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
00	Daniel Ho	i-Fire Engineers Pty Ltd	Draft issue for comments	28/01/2022
01	Daniel Ho	i-Fire Engineers Pty Ltd	Re-issue to design team	25/02/2022
02	Daniel Ho	i-Fire Engineers Pty Ltd	Re-issue to design team	23/03/2022

2 Applicant

2.1 Agreement

As the applicant, I confirm the following:

- I agree to pay Fire and 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 performance 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 fire engineer	Daniel Ho	BDC number	2348
Company name	i-Fire Engineers Pty Ltd		
Fire engineer's phone no.	0451 001 328		
Fire engineer's email	daniel.ho@i-fire.com.au		

2.2 Remittance advice information (TBA)

Invoices will be issued based on the information provided below:

ASIC company name	Parramatta National Rugby League Club Pty Limited		
Australian business number	66 092 536 519	Trading name	Parramatta Eels
Remittance contact name	Laura Davidson		
Remittance street address	Corner Kennedy Avenue & Stone Mason Drive, Kellyville 2155		
Remittance email address	Laura.Davidson@parraeels.com.au		
Remittance phone number	0417 295 913	Remittance fax number	N/A
Purchase order ref. no.	If applicable	Project code ref. no.	If applicable
Project leader contact name	Chris Brown (Waypoint)		

Project leader contact email	Chris.brown@waypointgrp.com.au

3 Consultation

3.1 Stakeholders

Role	Name and BPB number	Organisation and phone	Email address
BCA consultant	Athish Dulichan	Philip Chun	athish.dulichan@philipchun.com
Certifier	Mark Maxwell BDC3396	Philip Chun BC NSW	mark.maxwell@philipchun.com
Fire Engineer	Daniel Ho BDC2348	i-Fire Engineers	daniel.ho@i-fire.com.au
FRNSW reviewers	FRNSW use only FRNSW use only	Fire and 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 at its discretion hold a meeting with the applicant to discuss aspects of the proposed performance solution.

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

4 Project details

4.1 Premises

Premises name	Premises name (if applicable)
Primary street address	Kellyville Park Centre, Parramatta Eels
Secondary street address	Secondary street address (if applicable)
Premises suburb	Kellyville NSW 2155
Lot and DP numbers	**E.g. Lots A and B of DP 12345, Lot 10 of DP 111213**

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: NCC2019 Amdt 1

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

How many performance solution issues are proposed in this FEBQ? 2

Note: The number of performance 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 certifier determining the application for construction certificate, may affect FRNSW advice in respect to this performance solution.

Identify if any previous performance solution applies to the building:

N.A.

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

None

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 issuing of any DA conditions of consent, or conditions of an existing consent have been modified (i.e section 4.55 of *Environmental Planning and Assessment Act 1979*). 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.

None submitted that we are aware of.

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

COE (Eels Centre of Excellence – admin and training building)

Main occupancy class	9b	Largest fire compartment (within the building)	Area (m^2)	3,440m^2
Other occupancy classes	Lower Ground Level - Class 5, 6, 9b Ground Level - 5, 9b		Volume (m^3)	15,243m^3 (measured underside of roofing)
Type of construction	B		Height (m)	10.5m (from lower ground F.L to highest point of roof)
Effective height (m)	4	Ground floor area (m^2)		1,934m^2 (excl. balcony)
Rise in storeys	2	Total floor area (m^2)		4,808m^2 (excl. balcony)
Levels contained	2	Total volume (m^3)		23,672m^3 (measured underside of roofing)

CF (Community Facilities – game day pavilion for players and spectators)

Main occupancy class	9b	Largest fire compartment (within the building)	Area (m^2)	1,692m^2
Other occupancy classes	Lower Ground Level - Class 7b, 9b Ground Level - Class 6, 9b		Volume (m^3)	7,967m^3 (measured underside of roofing)
Type of construction	B		Height (m)	4.7m (from lower ground F.L to highest point of roof)
Effective height (m)	5	Ground floor area (m^2)		788m^2 (excl. external concourse & grandstand)
Rise in storeys	2	Total floor area (m^2)		1,849m^2 (excl. external concourse & grandstand)
Levels contained	2	Total volume (m^3)		8,845m^3 (measured underside of roofing)

Outline any additional building characteristics:

The proposed site is to be located off Memorial Ave, Kellyville. Refer to Figure 1 for the location of the proposed site.

