not proposed to be protected in accordance with clause C3.4 of the BCA as shown in Figure 18 to Figure 20.

The assessment was undertaken to demonstrate that the proposed design complies with performance requirement CP2 in lieu of compliance with clause C3.3.

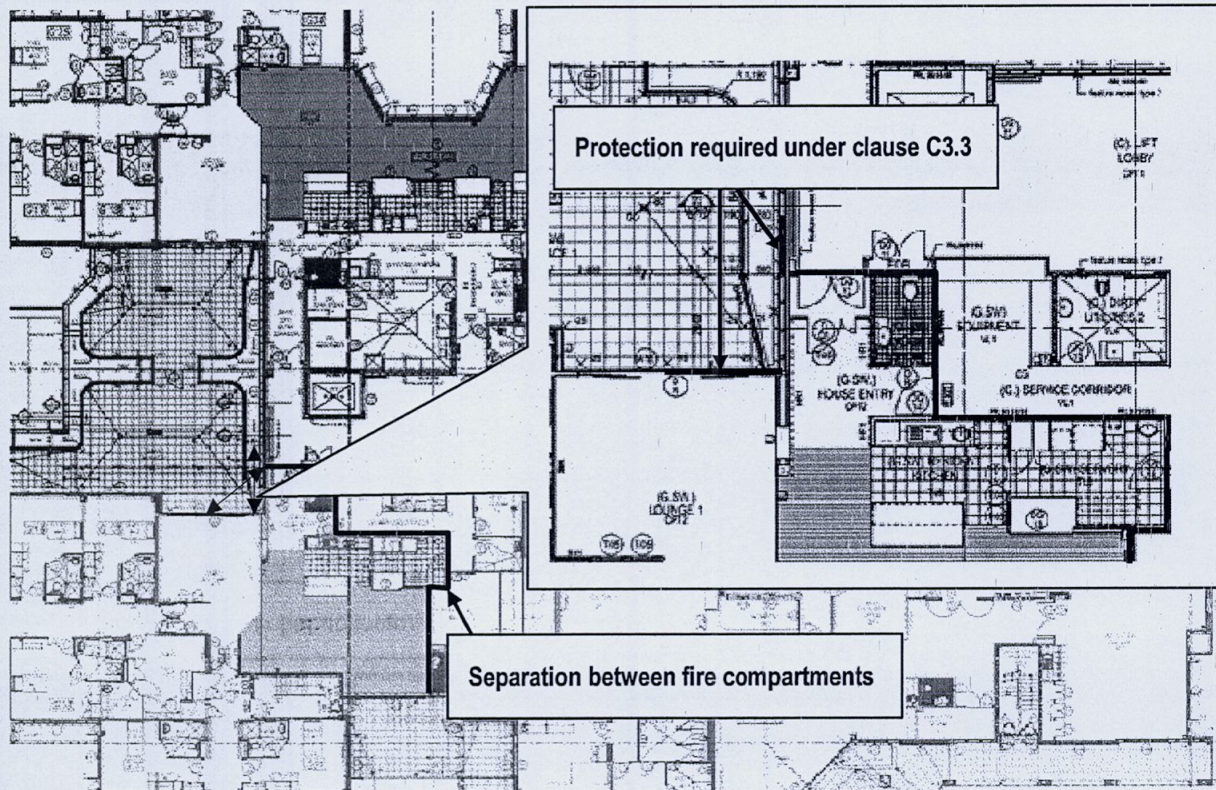


Figure 18 Ground floor

## 8.2 Methodology

The assessment undertaken for the building was a quantitative absolute assessment involving sub-system C – Fire spread and impact and control.

## 8.3 Intent of the BCA

The Guide to the BCA <sup>15</sup> says that the intent of clause C3.3 is 'to limit the spread of fire between fire compartments through external walls and the openings in them'.

It is the interpretation of Defire that the intent is to provide protection against incoming radiation and as there may be openings in both walls the BCA requires openings in both walls to be protected.

