Fire & Rescue NSW

Fire Engineering Brief Questionnaire (FEBQ)

1 Document control

Applicant reference number Enter ref. no. **FRNSW reference number** FRNSW use only

Ver.	Author	Organisation	Status	Date
01	Rohan Defries	Defire	Initial submission	13/11/2017

2 Applicant

2.1 Role of applicant

☐ Local government authority ☐ Certifying authority ☐ Fire safety engineer
☐ Development owner ☑ Other Crown

Note: The applicant is expected to have the consent of the development owner to act on their behalf.

2.2 Agreement

As the applicant, I confirm the following:

- I agree to pay Fire & Rescue NSW (FRNSW) the charges set out in Clause 46 of the *Fire Brigades Regulation 2014* (see Section 10).
- I agree to forward with this application the following documentation for FRNSW to review and provide advice on the assessment methods and acceptance criteria proposed for the given alternative solution:
  - ☑ Copy of proposed building plans and specifications (e.g. relevant floor plans, elevations, site plan, section views, hydrant plan and schematic)
  - ☑ BCA report or letter from an accredited certifier that identifies all non-compliances (if available)
  - ☐ CFD/zone modelling inputs form (if applicable)
  - ☑ Report extract of the trial design requirements/proposed fire safety measures (optional).

Name of applicant	Andreas Winkelmeier c/- Health Infrastructure
Applicant phone number	02 8215 9833
Applicant email address	awinkelmeier@savills.com.au

2.3 Remittance advice information

Invoices will be issued based on the information provided below:

Company / vendor name	Health Infrastructure		
Australian business number	89 600 377 397	Trading name	Health Infrastructure
Remittance contact name	C/- Andreas Winkelmeier, APP		
Remittance street address	Level 6, 77 Pacific Highway, North Sydney NSW 2060		
Remittance postal address	Box 1060, North Sydney NSW 2059		
Remittance email address	hi-accounts@health.nsw.gov.au		
Remittance phone number	02 8215 9833	Remittance fax number	02 8904 1377

3 Consultation

3.1 Stakeholders

Role	Name and BPB number	Organisation and phone	Email address
Fire safety engineer	Rohan Defries / Jason Jeffress BPB 0197	Defire 02 9211 4333	rohan@defire.com.au jason@defire.com.au
Certifying authority	Vanessa Batty	McKenzie Group 02 8298 6800	vbatty@mckenzie-group.com.au
FRNSW reviewers	FRNSW use only FRNSW use only	Fire & Rescue NSW 02 9742 7434	firesafety@fire.nsw.gov.au

3.2 Meeting details

In conjunction with the written comments provided in response to this FEBQ, FRNSW may hold a meeting with the applicant to discuss aspects of the proposed alternative solution. The meeting will be at the discretion of FRNSW.

Type of meeting preferred ☑ No meeting ☐ Telephone meeting ☐ Face-to-face meeting

4 Project details

4.1 Premises

Premises name	St Leonards Health Organisations Relocation project (SHOR)
Primary street address	Reserve Road, St Leonards
Secondary street address	
Premises suburb	St Leonards
Lot and DP numbers	

4.2 Proposed works

☑ New building
☐ Refurbishment of an existing building
☐ Extension of an existing building
☐ Change in use within an existing building
☐ Other: (provide details)

Applicable NCC: NCC 2016

For existing buildings:
Approximate year of construction:
Building code when constructed:

How many alternative solution issues are proposed in this FEBQ? 3

Note: The number of alternative solution issues must address all identified non-compliances.

Have all departures from the deemed-to-satisfy (DtS) provisions of the *National Construction Code* (*NCC*) been identified for this proposed design (i.e. a BCA report or letter from an accredited certifier)? Yes

Note: Any advice given is subject to all non-compliances being identified. Any new DtS departures identified, including any from the certifying authority determining the application for construction certificate, may affect FRNSW advice in respect to this alternative solution.

Identify if any previous alternative solution applies to the building:

Nil.

Identify if any application has been/will be submitted under Clause 188 of the *Environmental Planning and Assessment Regulation 2000*:

Nil

Identify if the premises is or will be subject to any development application (DA) conditions or special regulatory approvals (e.g. BPB conditions, ministerial conditions, crown building works):

Note: FRNSW will not comment on existing buildings subject to voluntary upgrade or change of use prior to the issue of any DA conditions of consent or Section 96 amendments. Comment will also not be provided if an order has been issued unless the Council agrees. The Council may seek advice during the DA review.

Noted

Will the premises be subject to a fire safety study, risk assessment or dangerous goods study? No

Note: Any study/risk assessment should be completed prior to submitting this FEBQ, and should be attached to this application.

4.3 Description of building occupancy

Main occupancy class	5	Other occupancy classes	Classes 6, 7a, 7b and 9b
Type of construction	A	Largest fire compartment (m^2)	**Area**
Effective height (m)	41.4m	Ground floor area (m^2)	**Area**
Rise in storeys	12	Total floor area (m^2)	**Area**
Levels contained	13	Total volume (m^3)	**Volume**

Note: The definition of effective height has changed in *NCC 2016*. For any other applicable *NCC*, consideration must be given to the NSW Supreme Court case [2012] NSWSC 1244.