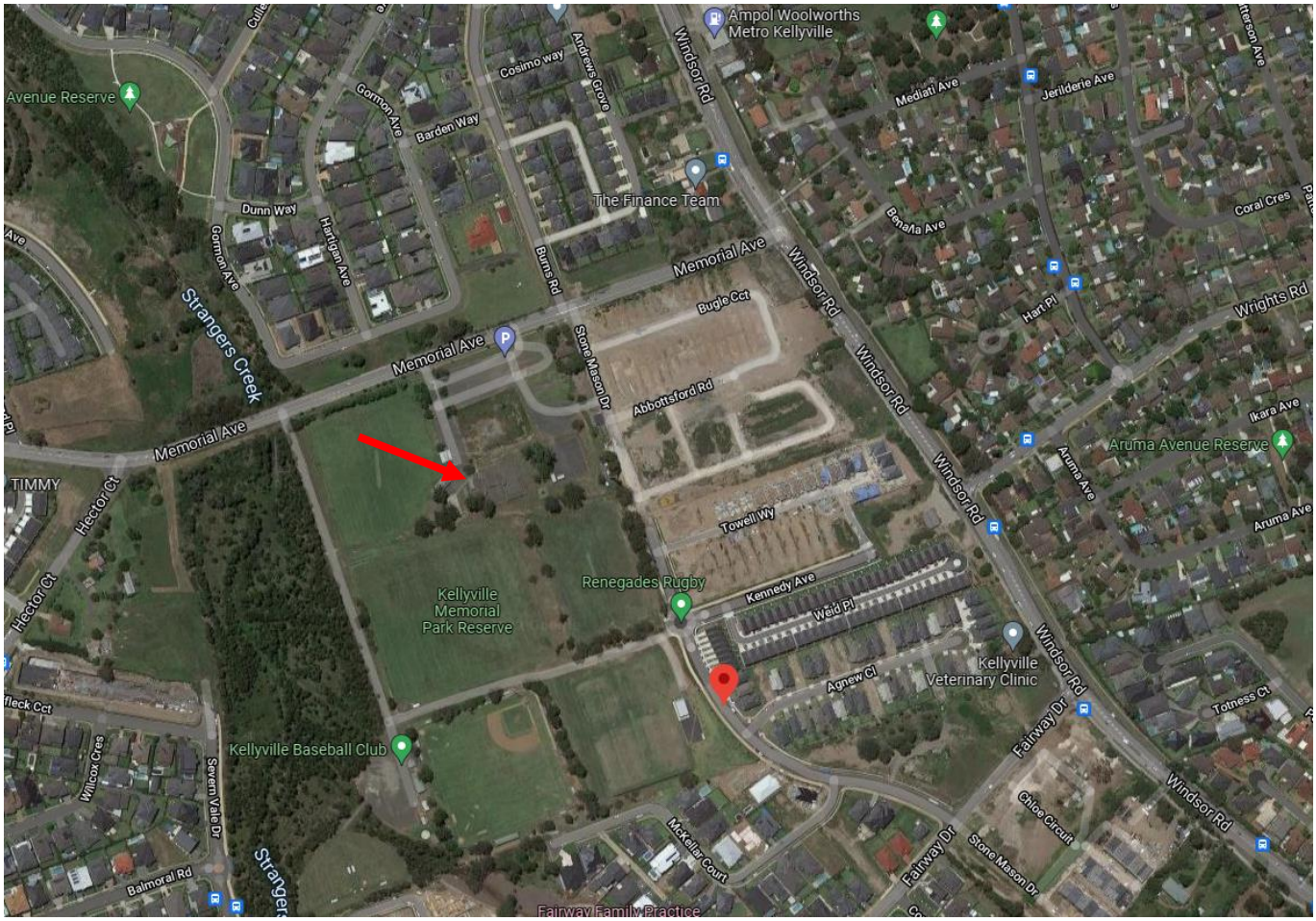

Figure 1: Location of the proposed site

The proposed stie will feature two buildings: Building A: CF (Community Facilities) and Building B: COE (Eels Centre of Excellence), four training fields, and an existing open-air carpark. Refer to Figure 2.

