Exova Warringtonfire Aus Pty Ltd
Suite 2002a, Level 20,
44 Market Street
Sydney, New South Wales 2000
Australia

T: +61 (0)2 8270 7600
F: +61 (0)2 9299 6076
E: market.pacifc@exova.com
W: www.exova.com

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DEVELOPMENT APPLICATION REPORT				Fire Engineering
Project Name:	Eastwood Shopping Centre Development		Document No.	CA01
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Client:	Yuhu Group (Australia)		Issued for: DA	
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From:	Simon Krishnan	[simon.krishnan@exova.com]		Page 1 of 13

To:	Cc:	Organisation	Person	Fax/Email
☒	☐	Rice Daubney	Mark Shoolman	mark.shoolman@hdrricedaubney.com
☒	☐	Rice Daubney	Lilian Krasnowski	lilian.krasnowski@hdrricedaubney.com
☒	☐	Steve Watson and Partners	Nick Hontas	nhontas@swpartners.com.au
☒	☐	Yuhu Group (Australia)	Bob Shin	BobShin@yuhugroup.com.au

Subject: Fire safety engineering trial concept design – Eastwood Shopping Centre Redevelopment

1 INTRODUCTION

Exova Warringtonfire Aus Pty Ltd has been engaged by Yuhu Group (Australia) as the fire safety engineers detailing the fire safety engineering trial concept design strategy for the proposed mixed use development including 440-450 apartments known as the Eastwood Shopping Centre Development.

We have undertaken a preliminary fire safety engineering assessment of the DA architectural plans for the proposed development together with the BCA Assessment Report.

The advice contained in this report is based on the following:

1. The relevant provisions of the Building Code of Australia 2016 (BCA).
2. BCA Assessment Report prepared by Steve Watson & Partners dated 22.7.2016.
3. Architectural plans prepared by Rice Daubney, as referenced in Table 1.1.

Table 1.1 – Referenced architectural drawings

Drawing no.	Title	Issue no.	Date
DA1104	BASEMENT 4	00	15.07.16
DA1103	BASEMENT 3	00	15.07.16
DA1102	BASEMENT 2	00	15.07.16
DA1101	BASEMENT 1	00	15.07.16
DA1100	LOWER GROUND PLAN	00	15.07.16
DA1201	GROUND PLAN - ROWE ST	00	15.07.16
DA1301	LEVEL 1 - RUTLEDGE ST	00	15.07.16
DA1302	LEVEL 2	00	15.07.16
DA1303	LEVEL 3	00	15.07.16
DA1304	LEVEL 4	00	15.07.16
DA1305	LEVEL 5	00	15.07.16
DA1306	LEVEL 6	00	15.07.16
DA1307	LEVEL 7	00	15.07.16
DA1308	LEVEL 8	00	15.07.16
DA1309	LEVEL 9	00	15.07.16
DA1310	LEVEL 10	00	15.07.16
DA1311	LEVEL 11	00	15.07.16

Drawing no.	Title	Issue no.	Date
DA1312	LEVEL 12	00	15.07.16
DA1313	LEVEL 13	00	15.07.16
DA1401	ROOF LEVEL	00	15.07.16
DA1501	ELEVATION ROWE STREET	00	15.07.16
DA1502	ELEVATION RUTLEDGE STREET	00	15.07.16
DA1503	ELEVATION WEST PARADE	00	15.07.16
DA1504	ELEVATION TRELAWNEY STREET	00	15.07.16
DA1505	ELEVATION INTERNAL STREET EAST	00	15.07.16
DA1506	ELEVATION INTERNAL STREET WEST	00	15.07.16
DA1606	INTERNAL STREET SECTION LOOKING EAST	00	15.07.16

2 BUILDING DESCRIPTION

The proposed development involves the construction of a large mixed use building comprising 4 levels of basement carparking, 2 levels of retail / commercial and 13 levels of residential apartments. The site is bound by Rowe Street to the North and Rutledge Street to the South. The proposal also includes an associated landscaped public podium and a communal indoor swimming pool on Level 1. Vehicular access to the loading dock is provided via West Parade on the eastern side of the site.

