13 March 2014
Our Ref: 14044-L01

CID Group

c/- ZTA Architects

Suite 308, 55 Miller Street
Pyrmont NSW 2209

Attn: Mr Perry Savidis

PROPOSED MIXED USE DEVELOPMENT – JORDAN SPRINGS BOULEVARD FIRE ENGINEERING CONCEPT (for DA Submission)

We refer to the proposed mixed use development to be located in Jordan Springs Boulevarde, and provide the following in regards to the proposed use of Alternative Solutions to address identified variations to the Deemed to Satisfy (DTS) provisions of the Building Code of Australia 2013 (BCA).

The purpose of this document is to assist in the design development process, and to assist the Consent Authority in the determination of the Development Application.

PROJECT DESCRIPTION

The proposed development comprises the construction of 4 Buildings (Blocks A to D) over common basement car parking levels, and a ground floor podium level. In summary the development will comprise:

- Basements 1 and 2 - car parking (more than 40 vehicles), plant, ancillary
- Block A:
  - Level 1 (ground level) - residential units, retail tenancies
  - Levels 2 to 6 - residential units
- Block B:
  - Level 1 (ground level) - retail tenancies, restaurants
  - Levels 2 to 6 - residential units
- Block C:
  - Level 1 (ground level) - residential units, retail tenancies, restaurants
  - Levels 2 to 5 - residential units
- Block D:
  - Level 1 (ground level) - retail tenancies, restaurants, plant, ancillary
  - Levels 2 to 6 - residential units

Egress from the basement levels is via dedicated fire-isolated exits that discharge directly to an open space on level 1 (being the level of egress to an open space).

Egress from the residential levels of each building is via dedicated fire-isolated exit, which discharge directly into the ground floor entry lobbies in lieu of directly to an open space. This is proposed to be addressed via an Alternative Solution.

RELEVANT BCA ASSESSMENT DATA

The relevant BCA Assessment Data for the proposed development are summarised in Table 1 below.

Table 1: Relevant BCA References

BCA Reference	BCA Assessment
Building Classification and Use	Class 2 (residential) Class 5 (office) Class 6 (retail) Class 7a (car parking)
Rise in Storeys	6
Number of Levels Contained	7
Minimum Type of Construction Required	Type A
Effective Height	Less than 25m (more than 12m)
Maximum Size of Fire Compartments	To comply for Type A construction

PROPOSED VARIATIONS TO BCA DTS PROVISIONS

The proposed variations to the DTS provisions of the BCA are summarised as follows:

Exit Travel Distances - BCA Clause D1.4

- It is proposed to have extended exit travel distances within parts of the subject development as follows:
    - Up to 50m travel distance to an exit within the basement levels, in lieu of 40m.
    - Up to 10m travel distance to a single exit within the residential levels of Block A (western portion), in lieu of 6m.
    - Up to 12m travel distance to a single exit within the residential levels of Block C, in lieu of 6m.
    - Up to 9.5m travel distance to a single exit within the residential levels of Block D (northern portion), in lieu of 6m.
    - Up to 12m travel distance to a single exit within the residential levels of Block D (southern portion), in lieu of 6m.

Distance between Alternative Exits - BCA Clause D1.5

- It is proposed to have a distance between alternative exits within the basement levels of up to 66m, in lieu of 06m.

Travel via Fire-Isolated Exits - BCA Clause D1.7

- It is proposed to have the fire-isolated exits serving the residential levels of the building discharge into the level 1 (ground level) entry lobbies, in lieu of directly to an open space.

Fire Hose Reels - BCA Clause E1.4

- It is not proposed to install fire hose reels on the residential levels of Blocks A, B, C and D (*fire hose reel coverage will be provided throughout all non-residential levels / parts of the development as per BCA requirements*).