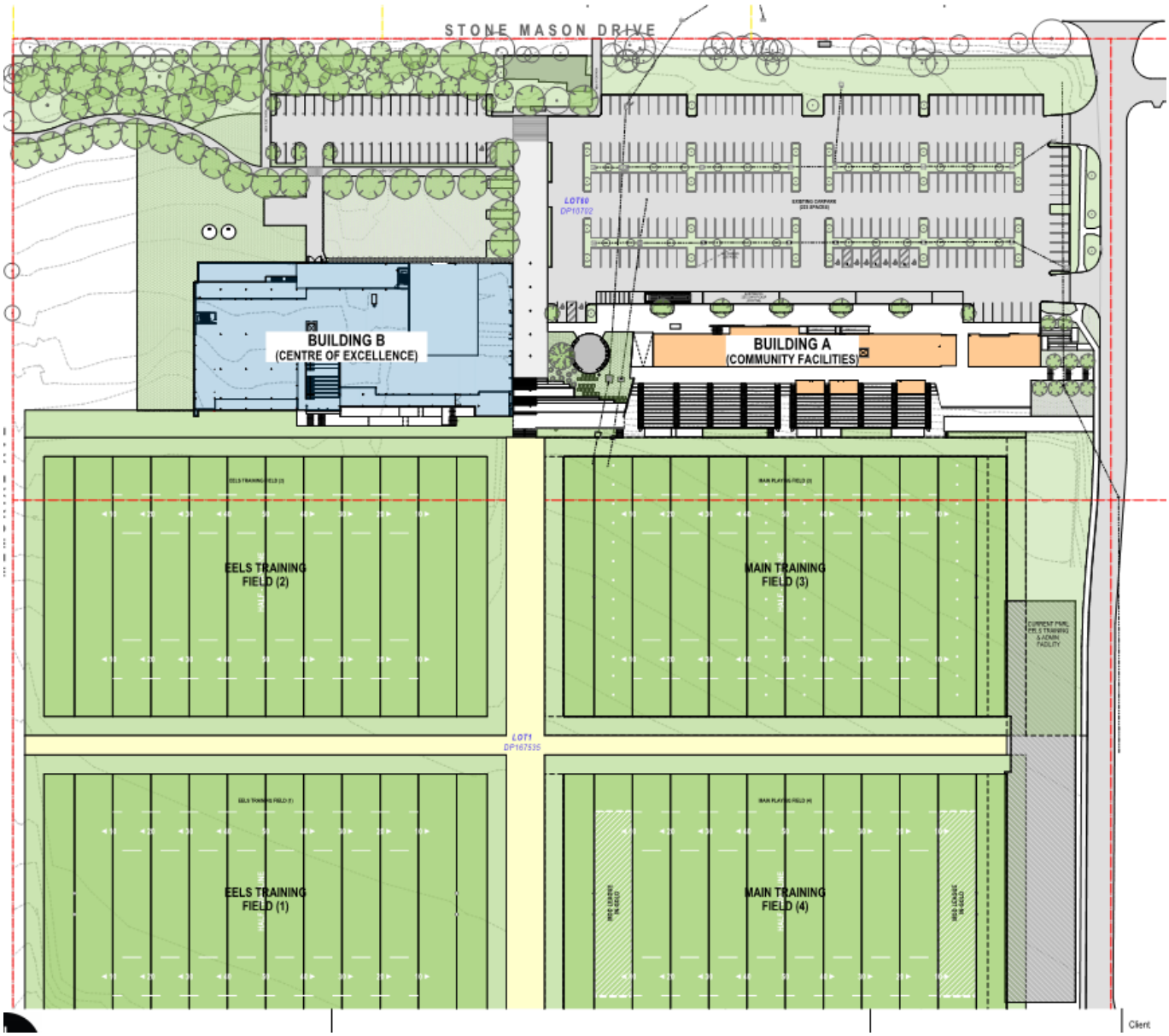

Figure 2: Layout of the proposed site

With the exception of the areas subject to Performance Solutions, BCA DtS compliant egress provisions are to be provided within the proposed building.

The building use is not expected to increase the fire risk or fire load when compared to a BCA DtS compliant building with similar designs.

List key occupant characteristics for the building:

Refer to Table 1 for the key occupant characteristics:

Table 1: Key occupant characteristics

Occupant type	Comment
Staff	Population numbers, occupant density and distribution BCA Table D1.13 occupant density applies. The population numbers and distribution shall be in compliance with the BCA DtS provisions. Occupant alertness and responsiveness Staff are alert, awake and expected to respond to fire alarm and evacuation signals from the building occupant warning system for evacuation. Occupant familiarity

Occupant type	Comment
	Staff are expected to be familiar with their workplace, building layout and exit locations. Mobility and level of assistance required Staff are expected to be able to carry out unassisted evacuation. Emergency training Staff are expected to assist the general public and visitors during an evacuation.
General public and visitors	Population numbers, occupant density and distribution BCA Table D1.13 occupant density applies. The population numbers and distribution shall be in compliance with the BCA DtS provisions and the DA consent. Occupant alertness and responsiveness General public and visitors are alert, awake and expected to respond to fire alarm and evacuation signals from the building occupant warning system for evacuation. Occupant familiarity General public and visitors may not be familiar with the building layout and exit locations. It is expected that they are able to navigate to exits due to the relatively simple building layout. Mobility and level of assistance required Most of the general public and visitors are expected to be able to carry out unassisted evacuation. Occupants with disabilities are expected to be able to carry out self-assisted evacuation or be assisted by staff and other occupants during an evacuation. Emergency training General public and visitors are not expected to be trained for emergencies.
Authorised personnel	Occupant alertness and responsiveness Authorised personnel (maintenance people and contractors etc.) are alert, awake and expected to respond to fire alarm, occupant warning system and evacuation signals. Occupant familiarity Authorised personnel may not be familiar with the building layout and exit locations. It is expected that the authorised personnel are able to navigate to exits due to the relatively simple building layout or exit by the same route as they came in the building. Mobility and level of assistance required Authorised personnel are expected to be unassisted. Emergency training Management procedures shall be undertaken to induct authorised personnel for emergency procedures and exit location etc. via an induction program or provide supervision whilst on site. It is advised that the chief/senior on duty is responsible for fire evacuation of patients and staff, knowing all the exits.