As stipulated within the NSW Environmental Planning & Assessment (EP&A) Regulation 2000, the proposed development is to comply with the Building Code of Australia 2016 (BCA). Based on required compliance with BCA 2016, a description of the parameters relating to the development in the context of the requirements and definitions provided within the BCA is provided in Table 2.1.

Table 2.1 – BCA deemed-to-satisfy provision reference criteria for the proposed development

BCA clause		Description or requirement
A1.1	Effective height	The effective height of the building will be more than 25 metres, approximately 49.1 metres.
A3.2	Occupancy classification	The building will be of the following classifications:- • Class 2 (Residential apartments) • Class 5/6 (Retail/Commercial) • Class 7a (Carparking) • Class 7b (loading dock)
C1.1	Minimum type of construction	Type A construction is applicable.
C1.2	Rise in storeys	The building will have a rise in storeys of fifteen (15).

C2.2	Fire compartment size limitations	Fire compartment size limitations for Class 5, 6 and 7b occupancies of Type A construction are as follows:
		• Class 5
		  ○ 8,000 m^2
		  ○ 48,000 m^3
		• Class 6 and 7b
		  ○ 5,000 m^2
		  ○ 30,000 m^3
		These fire compartment size limitations will not be exceeded.
		NB. Fire compartment size limitations do not apply to Class 2 parts or sprinklered Class 7a parts.

3 PERFORMANCE SOLUTION

The proposed performance solutions as advised by Steve Watson and Partners are described in Table 3.1 below, along with details of the relevant BCA performance requirements and BCA assessment methods.

The relevant performance requirements have been identified in conjunction with Steve Watson and Partners and in accordance with BCA clause A0.10, the latter requiring consideration of any relevant performance requirement from parts of the BCA other than those where the DtS variation is to be found.

All other items of fire and life safety are to be provided in compliance with the DtS provisions of the BCA.

Table 3.1 – Summary of BCA DtS provision departures and proposed performance solutions

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td colspan="2">C1.1 refers to Specification C1.1, which nominates fire resistance levels (FRLs) for building elements generally of 3 hours for class 6 occupancies and 4 hours for loading dock occupancies.</td><td rowspan="4">Performance solution 1
The retail (incl. loading dock) portions of the development are proposed to achieve a 2 hour fire rating throughout in lieu of 3 and 4 hours respectively.</td></tr>
<tr><td>BCA Clause</td><td>Spec C1.1</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>CP1 & CP2</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(b)(ii) “other Verification Methods”</td></tr>
<tr><td colspan="2">Clause C2.2 nominates a maximum fire compartment size of 8,000 m^2 and 48,000 m^3 for Class 5 occupancies and 5,000 m^2 and 30,000 m^3 for Class 6 occupancies of Type A construction.</td><td rowspan="4">Performance solution 2
Fire compartments on lower ground will exceed the maximum 5000 m^2 and 30,000 m^3 limitations of Table C2.2 for Class 6. Compartment size is approximately 6000 m^2 and 32,000 m^3 per level.
Note: Fire compartment comprises the supermarket (incl. BOH areas), liquor tenancy, mall leading towards open space (incl. 2 kiosks), fresh food tenancy and travelators).</td></tr>
<tr><td>BCA Clause</td><td>C2.2</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>CP2 & EP2.2</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(b)(ii) “other Verification Methods”</td></tr>
<tr><td colspan="2">C2.7 refers to a fire wall must be constructed in accordance with the relevant FRL prescribed by Specification C1.1.
D1.12 stipulates that in a Class 5 or 6 building that is sprinklered throughout, an escalator must not connect more than 3 storeys if each of those storeys is provided with a sprinkler system complying with Specification E1.5 throughout.</td><td rowspan="4">Performance solution 3
The travelator extending through 4 storeys is proposed to be enclosed with drencher protected glass in lieu of 2 hour solid construction on Basement 1, Basement 2 and Ground Level.</td></tr>
<tr><td>BCA Clause</td><td>C2.7 & D1.12</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>CP2, DP4 & EP2.2</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to-Satisfy Provisions.”</td></tr>
<tr><td colspan="2">D1.2 stipulates that each storey in a building with an effective height of more than 25 metres be provided with at least two exits.</td><td rowspan="2">Performance solution 4
The following areas are not provided with access to 2 exits:
(a) <u>Ground</u></td></tr>
<tr><td>BCA Clause</td><td>D1.2</td></tr>
</table>