Outline any additional building characteristics:

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the St Leonards Health Organisations Relocation (SHOR) Project at the Royal North Shore Hospital (RNSH).

- Construction of a 10-storey building with a total GFA of 30,977 m^2 comprising of the following uses:
  - 28,615 m^2 of health-related employment generating uses;
  - 658m^2 lobby;
  - 241m^2 café;
  - 902 m^2 child care facility;
  - 561m^2 basement storage and miscellaneous.
- Construction of 2 basement levels with 115 car parking spaces and 1 car wash bay;
- Subdivision of the existing land parcel into the following additional allotments:

  Proposed Lot 41 (Area 8,049 m^2);

  Proposed Lot 42 (Area 64 m^2); and

  Proposed Lot 40 (Residue Lot comprising the RNS hospital precinct)
- Improved east-west connectivity of the 4A+4B precinct through an at grade pedestrian access way interconnecting Herbert Street (east) to Reserve street (west);
- Creation of an additional easement along the southern alignment of the site for unrestricted vehicular access; and
- Associated public domain and landscaping works.

Representative of the design is a central stair arrangement that allows the interconnection of floors. The stair will extend through all storeys from ground to level 9, however each connection will be limited to two storeys in fire mode.

List key occupant characteristics for the building:

Characteristic	Description
Familiarity	Office occupants are expected to be staff who are familiar with the layout of the building. Cafe occupants are expected to be primarily associated with the office use, familiar with the layout of the building and location of fire exits. A limited number of staff are also expected to be present who are familiar with the layout of the building Carpark occupants are mainly expected to be associated with the office and be within the carpark for short periods. Childcare centre occupants are mainly children who will require assistance from staff to evacuate the building. Staff will be present who are familiar with the layout of the building and trained in emergency situations.
Awareness	Occupants are expected to be awake and alert to a potential emergency event such as a fire in the building. Childcare centre staff will be present at all times who are alert and aware of their responsibility to assist children in the event of an evacuation, even though children may be asleep at the time of an incident.
Mobility	Occupants are assumed to have the same level of mobility as the general population. This may include a limited proportion of mobility impaired occupants. These occupants may require crutches, a wheelchair or similar to evacuate on their own or need assistance from other occupants. Children within the childcare centre will require assistance during evacuation. Safe havens will be incorporated into the design to assist with the evacuation of children. The design of the childcare centre is currently under design development and is to be subject to a separate BCA assessment and fire engineering assessment.
Age	The majority of the occupants within the office areas are between 15-65 years of age. The majority of occupants within the childcare centre are children between 0-5 years of age. Staff between the ages of 18-65 will be present at all times to facilitate evacuation.
Language	Although occupants may have English as their second language, they are expected to understand signs and verbal instructions in English enough to not adversely impact evacuation.
Occupant load	Population densities used in this assessment are based on table D1.13 of the BCA which specifies 1m^2/person for cafés, 10m^2/person for offices, 30m^2/person for carparking, storage and plant, and 4m^2/person for childcare.

5 Hazards

Outline any hazards unique to the building:

☐ Insulated sandwich panels
☐ Electrical hazards (substations/switchboards etc.)
☐ Other: (provide details)
☐ Dangerous / hazardous goods storage
☐ Alternative electrical generation (e.g. solar, tri-gen)

6 Preventative and protective measures

Identify fire safety measures that are, or will be, provided throughout the building, including anything undecided, which should be mentioned as part of the FEBQ review. Additional information may be added to the comments section below to better describe any systems or indicate systems that may be subject to alternative solution.

Occupant warning system

- ☐ Building occupant warning
- ☐ EWIS
- ☑ SSISEP
- ☐ Break glass unit
- ☐ Visual / tactile alarm devices

Signage

- ☑ Emergency lighting
- ☑ Exit and direction signs
- ☑ Warning and operational signs

Facilities for emergency services

- ☑ Emergency lifts
- ☑ Fire control centre
- ☐ Fire control room
- ☐ Perimeter vehicular access
- ☐ Standby power supply system

Smoke hazard management

- ☑ Zone smoke control
- ☐ Purge system (existing building)
- ☐ Smoke and heat vents
- ☐ Smoke exhaust
- ☐ Smoke baffles
- ☐ Ridge vents
- ☑ Stair pressurisation
- ☐ Impulse / jet fans (in carpark)
- ☐ Other: (provide details)

Hydrant system

- ☑ AS 2419.1-2005
- ☐ AS 2419.1-1994 (existing building)
- ☐ Ordinance 70 (existing building)
- ☑ External hydrants
- ☑ Internal hydrants
- ☐ Street hydrant coverage only
- ☑ Hydrant booster assembly
- ☑ Pumpset
- ☐ Other: (provide details)