5 Hazards

Outline any hazards unique to the building:

- ☐ Combustible external cladding
- ☐ Combustible waste (i.e., waste facility)
- ☐ Hazardous chemicals / dangerous goods
- ☑ Electricity supply system (e.g., substations)
- ☐ Battery system (e.g., BSS, BESS, ESS)
- ☑ Alternative electrical generation (e.g., solar, tri-gen)
- ☐ Insulated sandwich panels
- ☐ Podium type building
- ☐ A basement level
- ☐ An atrium (Part G3 of BCA)
- ☐ Car stacker
- ☐ Other: (provide details)

Note: Clauses E1.10 and E2.3 of the NCC should be addressed when special hazards exist (e.g. car stacker, hazardous chemicals/dangerous goods).

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 a performance solution.

Suppression system

- ☐ CA16 (existing building)
- ☐ AS 2118.1-2017
- ☐ AS 2118.1-2006
- ☐ AS 2118.1-1999 (existing building)
- ☐ 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)
- ☐ FPAA101D (class 2 or 3)
- ☐ FPAA101H (class 2 or 3)
- ☐ Fast response heads
- ☐ ESFR
- ☐ Storage mode sprinklers
- ☐ Gaseous suppression system
- ☐ Water mist system

Hydrant system

- ☐ AS 2419.1-2017
- ☑ AS 2419.1-2005
- ☐ AS 2419.1-1994 (existing building)
- ☐ Ordinance 70 (existing building)
- ☑ External hydrants
- ☐ Internal hydrants
- ☐ Internal dry-riser (for Class 2/3)
- ☐ Street hydrant coverage only
- ☑ Hydrant booster assembly
- ☐ Pumpset

Firefighting equipment

- ☑ Portable fire extinguishers
- ☑ Fire hose reels

Detection system

- ☐ AS 3786:2014
- ☐ AS 3786-1993 (existing building)
- ☑ AS 1670.1:2018
- ☐ AS 1670.1:1995 (existing building)
- ☐ AS 1668.1:2015
- ☐ AS 1670.3-2018 (monitored)
- ☐ AS 1670.3-2004 (existing building)
- ☐ Smoke alarms
- ☐ Heat alarms
- ☑ Smoke detectors
- ☑ Heat detectors
- ☐ Flame detectors
- ☐ CO detectors
- ☐ Multi-criteria fire detectors
- ☐ Aspirated smoke detection
- ☐ Beam detection

Water supply

- ☐ Reticulated town main
- ☐ Private water main
- ☐ Onsite storage tank
- ☐ Gravity tank/reservoir
- ☐ Dual supply

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)

Facilities for emergency services

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

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

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 shutdown of the air-handling system

7 Departures from the Deemed-to-Satisfy provisions

Issue number: 1 **Title:** Rationalisation of the FRLs in the Ground Floor in COE building

Details of departures from DtS provisions:

To permit reduced FRL to the retail tenancies at the Ground Level of the COE building and at the Ground Level of the CF building from 180 minutes to 120 minutes.