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP4 & EP2.2</td><td rowspan="2">• Specialty retail tenancies facing Rowe Street without connection to mall
(b) <u>Level 1</u>
• Specialty mezzanines on gridline 1A and 14A
• Commercial tenancies at western end
• Central public park ‘The secret garden’
• Residential lobby of Building CA
• Gas / water / NBN and Comms rooms adjacent main switch room
• Pump room, commercial tenancy, residential lift lobby and gym on eastern side
• Plant room located behind private open space areas of residential units long western boundary
(c) <u>Level 2</u>
• Outdoor communal residential space
(d) <u>Level 6</u>
• Building BB
(e) <u>Level 7</u>
• Building BB</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
</table>

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td colspan="2">D1.4 stipulates that no point on a floor must be more than 20 m from an exit, or a point from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40 m.
D1.4 states that for class 2 areas, the entrance doorway of any sole-occupancy unit must be not more than 6 m from either an exit or a point which travel in different direction to two exits is available.</td><td rowspan="4">Performance solution 5

Travel distances from the following areas exceed 6m from the entrance doorway of any sole-occupancy unit, 20m to a point of choice and/or 40m to the first exit for the other classifications:

(a) <u>Basement Levels 1 to 4</u>
• Approx. 30m to point of choice
• Approx. 85m to first exit
(b) <u>Ground</u>
• Approx. 30m to point of choice
• Approx. 80m to the nearest exit from the service corridor (ground level) and supermarket (lower ground level)
(c) <u>Level 1</u>
• Approx. 48m to open space from ground floor commercial suite of Building DB without point of choice
• Approx. 45m to first exit from Yum Cha Tenancy
• Approx. 85m to open space from central public park ‘The secret garden’ without point of choice
• Approx. 30m to point of choice within Medical Centre
• Approx. 22m to open space from Building CA residential lobby
• Approx. 30m to exit from Gym tenancy without point of choice
• Approx. 90m to the road from plantroom behind private open space courtyards of residential Building BB
• Approx. 27m to open space from gas meters room below Building CB
(d) <u>Level 2</u>
• Commercial suites within Building DB approx. 30m to point of choice
(e) <u>Residential Buildings</u>
• Approx. 12m to exit and/or point of choice throughout
• Approx. 67m to open stair from most disadvantaged point on communal outdoor space (open to sky and assuming no access back into residential buildings)
• Approx. 30m to single exit serving rooftop communal space on Level 6 of Building DB</td></tr>
<tr><td>BCA clause</td><td>D1.4.</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP4 & EP2.2.</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
</table>

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td colspan="2">D1.5 stipulates that exits that are required as alternative means of egress must be not more than 60 metres apart.</td><td rowspan="4">Performance solution 6

Travel distances from the following areas exceed 60m between alternative exits:

(a) <u>Basement Levels 1 to 4</u>
• Approx. 110m
(b) <u>Lower Ground and Ground</u>
• Approx. 100m
(c) <u>Level 1</u>
• Approx. 80m from Yum Cha tenancy
• Approx. 100m from communal pool area via the public park to pedestrian entrance adjacent to Yum Cha tenancy
(d) <u>Residential Buildings</u>
• Scissor stairs serving as required exits are less than 9m apart – approx. 3.8m worst case being in Building CB</td></tr>
<tr><td>BCA Clause</td><td>D1.5</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP4 & EP2.2.</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
<tr><td colspan="2">D1.7 refers to
(a) A doorway from a room must not open directly into a stairway, passageway or ramp that is required to be fire-isolated
(b) Each fire-isolated stairway or fire-isolated ramp must provide independent egress from each storey served and discharge directly, or by way of its own fire-isolated passageway
(c) Where a path of travel from the point of discharge of a fire-isolated exit necessitates passing within 6 m of any part of an external wall of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have—
(i) an FRL of not less than 60/60/60; and
(ii) any openings protected internally in accordance with C3.4.</td><td rowspan="4">Performance solution 7