Firefighting equipment

- ☑ Portable fire extinguishers
- ☑ Fire hose reels

Water supply

- ☑ Grade 1
- ☐ Grade 2
- ☐ Grade 3
- ☑ Onsite storage tank
- ☐ Dual supply

Detection system

- ☐ AS 3786-1993 / AS 3786:2014
- ☑ AS 1670.1:2015
- ☑ AS/NZS 1668.1:2015
- ☐ AS 1670.3-2004 (monitored)
- ☐ Smoke alarms
- ☐ Heat alarms
- ☑ Smoke detectors
- ☐ Heat detectors
- ☐ Flame detectors
- ☐ CO detectors
- ☐ Multi-criteria fire detectors
- ☐ Aspirated smoke detection
- ☐ Beam detection
- ☐ Other: (provide details)

Suppression system

- ☐ CA16 (existing building)
- ☑ AS 2118.1-1999
- ☐ AS 2118.1-2006
- ☐ AS 2118.2-2010 (wall-wetting)
- ☐ AS 2118.3-2010 (deluge)
- ☐ AS 2118.4-2012 (residential)
- ☐ AS 2118.5-2006 (domestic)
- ☐ AS 2118.6-2012 (combined)
- ☑ Fast response heads
- ☐ ESFR
- ☐ Storage mode sprinklers
- ☐ Gaseous suppression system
- ☐ Water mist system
- ☐ Other: (provide details)

Protection of openings

- ☑ Fire doors
- ☐ Smoke doors
- ☐ Solid core doors
- ☐ Fire windows
- ☐ Fire shutters
- ☑ Wall-wetting sprinklers
- ☑ Fire curtain
- ☐ Smoke curtain
- ☐ Safety curtain for openings
- ☑ Fire dampers
- ☐ Smoke dampers
- ☐ Fire seals (intumescent)
- ☐ Hot smoke seals (>200ºC)
- ☐ Medium temp. smoke seals

Additional information:

Automatic opening sliding doors at entry.

7 Departures from the Deemed-to-Satisfy provisions

Issue number: 1 **Title:** Internal non-required stairway

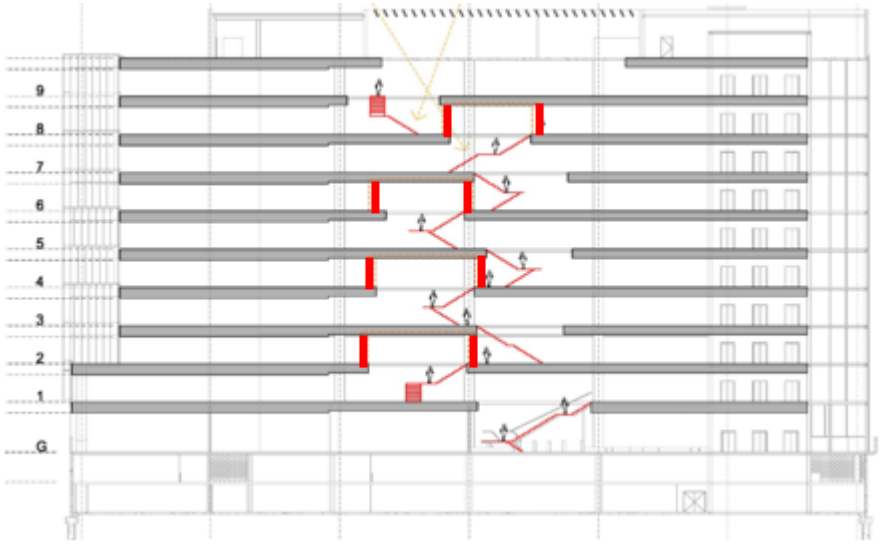
Details of departures from DtS provisions:

Clause D1.12(d) of the BCA states that, except where permitted in D1.2(b) or (c), a non-required non-fire-isolated stairway 'must not connect, directly or indirectly, more than 2 storeys at any level in a class 5, 6, 7, 8 or 9 building and those storeys must be consecutive.'

The proposed building design incorporate the connection of ground to level 9 with inter-tenancy stairs. The internal stairs result in the interconnection of multiple storeys in contravention with clause D1.12(d) of the BCA. Even though the building is sprinkler protected, the connections are not eligible for the exceptions under clause D1.12(b)(iv) of the BCA as the stairways do not comply with specification D1.12.

Fire separation of the voids are proposed to maintain two-level fire compartments throughout the building. The fire separation is to be provided via vertical fire curtains that achieve an FRL of -/120/-. This contravenes the requirements of clauses C1.1 and C2.7 of the BCA as they do not achieve the required FRL of -/120/120 for a fire wall.