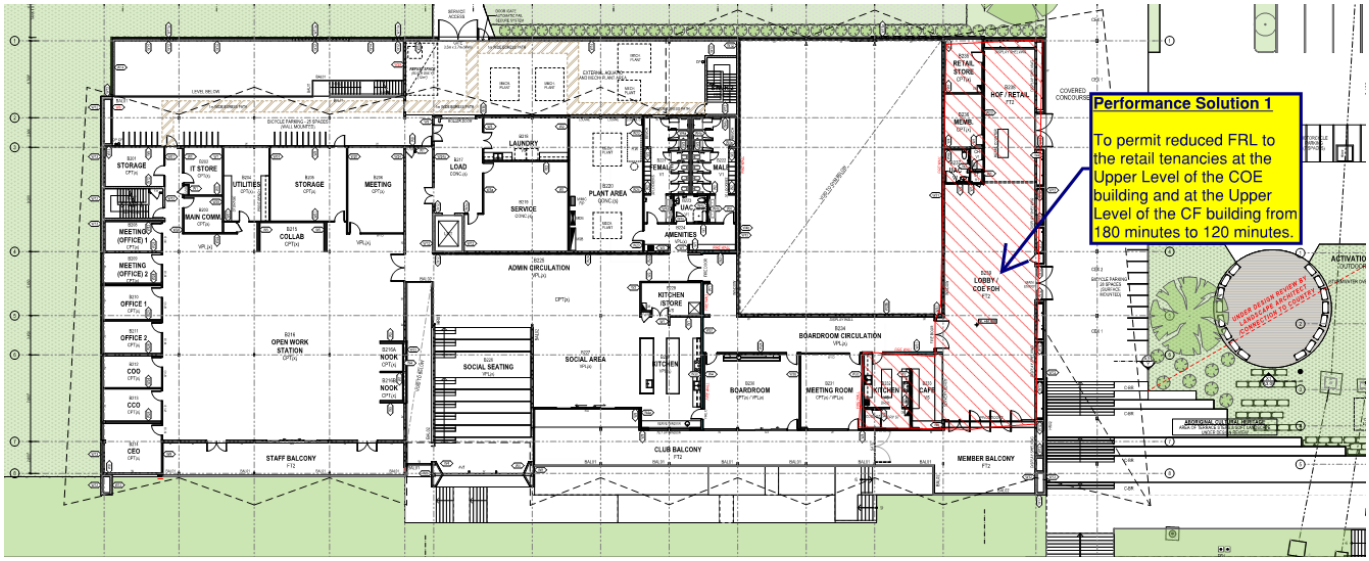

Figure 3: Performance Solution 1 at COE Ground Level.

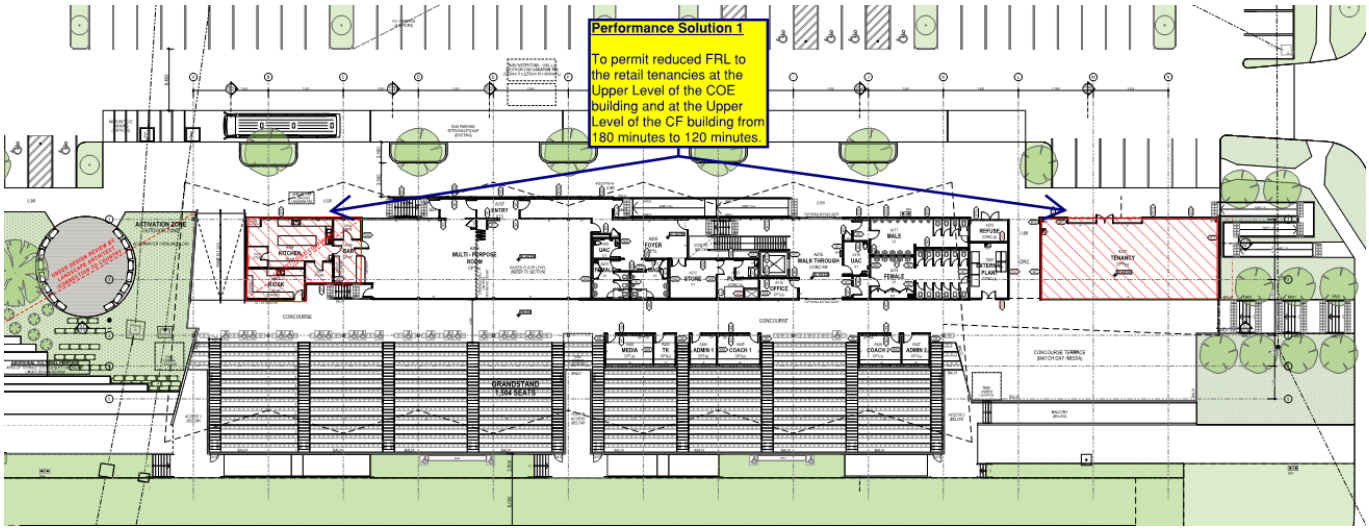

Figure 4: Performance Solution 1 at CF Ground Level.

In accordance with BCA Specification C1.1, FRL 180 minutes of construction is required for Class 6 building elements in a building of Type A construction.

Applicable DtS provisions:	C1.1	Performance requirements:	CP1, CP2

List key fire safety measures:

- External glazed construction to most of the subject tenancies. The glazing is expected to break and allow the fire to be ventilated to reduce the intensity of the fire.

- A relatively small area for the retail tenancy. The floor area of the retail tenancies is about 11% (approx.) of the total floor area of the upper level. This represents only about 1% increment above the BCA DtS permitted ratio (10%) , under A6.0, for which fire separation between the classification is not required.