## 8.4 Acceptance criteria

The acceptance criterion for the assessment is that the fire spread between fire compartments through external walls is mitigated to the degree necessary.

## 8.5 Fire hazards

The BCA requires openings in both fire compartments separated by a fire wall to be protected in accordance with clause C3.3.

The risk of fire spread between fire compartments is to be assessed for a fire sprinkler controlled fire.

## 8.6 Assessment

The requirement for protection of external walls and openings in separate fire compartments is intended to mitigate risk of fire spread between fire compartments. The BCA allows externally drencher protected glazing as a means of protection. External drenchers do not suppress internal fires and hence do not prevent radiation from a fire affected compartment. It is therefore considered that the requirement is intended to mitigate risk of fire spread by protecting the glazing against a fire within the adjoining compartment. This is also consistent with requirements for protection of openings located closer than 3m from the boundary which are subject to the same requirements. A 60 minute fire rating or drencher protected glazing has therefore been deemed by the BCA to provide an adequate level of protection against incoming radiation.

### 8.6.1 Benefits of sprinkler system

The building is provided with a sprinkler system throughout. The benefits of sprinkler systems have been discussed in section 6.5. The successful activation of the sprinkler system is expected the following impact on compartment temperatures during a fire <sup>16,17,18</sup>:

- The average temperatures outside the immediate area of operation of the sprinkler system are below 100°C. This is due to water's high latent heat of vaporisation limiting the temperature of the combustion products to the boiling point of water.
- The temperatures in the localised area above the fire are stated to be somewhat higher than the mean compartment temperature but are still unlikely to exceed 200°C except in the immediate vicinity of the flames.

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<sup>15</sup> Guide to the BCA 2007, Australian Building Codes Board, Australia, 2007.

<sup>16</sup> England, J.P., Young, S.A., Hui, M.C. & Kurban, N., Guide for the Design of Fire Resistant Barriers and Structures, Warrington Fire Research (Aust) Pty Ltd & Building Control Commission, Victoria, August 2000.

<sup>17</sup> Design of Sprinklered Shopping Centre Buildings, published by OneSteel – Market Mills.

<sup>18</sup> Technical Memoranda TM19:1995 – Relationship for smoke control calculations, CIBSE, UK 1995.

## 8.8 Compliance with the performance requirements

A checklist of compliance with the relevant performance requirements of the BCA for the assessment undertaken is listed as follows.

- CP2** A building must have elements which will, to the degree necessary, avoid the spread of fire –  
to exits; and  
to sole-occupancy units and public corridors; and  
between buildings; and  
in a building  
(b) Avoidance of the spread of fire referred to in (a) must be appropriate to –

Criteria	Compliance
(i) the function or use of the building; and	The project is a two storey aged care building.
(ii) the fire load; and	The fire load in class 9c is equivalent to a DTS compliant design. Sprinkler is provided in throughout the building to limit fire intensity.
(iii) the potential fire intensity; and	The successful activation of the sprinkler system is expected to limit the potential fire intensity and maintained the average compartment temperatures below approximately 100°C.
(iv) the fire hazard; and	The assessment has demonstrated that fire spread between fire compartments is mitigated to the degree necessary.
(v) the number of storeys in the building; and	The building has a rise in storeys of two.
(vi) its proximity to other property; and	Separation distances to adjoining building comply with DTS provisions of the BCA.
(vii) any active fire safety systems installed in the building; and	The building is protected with a sprinkler system in accordance to specification E1.5 throughout and provided with a smoke detection system in accordance with clause 4 of specification E2.2a of the BCA.
(viii) the size of any fire compartment; and	The size of the fire compartments is to comply with the provisions of the BCA.
(ix) fire brigade intervention; and	The assessment has demonstrated that the fire hazards associated with the building are not higher than for a building which would be allowed to be constructed out of type C construction and as such fire brigade intervention is also facilitated to the same degree. Refer to section 6.
(x) other elements they support; and	Not affected by the proposed design.
(xi) the evacuation time.	Not expected to affect the evacuation time.