The indicative void locations and proposed fire separations are detailed below:



Section through the building and indicative fire curtain locations

Applicable DtS provisions:	Clauses C1.1, C2.2, C2.7 and D1.12	Performance requirements:	CP2 and DP4

List key fire safety measures:

- Sprinkler system – AS 2118.1-1999
- Smoke detection and alarm system – AS 1670.1-2015
- Zone smoke control system – AS 1668.1:2015
- Fire curtains at levels 2, 4, 6 and 8

Proposed alternative solution:

The building is provided with a sprinkler system. The successful activation of the sprinklers should have the following benefits:

- A reduction in the rate of burning and quantity of smoke produced, subsequently increasing the available safe evacuation time.
- A reduced fire intensity and duration, which in turn reduces the severity of fire exposure to structural and fire separating elements.
- A reduction in the chances of a fire becoming large – ie spreading beyond the area / room of origin or flashover occurring.

Full scale tests have shown that standard sprinklers can be expected to maintain tenable conditions in relation to temperature and toxicity outside the room where the fire started.

Vertical fire curtains that achieve an FRL of -/120/- are also proposed at levels 2, 4, 6 and 8. The FRL criterion for insulation is intended to prevent the ignition of combustible items which may be in direct contact with the fire curtain. Objects in direct contact with the fire curtain can be heated via conduction through the curtain. The criteria in AS 1530.4-2005 for failure of the insulation component are intended to represent temperatures which could cause ignition of combustibles in contact with the fire rated element. The risk of fire spread via combustibles in direct contact with the fire curtain is considered to be low as the curtains will be located at the stair voids – the areas adjacent the curtains are the edges of voids and circulation space.

Performance solution:

- ☑ A0.3(a)(i) - Comply with the performance requirements
- ☐ A0.3(a)(ii) - Be at least equivalent to the DtS provisions

Assessment methods:

- ☐ A0.5(a) - Evidence of suitability
- ☐ A0.5(b)(i) - Verification methods in the NCC
- ☑ A0.5(b)(ii) - Other verification methods
- ☐ A0.5(c) - Expert judgement
- ☐ A0.5(d) - Comparison with the DtS provisions

Assessment approach:

☐ Comparative	☑ Qualitative	☐ Deterministic
☑ Absolute	☐ Quantitative	☐ Probabilistic

IFEG sub-systems used in the analysis:

☐ A – Fire initiation and development and control	☑ D – Fire detection, warning and suppression
☑ B – Smoke development and spread and control	☑ E – Occupant evacuation and control
☑ C – Fire spread and impact and control	☑ F – Fire services intervention

Acceptance criteria and factor of safety:

The acceptance criteria proposed for the assessment are to demonstrate:

- The performance based fire separation, incorporating -/120/- vertical fire curtains, adequately mitigates the risk of fire and smoke spread.
- The interconnection of storeys by inter-tenancy stairs is equivalent to a design complying with clause D1.12 of the BCA.

Fire scenarios and design fire parameters:

The design fire is not proposed to be quantified. A fire on one of the office levels will be considered.

Describe how fire brigade intervention will be addressed or considered:

Fire brigade intervention will be qualitatively discussed.

Verification/validation analyses:

☐ Sensitivity studies ☐ Redundancy studies ☐ Uncertainty studies ☑ None

The reliability of sprinklers and fire curtains will be discussed. Simultaneous failure of both fire curtains and sprinklers is unlikely to occur.

Provide details on proposed modelling/assessment tools:

NA

Issue number: 2 **Title:** Travel distance to an exit

Details of departures from DtS provisions:

The following maximum travel distances apply to the building:

a. 20m to a point of choice,

b. 50m to an exit on the basement levels

c. 50m to the closest of two or more alternative exits on ground floor to level 9

d. 50m to an exit on the roof top plant area

e. 60m between alternative exits

The proposed travel distance on typical office floors is set up as parameters to be met in the fitout.

Applicable DtS provisions:	Clause D1.4	Performance requirements:	DP4 and EP2.2

List key fire safety measures:

- Smoke detection and alarm system – AS 1670.1-2015
- Sprinkler system – AS 2118.1-1999
- Zone smoke control – AS 1668.1:2015
- Stair pressurisation – AS 1668.1:2015
- Strobes in conspicuous locations at plant level.

Proposed alternative solution:

Qualitative discussion on the benefit and impacts of sprinkler protection will be provided.

Analysis of the total evacuation time on the basis of the AS 1670.1-2015 smoke detection system for the proposed design. The assessment will calculate the differences between a DTS base case for total evacuation and compare it to the proposed design. The outcome is expected to be in favour of the proposed design despite the increase in travel distance.