Proposed alternative solution:

The Performance Solution permits reduced FRL to the retail tenancies at the Ground Level of the COE building and at the Ground Level of the CF building from 180 minutes to 120 minutes.

Performance solution:

☑ A2.2(1)(a) - Comply with all relevant performance requirements
☐ A2.2(1)(b) - Be at least equivalent to the DtS provisions

Assessment methods:

☐ A2.2(2)(a) - Evidence of suitability
☐ A2.2(2)(b)(i) - Verification methods provided in the NCC
☑ A2.2(2)(b)(ii) - Other verification methods accepted by the appropriate authority
☐ A2.2(2)(c) - Expert judgement
☐ A2.2(2)(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 Performance Solution is acceptable if the assessment can demonstrate that the fire severity (time equivalent) estimated from the three different time equivalent formulae is less than the proposed FRL rating (120 minutes).

Fire scenarios and design fire parameters:

A fire within the retail tenancies.

With reference to the International Fire Engineering Guidelines (ABCB, 2005) , the average fire load densities (ef) for Class 6 areas is 600MJ/m2. For conservatism, fuel load densities using 90th percentile are considered for the base case scenario.

It is considered that the building may contain diverse materials, therefore the average value of calorific value of fuel (ΔHc) from the following typical materials are adopted in this assessment.

Table 2: Calorific value of fuel (ΔHc)

Material	Calorific value of fuel (ΔHc)
Polyurethane Foam	31.6 MJ/kg
Wood	21.8 MJ/kg
Polystyrene Foam	42.9 MJ/kg
Leather	19.8 MJ/kg
Alcohol	31.8 MJ/kg

Material	Calorific value of fuel (ΔHc)
Average	29.6 MJ/kg

Describe how fire brigade intervention will be addressed or considered:

Calculations will show that the subject structures are unlikely to collapse before the fire brigade arrives and take control.

Verification/validation analyses:

☐ Sensitivity studies ☐ Redundancy studies ☑ Uncertainty studies ☐ None

The assessment will consider three formulas to calculate the fire severity.

Provide details on proposed modelling/assessment tools:

The Law Formula, Eurocode Formula, and CIB Formula are used to analyse the equivalent fire severity for the areas subject to Performance Solution. The Performance Solution is acceptable if the assessment can demonstrate that the fire severity (time equivalent) estimated from the three different time equivalent formulae is less than the proposed FRL rating (120 minutes).

Issue number: 2 **Title:** Glazed construction between different classifications in COE building

Details of departures from DtS provisions:

To permit the use of wall wetting sprinklers on the glazed constructions as part of the fire wall between different fire compartments at the Lower Ground Level and the Ground Level of the COE building.