ACHIEVING COMPLIANCE WITH THE BCA

A Building Solution will comply with the BCA if it satisfies the Performance Requirements of the BCA. Clause A0.5 of the BCA states that compliance with the Performance Requirements can only be achieved by:

(a) complying with the Deemed to Satisfy provisions; or

(b) formulating an Alternative Solution which -

(i) complies with the Performance Requirements; or

(ii) is shown to be at least equivalent to the Deemed to Satisfy provisions; or

(c) a combination of (a) and (b).

Clause A0.9 of the BCA states that the following Assessment Methods, or any combination of them, can be used to determine that a Building Solution complies with the Performance Requirements:

(a) Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed to Satisfy Provision as described in A2.2.

(b) Verification methods such as -

(i) the Verification Methods in the BCA; or

(ii) such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements.

(c) Comparison with the Deemed to Satisfy provisions.

(d) Expert judgment

SUMMARY OF PROPOSED FIRE ENGINEERING STRATEGY

General

The proposed Fire Engineered Solution for the subject development will be completed in accordance with the processes described in the International Fire Engineering Guidelines, and will be prepared by a C10 Accredited Fire Safety Engineer (accredited with the NSW Building Professionals Board).

Alternative Solution 1 - Exit Travel Distances (basement levels)

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on the following:

- The provision of an automatic fire sprinkler system throughout the basement car parking levels, in accordance with BCA Specification E1.5 and AS 2218.1-1999.

- The provision of fast response sprinklers throughout the basement car parking levels, in lieu of standard response sprinklers. The provision of fast response sprinklers exceeds the minimum DTS provisions of the BCA, and will provide occupants within the car park with an earlier warning of fire when compared to a DTS Compliant Design.

  It is proposed to demonstrate that the provision of fast response sprinklers will improve occupant evacuation times, and thus offset the additional travel distances to reach an exit and between alternative exits.

- The characteristics of the basement car parking levels and the provision and location of alternative exits will also be considered. That is, occupants will not be required to travel back through the point of choice in order to reach an alternative exit.

Proposed Method of Analysis

Both a Quantitative and Qualitative Analysis is proposed to be undertaken to assess the Alternative Solution against the DTS provisions of the BCA, as permitted under Clause A0.9(c) of the BCA.

The Quantitative Analysis will include undertaking an evacuation assessment to compare the Required Safe Evacuation Time (RSET) for the Alternative Solution against a DTS Compliant Design.

The Qualitative Analysis will consider the characteristics of the basement car parking levels and the provision and location of alternative exits. That is, occupants will not be required to travel back through the point of choice in order to reach an alternative exit.

Proposed Acceptance Criteria

The Alternative Solution is to be shown to comply with BCA Performance Requirements DP4 and EP2.2, in terms of ensuring occupants are allowed to evacuate from the basement car parking levels safely and in tenable conditions, at least equivalent to that of a DTS Compliant Design.

Alternative Solution 2 - Exit Travel Distances (residential levels)

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on the following:

- The provision of an AS 1670.1 smoke detection system throughout the public corridor areas on the residential levels of the building, in accordance with the relevant DTS provisions of the BCA.

- The provision of an additional heat detector within each residential unit located within 1.5m of the unit entry doors, and connected back to the AS 1670.1 smoke detection system. The provision of an additional heat detector exceeds the minimum DTS provisions of the BCA, and will provide occupants within the building with an earlier warning of fire when compared to a DTS Compliant Design.

- The provision of a pre-recorded evacuation message to the building occupant warning system serving the building. The provision of a pre-recorded message exceeds the minimum DTS provisions of the BCA, and is intended to reduce occupant pre-movement times in the event of fire when compared to a DTS Compliant Design.

- The provision of hot temperature smoke seals to the self-closing and fire rated entry doors to the residential units. The provision of smoke seals exceeds the minimum DTS provisions of the BCA, and will assist in mitigating the spread of smoke from a fire affected residential unit into the public corridors.

Proposed Method of Analysis

A Qualitative Analysis is proposed to be undertaken to assess the Alternative Solution against the DTS provisions of the BCA, as permitted under Clause A0.9(c) of the BCA. The analysis will assess the ability of occupants to evacuate from the residential levels of the building safely, when compared to a design that complies with the minimum DTS provisions of the BCA.