Performance solution:

☐ A0.3(a)(i) - Comply with the performance requirements
☑ A0.3(a)(ii) - Be at least equivalent to the DtS provisions

Assessment methods:

☐ A0.5(a) - Evidence of suitability
☐ A0.5(b)(i) - Verification methods in the NCC
☐ A0.5(b)(ii) - Other verification methods
☐ A0.5(c) - Expert judgement
☑ A0.5(d) - Comparison with the DtS provisions

Assessment approach:

☑ Comparative ☐ Qualitative ☑ Deterministic
☐ Absolute ☑ Quantitative ☐ Probabilistic

IFEG sub-systems used in the analysis:

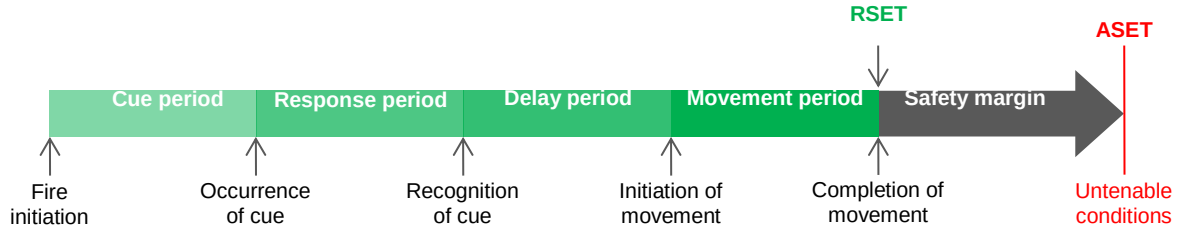
☐ A – Fire initiation and development and control
☐ B – Smoke development and spread and control
☑ C – Fire spread and impact and control
☑ D – Fire detection, warning and suppression
☑ E – Occupant evacuation and control
☐ F – Fire services intervention

Acceptance criteria and factor of safety:

The margin between the available safe evacuation time (ASET) and the required safe evacuation time (RSET) as shown in the figure below can be considered as a measure of the level of safety inherent in a particular design.

The acceptance criteria nominated for the assessment is that the ASET / RSET margin arising from the proposed design is at least equivalent to the corresponding margin arising from the base case.

The base case design is considered to provide a representative level of life safety required by the DTS provisions of the BCA.



ASET / RSET timeline

Fire scenarios and design fire parameters:

A survey conducted by the Building & Fire Research Laboratory[1] determined that there were four main fuel packages associated with commercial office buildings – reception area furnishings, office furnishings, workstations, and maintenance carts. The testing indicated that workstations result in the worst-case scenario out of these fuel packages. A number of workstation configurations were tested, including single panel, two-panel and three-panel. The testing showed that the growth rate was between a medium and fast t^2 fire, ignoring the incipient growth phase. This is supported by the following references:

- CIBSE Guide E[2] and British Standard BS 9999:2008[3] recommend a medium t^2 growth rate for office occupancies.
- NFPA 92B[4] provides t^2 growth rates for typical office fuel packages including work stations, shelf storage and office modules which range from slow to fast.
- Enclosure Fire Dynamics[5] recommends a fast t^2 fire growth rate for offices.

A fast t^2 fire growth rate is adopted for the assessment.

Describe how fire brigade intervention will be addressed or considered:

NA. Sub-system F is not applicable – the travel distance assessment relates to the evacuation of occupants despite the increase in distance to a fire isolated exit.

Verification/validation analyses:

☐ Sensitivity studies ☐ Redundancy studies ☐ Uncertainty studies ☑ None

The assessment is considered conservative based on the design fire chosen for assessment.

Provide details on proposed modelling/assessment tools:

Spreadsheet calculation for smoke detection based on Alpert's correlation. Calculation of occupant evacuation times will be based on the walking speeds and flow rates as per the SFPE Handbook.