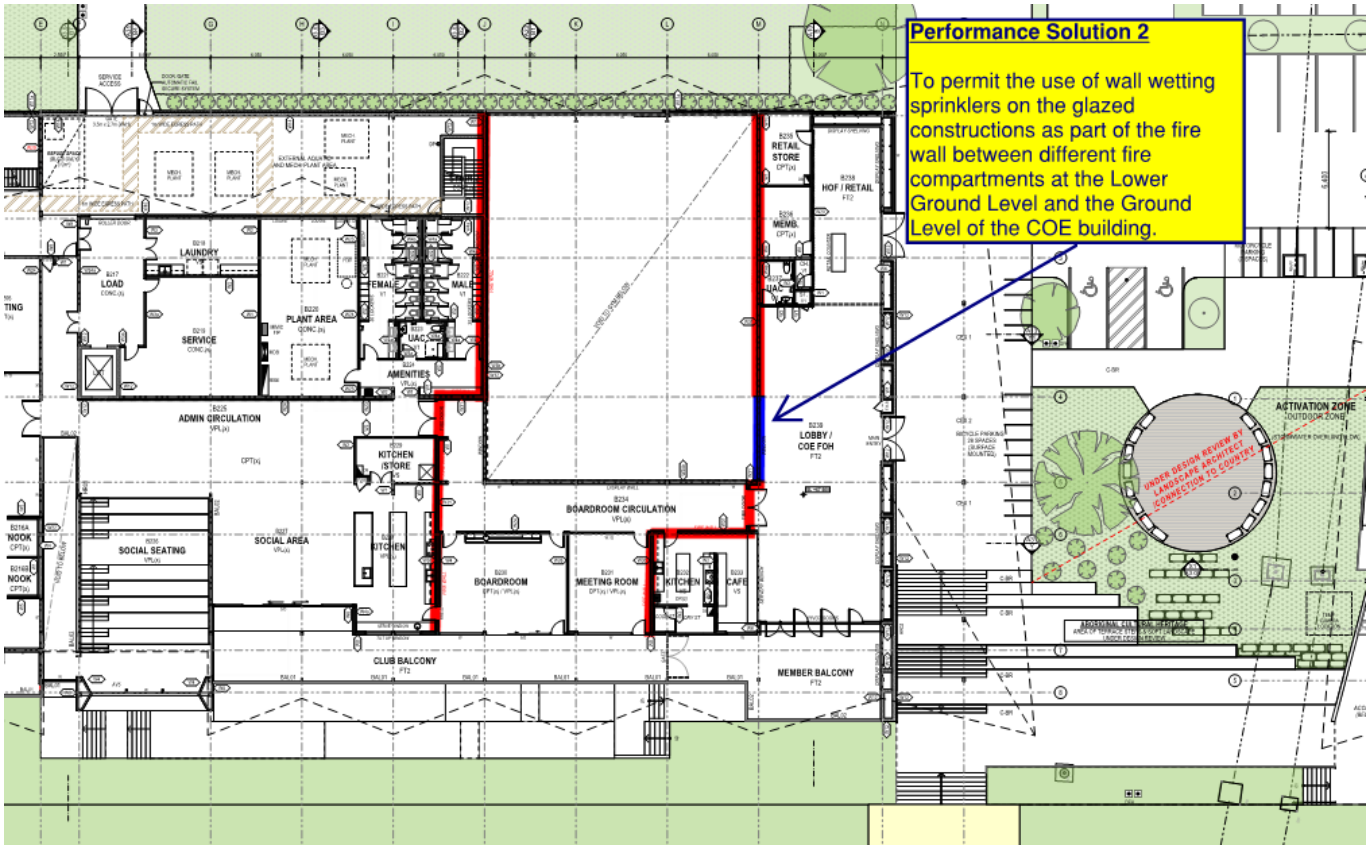

Figure 5: Performance Solution 2 at COE Ground Level.