(a) The following tenancies which do not occupy the entire storey contain doorways which open directly into fire-isolated exits:
<u>Lower Ground</u>
• Fire hydrant pump room
• Supermarket – doorways open directly into the 2 x fire-isolated exits within the BOH area
<u>Ground</u>
• Plant room at gridline 1B
• Mini Major – doorway opening directly into fire-isolated within BOH area
(b) The following fire-isolated stairways share a common discharging passageway to the road or open space:
• Fire-isolated stairways at north eastern corner of basement levels and Building BB
• Fire-isolated stairway at southern (central) part of basement levels and Building CA
• Fire-isolated stairway at south eastern corner of basement levels and Building CB
(c) The following fire-isolated stairways discharge point which necessitates passing by external openings of the building to reach the road or open space and/or within the confines of the building:
• Fire-isolated stairways serving Buildings BA and BB discharge to the central market hall on ground floor which necessitate passing by shopfronts to reach the road or open space
• Fire-isolated stairways serving commercial suites of Building DB discharge into covered colonnade which is approximately 25 m to open space and necessitates passing by openings within the external wall of the building
• Fire-isolated stairways (2 off) serving Building DA discharge into covered colonnade and necessitate passing by openings within external wall of the building
• Fire-isolated stairway serving southern (central) part of basement levels and Building CA discharge into covered area.
• Vehicular access ramp area which is approximately 22 m to open space</td></tr>
<tr><td>BCA Clause</td><td>D1.7</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP5</td></tr>
<tr><td>Assessment method</td><td>Qualitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
</table>

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td colspan="2">D1.9(a) states that a non-fire-isolated stairway or non-fire-isolated ramp serving as a required exit must provide a continuous means of travel by its own flights and landings from every storey served to the level at which egress to a road or open space is provided; and
D1.9(c) states that in a Class 5, 6, 7, 8 or 9 building, the distance from any point on a floor to a point of egress to a road or open space by way of a required non-fire-isolated stairway or non-fire-isolated ramp must not exceed 80 m.</td><td rowspan="4">Performance solution 8
The required non-fire isolated stairway providing egress from the level 2 residential communal space podium discharges to Level 1 and necessitates passing back underneath the building to reach Rutledge Street. The distance to Rutledge Street from the bottom riser is approximately 45 m. Total travel distance to Rutledge Street from the abovementioned podium is approximately 110 m in lieu of 80 m.</td></tr>
<tr><td>BCA Clause</td><td>D1.9</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP4 and EP2.2</td></tr>
<tr><td>Assessment method</td><td>Qualitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
<tr><td colspan="2">D1.10(d) states that the discharge point of alternative exits must be located as far apart as practical.</td><td rowspan="4">Performance solution 9
The fire-isolated stairways serving the commercial suites in Building DB discharge immediately adjacent to one another on Level 1 and share common pathway to open space.</td></tr>
<tr><td>BCA Clause</td><td>D1.10(d)</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP4</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(b)(ii) “other Verification Methods”</td></tr>
<tr><td colspan="2">Clause D2.19(b) of the BCA stipulates that doorway serving as a required exit or forming part of a required exit, or a doorway in a patient care area of a Class 9a health-care building must not be fitted with a sliding door unless it:
(i) leads directly to a road or open space and the door is able to be opened manually under a force of not more than 110 N; and
(ii) must open automatically if there is a power failure to the door or on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.
D2.21 (iv) states that a door in a required exits is fitted with a fail-safe device which automatically unlocks the door upon the activation of any sprinkler system complying with Specification E1.5 or smoke, or any other detector system deemed suitable in accordance with AS 1670.1 installed throughout the building.</td><td rowspan="3">Performance solution 10
(a) <u>Basement 1 – Travelator Lobby</u>
The sliding doors located at the travelator lobby are required to automatically close upon fire to maintain separation between the carpark and retail fire compartments. The conflicts with occupants within the lobby being able to egress through the doors to reach an exit. The operation of the doors is proposed to be addressed on a performance basis.
(b) <u>Lower Ground – Roller shutter to supermarket, fresh food and liquor tenancies</u>
The roller shutters at the main entry to each of the above mentioned tenancies will be closed after hours. Access to an exit via the roller shutter is proposed to be via a ‘push-to-exit’ button with battery backup in lieu of automatically opening upon fire alarm.</td></tr>
<tr><td>BCA Clause</td><td>D2.19(b) and D2.21</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>DP2</td></tr>
</table>