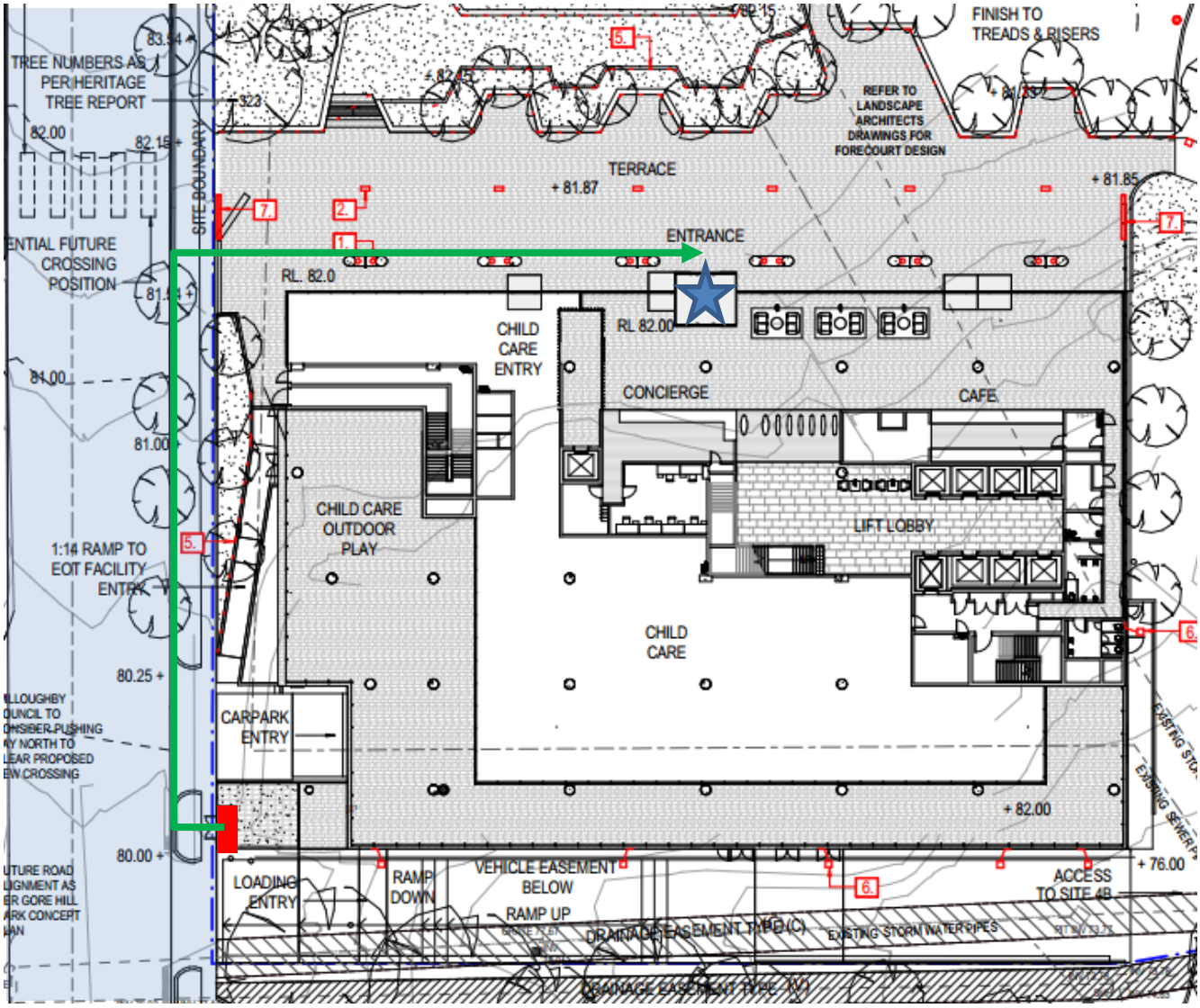
[1] Madrzykowski D, 1996, Office work station heat release rate study: Full scale vs bench scale, Conference Proceedings of the Seventh International Fire Science and Engineering Conference, Interflam '96, Interscience Communications Limited, London, England, pp 47-55.
[2] CIBSE Guide E: Fire Engineering, 2010, 3rd edition, The Chartered Institution of Building Services Engineers London.
[3] BS 9999:2008 Code of practice for fire safety in the design, management and use of buildings.: BSI British Standards 2008.
[4] NFPA 92B. Smoke management in malls, atria and large areas: National Fire Protection Association 2009, Table B.5.3(h).
[5] Karlsson B, Quintiere JG. 2000, Enclosure fire dynamics: CRC Press LLC.

Issue number: 3 **Title:** Hydrant booster assembly

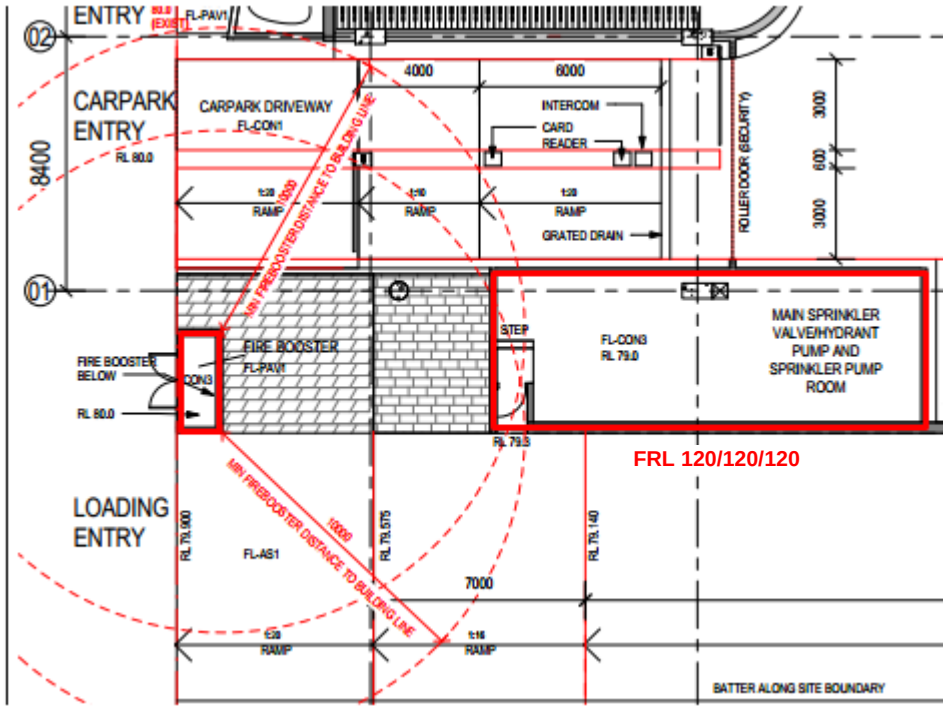
Details of departures from DtS provisions:

The hydrant booster assembly is proposed at the building line adjacent to the carpark entry and the adjacent kerb side. This means that the booster will not be within sight of the main entrance in accordance with clause 7.3 of AS 2419.1-2005 because the main entry is accessed from the grounds of the site with no street access directly adjacent to the main entrance. Refer illustration below.