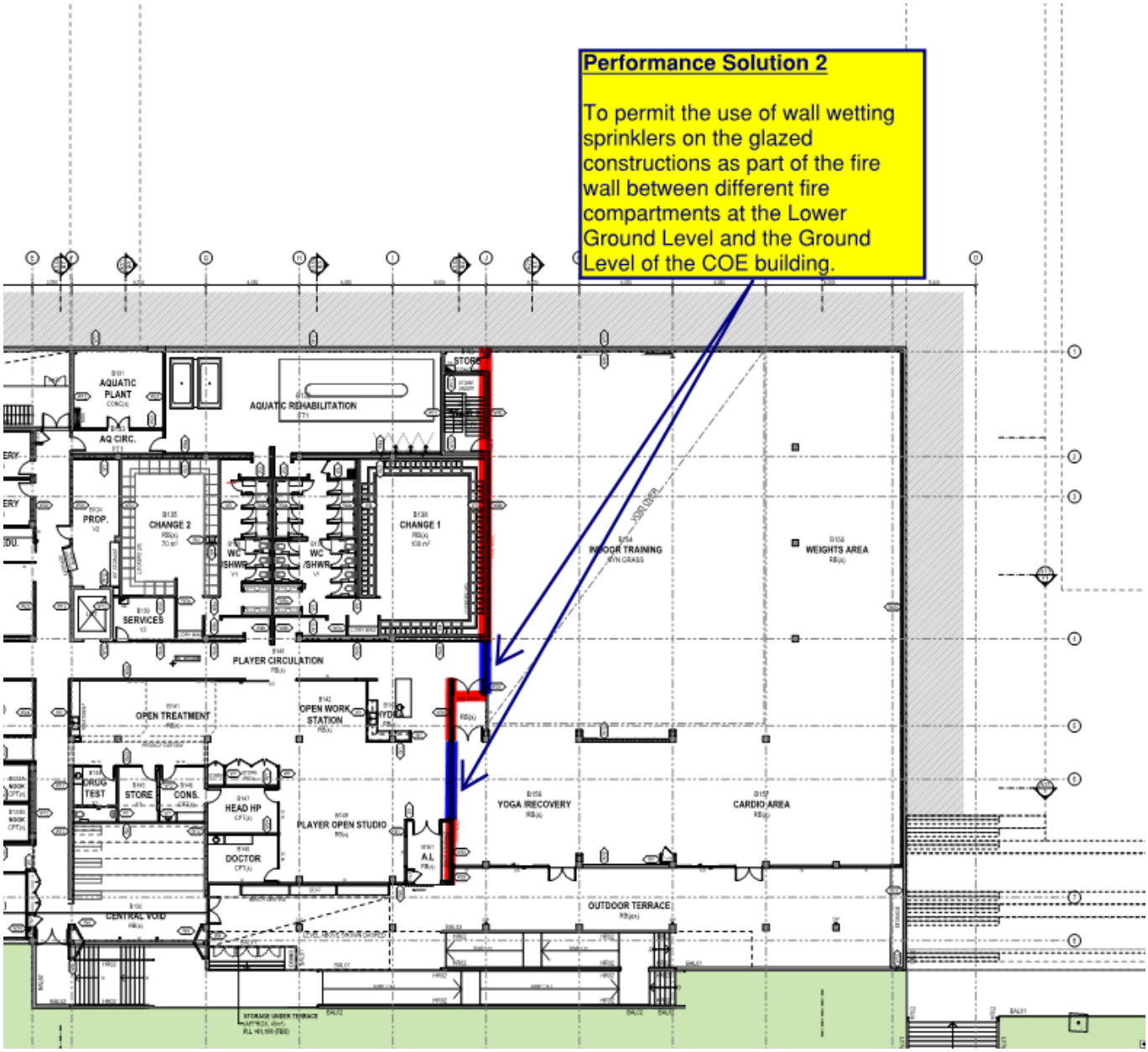

Figure 6: Performance Solution 2 at COE Lower Ground Level.

In accordance with BCA Clause 2.8(b), if a building has parts of different classifications located alongside one another in the same storey, the parts must be separated in that storey by a firewall.

According to Schedule 5 of the BCA, glazing is not an accepted construction element for firewalls.

Applicable DtS provisions:	C2.8	Performance requirements:	CP1, CP2

List key fire safety measures:

- Wall wetting sprinklers on both sides of the glazing.
- Low fuel load on both sides of the glazing (in the lobby, the corridor, and the main entry of the gym).

Proposed alternative solution:

The Performance Solution permits the use of wall wetting sprinklers on the glazed constructions as part of the firewall between different fire compartments at the Lower and Upper Levels of the COE building.

The wall wetting sprinkler system shall be a Tyco WS system, a toughened glass separation with drenchers on both sides.

Performance solution:

☐ A2.2(1)(a) - Comply with all relevant performance requirements
☑ A2.2(1)(b) - Be at least equivalent to the DtS provisions

Assessment methods:

☐ A2.2(2)(a) - Evidence of suitability
☐ A2.2(2)(b)(i) - Verification methods provided in the NCC
☐ A2.2(2)(b)(ii) - Other verification methods accepted by the appropriate authority
☐ A2.2(2)(c) - Expert judgement
☑ A2.2(2)(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 Performance Solution is acceptable if the assessment can demonstrate that fire spread through the subject glazing system is DtS equivalent.

Fire scenarios and design fire parameters:

The Performance Solution will qualitatively assess a fire on both sides of the glazing wall.

Describe how fire brigade intervention will be addressed or considered:

Limiting the fire spread through the subject glazing wall will enhance the Fire Brigade Intervention.

Verification/validation analyses:

☐ Sensitivity studies ☑ Redundancy studies ☐ Uncertainty studies ☐ None

Sprinkler heads will be provided on both sides of the glazing system.

Provide details on proposed modelling/assessment tools:

The proposed Tyco WS system has been tested and approved to have a 120 minutes fire-resistance rating to the U.S ASTM E119 fire test standard. As the BCA requires the determination of FRL through AS1530.4-2014, the equivalence of both tests will be assessed.

The assessment will assess the fuel load on both sides of the glazing walls to make sure that fuel load is limited and therefore the glazing system is unlikely to be cracked before the activation of the wall-wetting sprinkler heads.

The locations of the subject glazed construction are as follow:

- In the COE Ground Level: a void and a lobby.
- In the COE Lower Ground Level: a corridor and the main entry of the gym.

8 Construction, commissioning, management, use and maintenance

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

Furthermore, not less than one fire extinguisher to suite Class A, B and C fires and electrical fires must be provided at all times on each storey adjacent to each required exit or temporary stairway or exit.

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

The Performance Solution will not affect the commissioning of the systems (DtS equivalent).

How will the performance 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)?

No specific management and use procedures are proposed as part of the performance solutions.

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

No restrictions are placed by the performance solution on fuel load, use or populations within the building.

How will the performance 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 fire safety schedule and the fire safety statement of the building shall refer to the fire engineering report.

The fire engineering report and the requirements that will be listed must be maintained and certified in accordance with the Environmental Planning and Assessment Regulations 2000 and relevant Australian standards.

It is noted that the maintenance requirements of AS 1851 and AS/NZS 2293.2 are not mandatory however the legislation does mandate that fire safety measures must be maintained.

9 Additional comments

None

Note: Any in principle support extended for performance 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 Submission of this form

This completed form is to be emailed to firesafety@fire.nsw.gov.au.

All plans and specifications required by FRNSW for assessment are to be attached to the email (or sent separately if necessary due to file size). Refer to Submitting plans and specifications to FRNSW for further information.

12 Contact us

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