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(b)(ii) “other Verification Methods”</td><td></td></tr>
<tr><td colspan="2">E1.3 refers to a fire hydrant system being installed in accordance with AS 2419.1–2005, with clause 7.3 of AS 2419.1 stipulating that a fire brigade booster assembly be located so that it meets the following provisions:
(i) Readily accessible to fire-fighters.
(ii) Operable by fire brigade pumping appliances located within 8 m.
(iii) If within, or affixed to, the external wall of the building, the booster is:
(a) within sight of the main entrance to the building; and
(b) separated from the building by a construction with a fire resistance rating of not less than FRL 90/90/90 for a distance of not less than 2 metres each side of and 3 metres above the upper hose connections in the booster assembly.
AS2419.1-2005 Clause 6.4.2 states that internal pumprooms located within a building shall have –
(a) a door opening to a road or open space, or a door opening to fire isolated passage or stair which leads to a road or open space; and
(b) except where the building is sprinkler protected in accordance with AS2118.1, enclosing walls with an FRL not less than that prescribed by the BCA for a firewall for the particular building classification served by the fire hydrant system</td><td rowspan="4">Performance solution 11
Protection of the booster is proposed to be a combination of drenched glass and/or fire rated construction.
The Hydrant is not proposed to be within sight of the main northern entrance of the building.
The pump room is proposed to be located at Lower Ground and accessed via an airlock from the fire isolated stairway leading down from Rutledge Street.</td></tr>
<tr><td>BCA Clause</td><td>E1.3</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>EP1.3 & EP1.6</td></tr>
<tr><td>Assessment method</td><td>Qualitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
<tr><td colspan="2">Clause 6 of Specification E1.5 states that sprinkler alarm valves must be located in a secure room or enclosure which has direct egress to a road or open space.</td><td rowspan="4">Performance solution 12
The fire sprinkler valves are proposed to be located within the hydrant pump room at Lower Ground which is has no direct egress to a road or open space.</td></tr>
<tr><td>BCA Clause</td><td>E1.5</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>EP1.4 & EP1.6</td></tr>
<tr><td>Assessment method</td><td>Qualitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
</table>

<table>
<tr><th colspan="2">BCA DtS provision</th><th>Proposed performance solution</th></tr>
<tr><td colspan="2">E2.2 refers to Table E2.2b for class 6 buildings. Table E2.2b nominates an automatic smoke exhaust system in accordance with Specification E2.2b.
Spec E2.2b-6(b) states that the velocity of make-up air through doorways must not exceed 2.5m/s.</td><td rowspan="4">Performance solution 13

Performance based smoke exhaust system is proposed throughout the Lower Ground and Ground floor retail areas. This may include but not limited to omission of smoke exhaust to BOH areas, mark up air quantities, air velocities, smoke exhaust rates and inlets, location of baffles etc.</td></tr>
<tr><td>BCA Clause</td><td>E2.2 & Table E2.2</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>EP2.2</td></tr>
<tr><td>Assessment method</td><td>Qualitative and quantitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(b)(ii) “other Verification Methods”</td></tr>
<tr><td colspan="2">Table E2.2a stipulates that a Class 5, 6, 7b, 8 or 9b building or part of a building over 25m in height must be provided with a zone smoke control system in accordance with AS/NZS 1668.1</td><td rowspan="4">Performance solution 14

The Class 5, 6 and 7b areas are not proposed to be provided with zone smoke control system based on the areas being located to the under 25 metre levels (Lower ground, ground, Level 1, Level 2, Level 3, Level 4 and Level 5 only).</td></tr>
<tr><td>BCA Clause</td><td>Table E2.2a</td></tr>
<tr><td>Relevant performance requirement(s)</td><td>EP2.2</td></tr>
<tr><td>Assessment method</td><td>Qualitative assessment based on BCA A0.2(a) “a Performance Solution” and A0.5(c) “Comparison with the Deemed-to Satisfy Provisions.”</td></tr>
</table>

It is proposed that the method of BCA compliance for fire safety be achieved via a combination of prescriptive-based and performance-based design. This approach accords with clause A0.2(c) of the BCA which permits compliance to be achieved via one or a combination of the following:

- Performance Solution that, in accordance with clause A0.3, either demonstrates compliance with the BCA performance requirements or demonstrates fire safety at least equivalence with the deemed-to-satisfy provisions; or
- Deemed-to-Satisfied Solution.