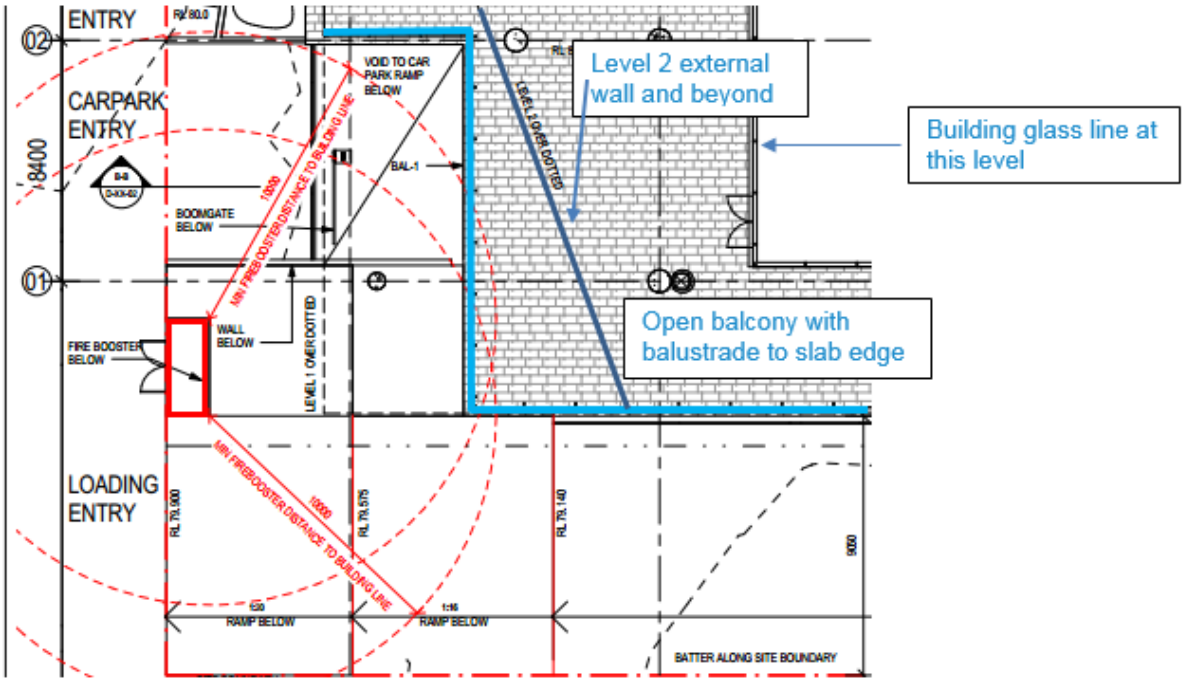
The second issue is that the booster is within 10m of the building and shielding wall protection in accordance with clause 7.3 of AS 2419.1-2005 is not proposed. Despite this, any exposure is to the fire separated hydrant pump room and sprinkler valve enclosure at street level and at the level directly above to the slab edge with the glass line of the building set back further than 10m beyond. See illustrations below.



Site plan – ground floor booster location and main entry



Kerb side arrival hardstand position



Booster and external wall of the level above

Applicable DtS provisions:	Clause E1.3 and clause 7.3 of AS 2419.1-2005	Performance requirements:	EP1.3

List key fire safety measures:

- Fire separated hydrant pump room and sprinkler valve enclosure.
- No other unprotected openings in external walls within 10m of the booster arrangement
- Block plans at the booster and the main entry
- Strobes at the booster and main entry
- Sprinkler protected building.

Proposed alternative solution:

The hydrant booster assembly is not proposed at the main entry of the site due to the inability of fire fighters to pull up in the appliance and set up from kerb side. The provision of a booster arrangement at the main entry would also mean that it would be more than 8m from the hardstand resulting in a separate compliance issue.

The booster is adjacent the main carpark entry, within sight of the staff end-of-trip entry and within 10m of the hydrant pump set and sprinkler valves. This provides a greater benefit to fire fighters at the appliance because of the ability to control set up and water demands to the building from a single location.

The main FIP will be available at the main entry. Fire fighters will have a plan at the booster indicating to them the means of wayfinding to the main entry and the FIP. The main entry will also be provided with a red strobe – as will the booster – to assist with negotiating towards the main entry, possibly after hours and at night.

The visual indicators will assist with intervention until such time as the fire's location is determined at the FIP and brigades make their way into the building. At this time, radio communication is likely.