Proposed Acceptance Criteria

The Alternative Solution is to be shown to comply with BCA Performance Requirements DP4 and EP2.2, in terms of ensuring occupants are allowed to evacuate from the residential levels safely and in tenable conditions, at least equivalent to that of a DTS Compliant Design.

Alternative Solution 3 - Travel via Fire-Isolated Exits

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on the following:

- Having the lift lobbies within the basement car parking levels smoke separated from the remainder of the basement levels in smoke proof construction that complies with BCA Specification C2.5. The provision of smoke separation is intended to mitigate the spread of smoke into the level 1 entries lobbies via the lift shafts, in the event of fire within a basement level. Glazing can be used provided it comprises of at least 6mm thick heat strengthened toughened safety glass.

  The doorways into the lift lobbies are to also be protected with self-closing smoke doors that comply with BCA Specification C2.5. Glazing can be used provided it comprises of at least 6mm thick heat strengthened toughened safety glass. The smoke doors are to also be fitted with medium temperature smoke seals.

- The provision of an AS 1670.1 smoke detection system throughout the public corridor areas on the residential levels of the building, in accordance with the relevant DTS provisions of the BCA.

- The provision of an additional heat detector within each residential unit located within 1.5m of the unit entry doors, and connected back to the AS 1670.1 smoke detection system. The provision of an additional heat detector exceeds the minimum DTS provisions of the BCA, and will provide occupants within the building with an earlier warning of fire when compared to a DTS Compliant Design.

- The provision of a pre-recorded evacuation message to the building occupant warning system serving the building. The provision of a pre-recorded message exceeds the minimum DTS provisions of the BCA, and is intended to reduce occupant pre-movement times in the event of fire when compared to a DTS Compliant Design.

- The provision of hot temperature smoke seals to the self-closing and fire rated entry doors to the residential units. The provision of smoke seals exceeds the minimum DTS provisions of the BCA, and will assist in mitigating the spread of smoke from a fire affected residential unit into the public corridors (including within the level 1 entry lobbies).

- Fire separating the discharge points from each fire-isolated exit, so that not more than 1 sole-occupancy unit opens directly into the level 1 entry lobbies. Refer also Figures 1 to 4 below.

- Fire separating the level 1 entry lobbies from the adjoining retail / commercial tenancies. Further, there are to be no doorway openings or access between the retail / commercial tenancies and the entry lobbies.

- The level 1 entry lobbies are to be constructed and maintained are “sterile” environments, and are not to contain any residential furniture, furnishings or the like.

NOTE: Clause D1.7 of the BCA does allow a sole-occupancy unit to directly open into a fire-isolated exit, provided the sole-occupancy unit occupies the whole storey. For the subject development, up to 3 residential units open directly into the level 1 entry lobbies in which the fire-isolated exits discharge into. Therefore the likelihood of fire within a ground floor residential unit is increased when compared to a DTS Compliant Design.

The fire engineering strategy will assess the fire safety systems and measures that are proposed for the development in terms of minimising the risk of the path of travel from the fire-isolated exit being blocked, when compared to the DTS provisions of the BCA.