Compliance with aspects of fire safety design that are not intended to meet the BCA deemed-to-satisfy provisions will be addressed as performance solutions forming the basis of a fire engineering analysis. The following assessment methods for the performance solutions are proposed:

- BCA clause A0.5(b), comprising utilisation of “other verification methods” appropriate to that which the approval authority will accept for determining compliance with the performance requirements; or
- BCA clause A0.5(c), comprising utilisation of a comparison of the level of fire safety performance associated with the proposed design to that achieved by the deemed-to-satisfy provisions.

The fire engineering analysis will follow the principles established within the International Fire Engineering Guidelines 2005. The acceptance criteria for the assessment of the performance solutions will be established in consultation with the relevant authorities having jurisdiction, including Fire and Rescue NSW, the design team and the owner’s representative. This process will continue throughout the development of the design.

Exova Warringtonfire Aus Pty Ltd has undertaken a preliminary fire safety engineering assessment of the DA architectural plans for the proposed development together with the BCA Assessment Report.

From the assessment undertaken, it is considered that the matters identified above that are likely to form fire safety engineering performance solutions can be readily addressed, enabling the proposed development to readily achieve compliance with the relevant fire safety related provisions of BCA 2016.

All other items of fire and life safety forming part of the proposed development are to be provided in compliance with the DtS provisions of the BCA.

4 TRIAL CONCEPT DESIGN

From the assessment undertaken, the fire safety engineering trial concept design is detailed below.

Fire Resistance & Compartmentation

The following summarises the trial concept design in relation to fire resistance and compartmentation:

(i) Fire resistance levels are to generally achieve 2 hours for the retail and loading dock portions of the development.

(ii) Medium-temperature smoke seals are to be provided to all doors opening into the common area of the residential levels. The medium-temperature seals shall be selected such that when fitted to a single-leaf door and tested in accordance with AS 1530.7–2007, they achieve a maximum total leakage rate of 25 m^3/h, corrected to STP, at a pressure differential of 25 Pa after more than 30 minutes exposure to 200 ºC (as per AS 6905–2007). The doorsets shall be provided with all hardware, closers and smoke seals to all four sides in accordance with the relevant test reports.

(iii) Where smoke exhaust system is not provided to the back-of-house areas, the walls separating the back-of-house areas from the remainder of the retail areas are to extend to the roof covering.

(iv) The following areas are to be provided with a wall-wetting drencher system:

- The travelator on Basement 1, Basement 2 and Ground floor (including additional glazing) to be enclosed with a drencher protected glazed construction.
- The hydrant booster is proposed to be protected by 90/90/90 FRL fire rated construction and the main residential lobby entry glazed doors on the southern elevation located next to the hydrant booster is to be drencher protected with self-closers to the doors.
- The glazed external wall from the commercial suite 1B facing the covered colonnade.
- The glazed external wall from the Mini Major Yum Cha facing the covered colonnade.

(v) All other proposed fire resistance and compartmentation matters are to comply with the BCA DtS Provisions within Section C of the BCA.

Egress

The following summarises the trial concept design in relation to egress:

(i) The sliding doors located at the travelator lobby on Basement 1 and Basement 2 are required to automatically close upon fire trip to maintain separation between the carpark and retail fire compartments. The access through the sliding doors will be via a ‘push-to-exit’ button with battery backup in lieu of automatically opening upon fire alarm.

(ii) Access to an exit via the roller shutter from the supermarket, fresh food and liquor main entries is to be via a ‘push-to-exit’ button with battery backup in lieu of automatically opening upon fire alarm.

(iii) Access back into Building DA from the communal outdoor space is to be provided.

(iv) All other proposed egress matters are to comply with the BCA DtS Provisions within Section D of the BCA.

Fire Services & Equipment

The following summarises the trial concept design in relation to fire services and equipment:

(i) An automatic fire sprinkler system is to be provided throughout all buildings with fast-response sprinkler heads to the basement carpark.