Performance solution:

- ☑ A0.3(a)(i) - Comply with the performance requirements
- ☐ A0.3(a)(ii) - Be at least equivalent to the DtS provisions

Assessment methods:

- ☐ A0.5(a) - Evidence of suitability
- ☐ A0.5(b)(i) - Verification methods in the NCC
- ☑ A0.5(b)(ii) - Other verification methods
- ☐ A0.5(c) - Expert judgement
- ☐ A0.5(d) - Comparison with the DtS provisions

Assessment approach:

☐ Comparative	☑ Qualitative	☐ Deterministic
☑ Absolute	☐ Quantitative	☐ Probabilistic

IFEG sub-systems used in the analysis:

☐ A – Fire initiation and development and control	☐ D – Fire detection, warning and suppression
☐ B – Smoke development and spread and control	☐ E – Occupant evacuation and control
☐ C – Fire spread and impact and control	☑ F – Fire services intervention

Acceptance criteria and factor of safety:

The acceptance criteria for the assessment is that the design facilitates safe fire fighter intervention and operations. The design is capable of ensuring brigades are protected at the booster and can find their way to the main entry of the building.

Fire scenarios and design fire parameters:

NA for this assessment

Describe how fire brigade intervention will be addressed or considered:

The assessment considers fire fighter arrivals and wayfinding for brigade intervention and operations

Verification/validation analyses:

☐ Sensitivity studies ☐ Redundancy studies ☐ Uncertainty studies ☐ None

NA. The assessment considers the location of the booster arrangement and main entry to facilitate fire fighting.

Provide details on proposed modelling/assessment tools:

NA

8 Construction, commissioning, management, use and maintenance

What considerations does the alternative solution require during the construction phase?

Compliance with clause E1.9 of the BCA.

How will the alternative solution affect commissioning of the systems (e.g. listed on fire safety schedule as essential or critical measure, combined new and old installations)?

The building work and fire safety measures relating to the performance solution report must be inspected by an appropriately qualified fire safety engineer prior to occupation to confirm that the holistic performance is consistent with these requirements. Detailed inspections and commissioning tests for the building fire safety systems will need to be undertaken separately by the relevant consultants and/or installers.

The table below sets out what will be required as a minimum to confirm that the building is consistent with the recommendations of the performance solution report.

Fire safety measures	Certification from relevant consultant / installer	Visual spot checks by fire safety engineer / interview installer	Holistic witness testing by fire safety engineer
Fire rating of structural elements	✓	✓	
Fire and/or smoke doors	✓	✓	
Fire curtains	✓	✓	✓
Exits and paths of travel		✓	
Emergency lighting and exit signage	✓	✓	
Portable fire extinguishers	✓	✓	
Smoke detection system	✓	✓	✓
Sound system and intercommunication system for emergency purposes	✓		✓
Sprinkler system	✓	✓	✓
Wall-wetting sprinkler system	✓	✓	
Fire hydrant system	✓	✓	✓
Fire hose reel system	✓	✓	
Stair pressurisation	✓		✓
Zone smoke control	✓		✓

Notes:

- Operation of smoke detectors will need to be simulated using smoke aerosol spray.
- Operation of sprinkler system will need to be demonstrated by opening test valve.
- Operation of smoke control / occupant warning systems will need to be witnessed following activation of smoke detection / sprinkler system.
- Operation of automatic fail safe devices / automatic fire curtains to be confirmed following activation of smoke detection / sprinkler system.
- Hydrant valve to be opened to confirm that the system is charged.

How will the alternative solution be addressed for ongoing building management and use (e.g. details to be provided in a 'fire safety management plan' for the building manager)?

An evacuation management plan is proposed. Fire safety management is not proposed at this time.

How will any restrictions on fuel load/use/populations within the alternative solution be managed and enforced (e.g. details to be provided in 'emergency management plan')?

No restrictions on fuel load/use/populations are proposed as part of the performance solutions.

How will the alternative solution be addressed for maintenance (e.g. details included on fire safety schedule, location of fire engineering report on site, plain English summary adjacent to FIP)?

The performance solution and associated fire safety measures must be implemented into the design and 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.

We recommend periodic inspection, testing and maintenance of all fire safety measures be undertaken in accordance with the AS 1851-2012 series of standards.

9 Additional comments

Nil

Note: Any in principle support extended for alternative solution issues through consultation is contingent upon all assumptions, analyses and conclusions in the fire engineering report being fully justified, and referenced as appropriate, to demonstrate how the relevant performance requirements have been satisfied to the extent required by the agreed acceptance criteria.

10 Scheduled charges

FRNSW charge for the provision of services performed in connection with statutory fire safety as per the schedule of charges identified in clause 46 and schedule 3 of the *Fire Brigades Regulation 2014*.

The charge applicable is $2,600 for each day (or part of a day) spent by the Commissioner or a fire brigade member providing advisory, assessment or consultancy services.

Note: For a full description of the charges applicable including terms, payment options, applying for a waiver or reduction of the charges, please refer to the FRNSW website at firesafety.fire.nsw.gov.au.

11 Contact us

For further information contact the Fire Safety Branch on (02) 9742 7434 or email firesafety@fire.nsw.gov.au.