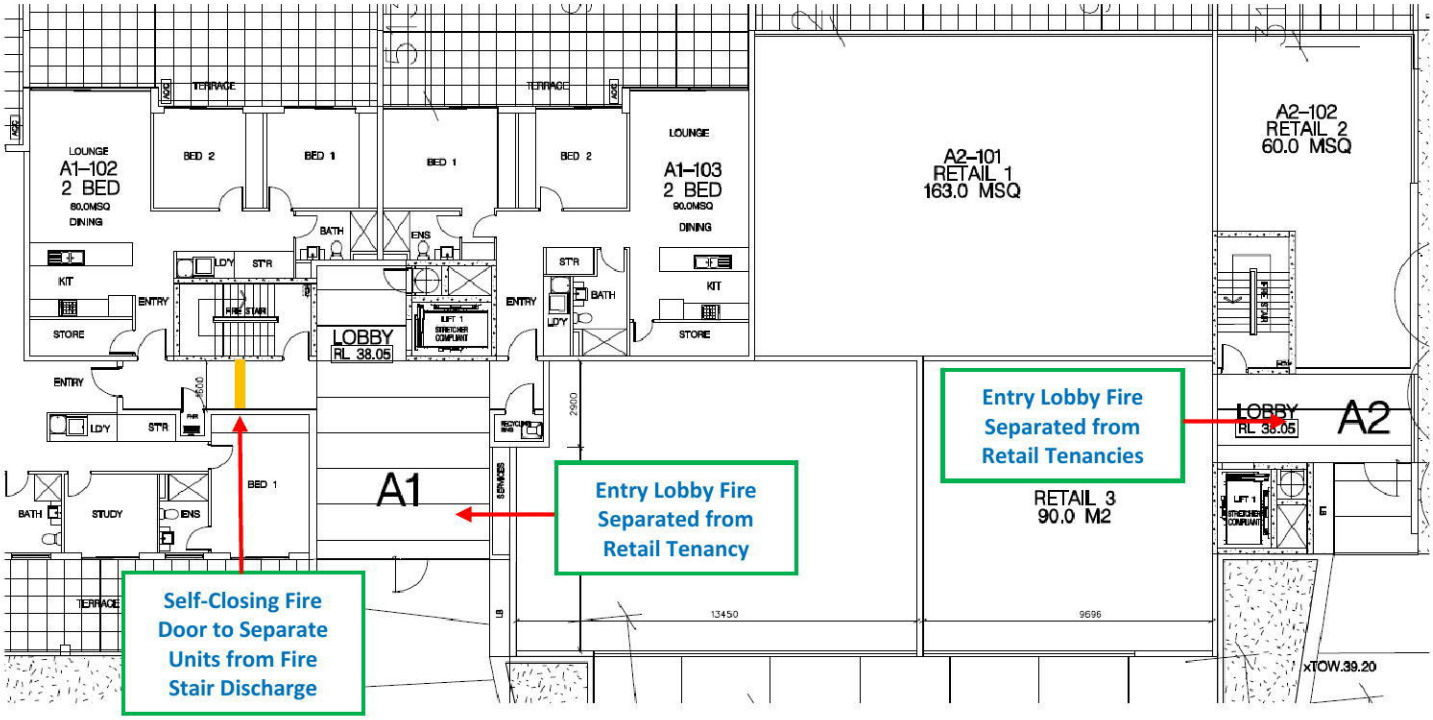

Figure 1: Building A - Part Level 1 Plan

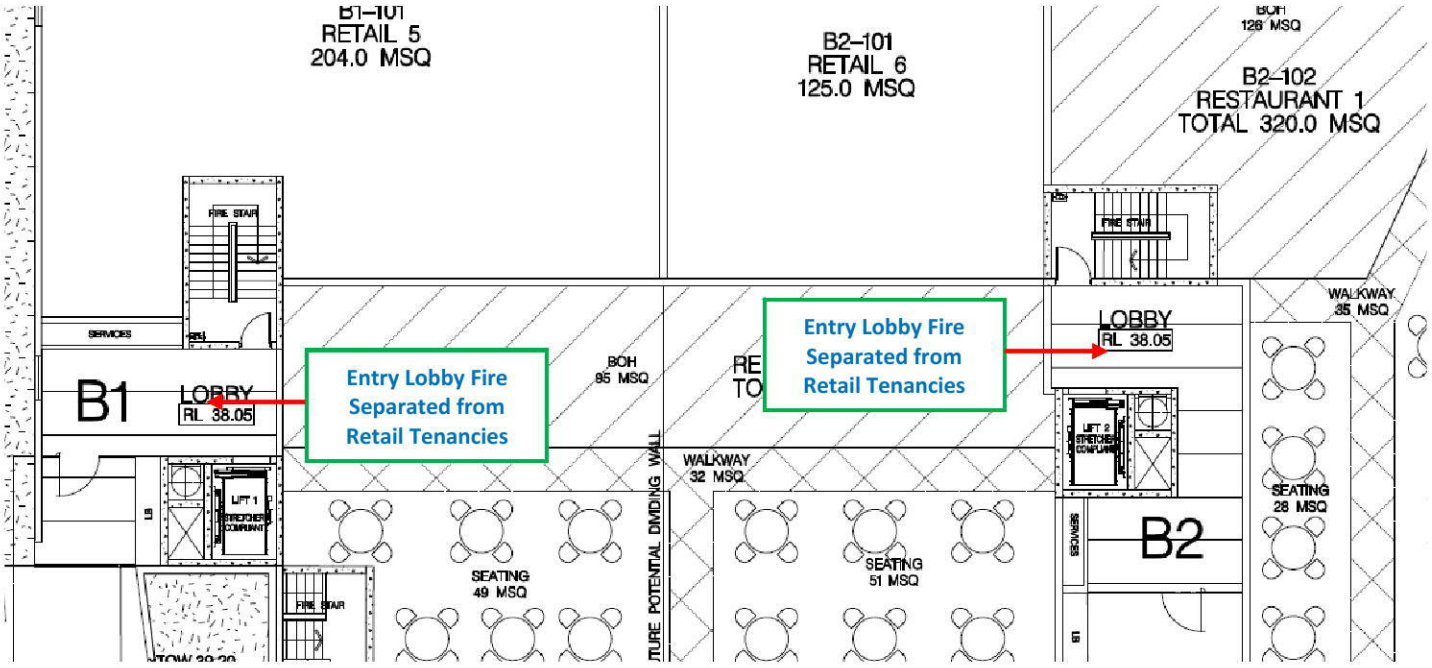

Figure 2: Building B - Part Level 1 Plan

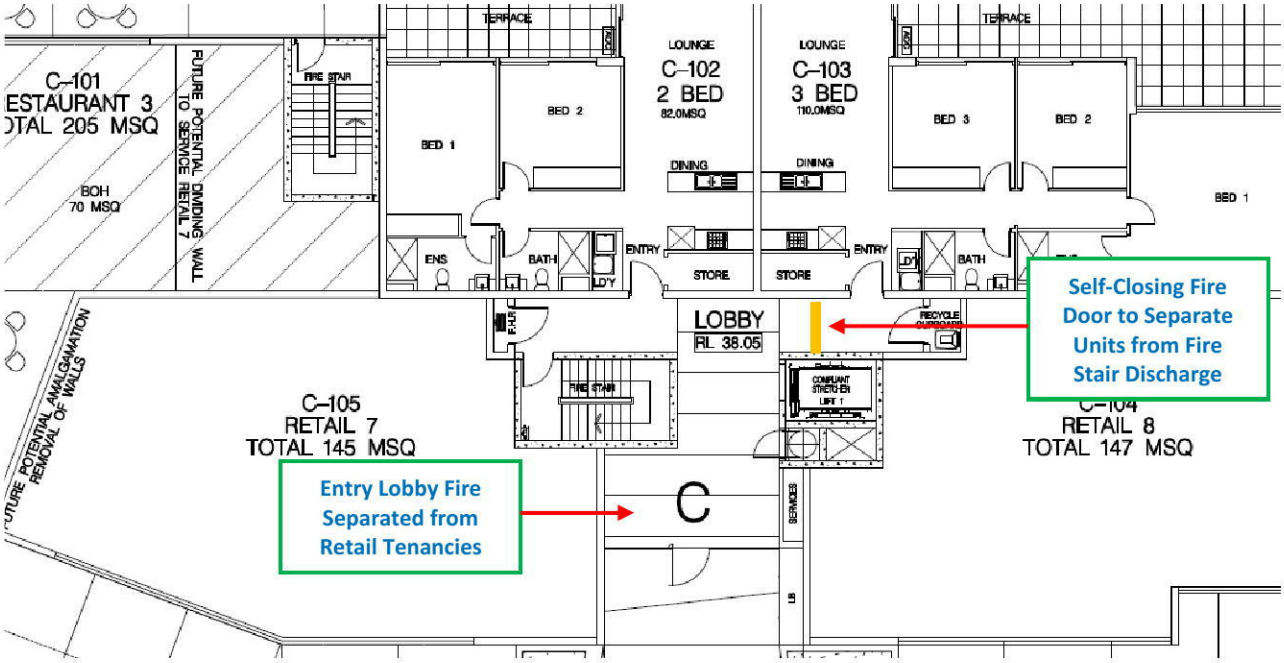

Figure 3: Building C - Part Level 1 Plan

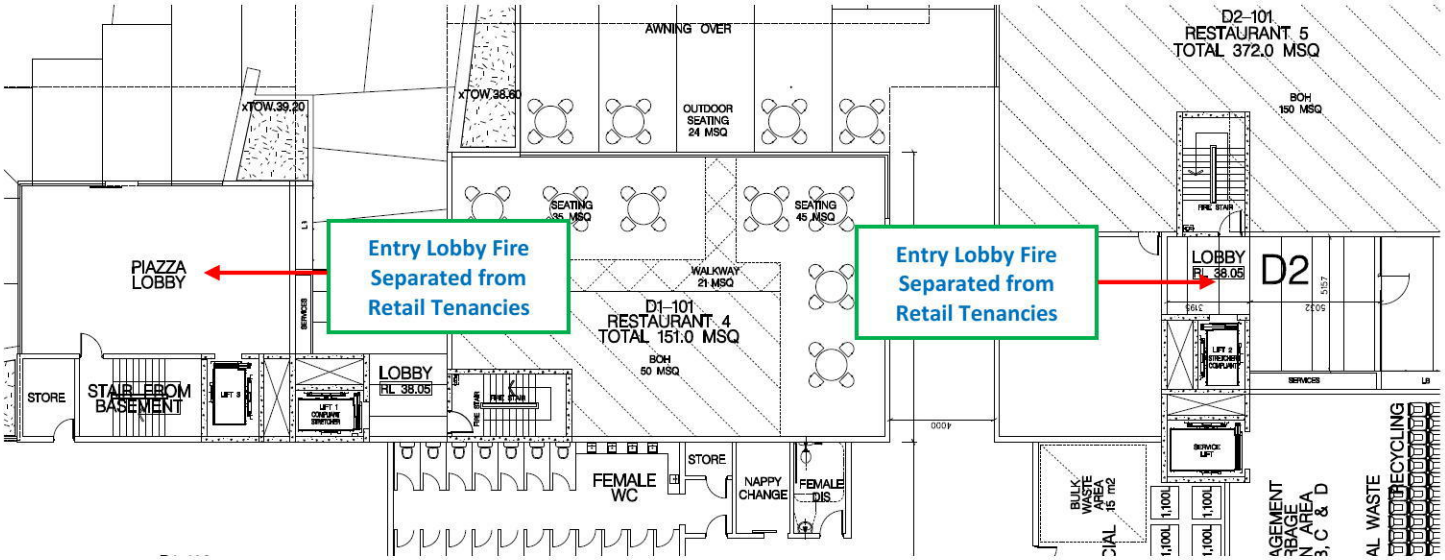

Figure 4: Building D - Part Level 1 Plan

Proposed Method of Analysis

A Qualitative Analysis is proposed to be undertaken to assess the Alternative Solution against the DTS provisions of the BCA, as permitted under Clause A0.9(c) of the BCA. The analysis will assess the ability of occupants to evacuate from the residential levels of the building safely, when compared to a design that complies with the minimum DTS provisions of the BCA.

Proposed Acceptance Criteria

The Alternative Solution is to be shown to comply with BCA Performance Requirements DP5 and EP2.2 in terms of allowing occupants to evacuate from the building safely, protected from the effects of fire and under untenable conditions, at least equivalent to that of a DTS Compliant Design.