(ii) An automatic smoke detection and alarm system is to be provided in accordance with BCA clause E2.2 and BCA Specification E2.2a including:

- Smoke detectors are to be provided to activate stair pressurisation systems for fire-isolated exits and smoke exhaust systems are to be installed in accordance with AS/NZS 1668.1 with smoke detectors provided in accordance with BCA Specification E2.2a.
- Smoke detectors are to be provided in accordance with clause 5 of BCA Specification E2.2a with AS1670.1 spacing in residential public corridors.
- The distance between smoke detectors shall not exceed 10.2 metres and not more than 5.1 from the wall within the commercial suites of Building DB and the service corridor on Ground level..

(iii) A fire hydrant system is to serve the proposed development in accordance with BCA clause E1.3 including a ring main system throughout. The Hydrant is not proposed to be within sight of the main northern entrance of the building.

(iv) A fire hose reel system is to serve the proposed development in accordance with Clause E1.4.

(v) Portable fire extinguishers are to serve the proposed development in accordance with AS 2444–2001 in relation to any of the specific risks nominated by BCA clause E1.6.

(vi) The wall-wetting drencher systems are to be provided in accordance with AS 2118.2–2010 including the following:

a) Operation of either a drencher or general fire alarm is to initiate the automatic-closing operation of any door forming part of the glazed, drencher-protected construction;
b) Drenchers are to be fed from the fire hydrant system, using a monitored isolation valve that is clearly labelled at the valve itself, in the sprinkler valve room on the sprinkler block plan and on the hydrant block plan, and is accessible without the need for a ladder – isolation status of the valve (open / closed) is to be indicated at the fire indicator panel;
c) The design to be capable of supplying the required flow and pressure for the simultaneous operation of the combined drenchers to one side of one of the protected glazing installations and the fire hydrant system; and
d) A design that is capable of fully wetting the glazing, including any doors when in the closed position, with no dry spots; a proprietary, tested system is to be used as the basis of the second option, unless an alternative system can be shown as being appropriate for the application (in the case of adoption of the Tyco “Model WS” system.

(vii) A smoke exhaust system is to be provided to the Lower Ground floor (Major tenancy and Mall area) and Ground floor (Major tenancy and Mall area) excluding the back-of-house areas to the tenancies, in accordance with BCA Specification E2.2b. The exhaust rates will be performance based throughout the Lower Ground and Ground floor retail areas including rationalised smoke exhaust rates and location of baffles.

(viii) Stair-pressurisation system is to be provided with an in accordance with BCA Table E2.2a, which includes compliance with AS/NZS 1668.1–1998 throughout all buildings.

(ix) A SSISEP is to be provided in accordance with clause E4.9, which includes compliance with AS1670.4–2004 throughout all buildings.

(x) A fire control centre is to be provided to serve the proposed development in accordance with BCA Specification E1.8.

(xi) Emergency lifts are to be provided to serve the proposed development in accordance with BCA Part E3.

(xii) Emergency lighting is to be provided to serve the proposed development in compliance with AS 2293.1–2005 in accordance with BCA Part E4.

(xiii) Exit signage is to be provided to serve the proposed development in compliance with AS 2293.1–2005 in accordance with BCA Part E4.

(xiv) All other proposed fire services and equipment matters are to comply with the BCA DtS Provisions within Section E of the BCA.

5 CONCLUSION

This fire safety engineering trial concept design details the fire safety engineering strategy that can be developed in relation to the proposed residential development, based on the current architectural drawings for this phase of the project. In all other respects, the proposed building works are to comply with the prescriptive, fire-safety-related DtS provisions of the BCA 2016.

The fire safety engineering performance solutions for the development, as detailed above, can be readily addressed and it is expected that the proposed development will readily achieve compliance with the relevant fire safety-related provisions of the BCA 2016.

It should be noted that the proposed performance solutions will be subject to a staged engineering process, involving a Fire Engineering Brief phase, where consultation will be required with the relevant stakeholders (including the certifying authority) and a Fire Engineering Report phase, where the engineering assessment and calculations are to be undertaken to determine that the design meets the agreed fire safety objectives. Implementation of the final design will be subject to the approval of the Authorities Having Jurisdiction, which includes the certifying authority.

Yours faithfully

Prepared by

Simon Krishnan
simon.krishnan@exova.com
Fire Safety Engineer
NSW Fire Engineering Group

Reviewed by

Peter Gardner
peter.gardner@exova.com
Manager Fire Engineering Consultancy
NSW Fire Engineering Group

For and on behalf of Exova Warringtonfire Aus Pty Ltd.