Alternative Solution 4 - Fire Hose Reels

Preliminary Fire Safety Strategy

The preliminary fire safety strategy will be based on the following:

- The provision of both a 9 litre water type portable fire extinguisher and a 4.5 kg dry chemical power AB(E) type portable fire extinguisher located adjacent to each fire-isolated exit on the residential levels of the building. Each pair of extinguishers to be located within 4m of each fire-isolated exit.

  The provision of portable fire extinguishers, in lieu of fire hose reels, is intended to enable occupants to undertake an initial attack on a fire.

- Consideration will also be given to the hazards associated with the use of fire hose reels within residential buildings, including:
  - An unwound fire hose reel into a fire effected unit will result in the unit entry door remaining chocked open. Such will contribute to the spread of smoke and / or fire into the pubic corridors.
  - An unwound fire hose reel could cause a trip hazard to evacuating occupants.
  - Encouraging occupants to continue fighting a fire (unlimited water supply), instead of evacuating. Portable fire extinguishers have a limited extinguishing agent.

Proposed Method of Analysis

A Qualitative Analysis is proposed to be undertaken to assess the Alternative Solution against the relevant Performance Requirements of the BCA, as permitted under Clause A0.9(b)(ii) of the BCA. The analysis will be based on assessing whether occupants on the residential levels of the building will be allowed to undertake an initial attack of a fire via the use of portable fire extinguishers, in lieu of fire hose reels.

Proposed Acceptance Criteria

The Alternative Solution is to be shown to comply with BCA Performance Requirement EP1.1 in terms of allowing occupants within the residential levels of the building to safely undertake an initial attack on a fire.

CONCLUSION

In consideration of the above, it is concluded that Alternative Solutions can be developed to the DTS provisions of the BCA to ensure the proposed development can achieve compliance with the relevant Performance Requirements of the BCA.

Yours Faithfully

Innova Services Pty Ltd

Jason Powell
Director
C10 Accredited Fire Engineer (BPB0801)
MIEAust, CPEng

REFERENCED ARCHITECTURAL PLANS

Table 2: List of Referenced Architectural Plans

Drawing No.	Issue	Title	Date
A 1000	E	Site Plan	23-02-2014
A 1001	E	Site Plan - Detail 1 of 2	23-02-2014
A 1002	E	Site Plan - Detail 2 of 2	23-02-2014
A 2000	E	Basement 2 (lower)	23-02-2014
A 2001	E	Basement 2 (upper)	23-02-2014
A 2200	E	Building A - Level 1 Plan	23-02-2014
A 2201	E	Building A - Level 2 Plan	23-02-2014
A 2202	E	Building A - Level 3 Plan	23-02-2014
A 2203	E	Building A - Level 4 Plan	23-02-2014
A 2204	E	Building A - Level 5 Plan	23-02-2014
A 2205	E	Building A - Level 6 Plan	23-02-2014
A 2210	E	Building B - Level 1 Plan	23-02-2014
A 2211	E	Building B - Level 2 Plan	23-02-2014
A 2212	E	Building B - Level 3 Plan	23-02-2014
A 2213	E	Building B - Level 4 Plan	23-02-2014
A 2214	E	Building B - Level 5 Plan	23-02-2014
A 2215	E	Building B - Level 6 Plan	23-02-2014
A 2220	E	Building C - Level 1 Plan	23-02-2014
A 2221	E	Building C - Level 2 Plan	23-02-2014
A 2222	E	Building C - Level 3 Plan	23-02-2014
A 2223	E	Building C - Level 4 Plan	23-02-2014
A 2224	E	Building C - Level 5 Plan	23-02-2014
A 2230	E	Building D - Level 1 Plan	23-02-2014
A 2231	E	Building D - Level 2 Plan	23-02-2014
A 2232	E	Building D - Level 3 Plan	23-02-2014
A 2233	E	Building D - Level 4 Plan	23-02-2014
A 2234	E	Building D - Level 5 Plan	23-02-2014
A 2235	E	Building D - Level 6 Plan	23-02-2014