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CONSULTANT'S ADVICE				Fire Engineering
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Subject: Section 75W submission fire engineering trial concept design				

1 INTRODUCTION

Exova Warringtonfire Aus Pty Ltd has prepared a fire safety engineering trial concept design for the revised section 75W submission of the proposed development, which comprises a new private hospital for AA Crown Holdings Pty Ltd, at Crown St, Wollongong, NSW. As such, this document describes the preliminary trial concept design, which details the fire safety engineering strategy that can be developed in relation to the proposed hospital.

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

- The relevant provisions of the Building Code of Australia 2013 (BCA).
- Discussion of preliminary design issues as part of a project meeting held at Health Projects International Pty Ltd offices on 21/05/2013.
- Liaison with mechanical engineer and architect to review compartmentation options for optimisation of building functionality and air-handling systems, including a meeting at Health Projects International Pty Ltd offices on 29/05/2013.
- Relevant architectural plans prepared by Health Projects International Pty Ltd, as referenced in Table 1.

Table 1 – Referenced architectural drawings

Drawing no.	Title	Issue no.	Date
WGPB-E-1-75W	East Elevation	3	07/06/2013
WGPB-E-2-75W	Urunga Parade & East Elevation	2	07/06/2013
WGPB-EC-1-75W	Building Extent Comparison Plans	1	31/05/2013
WGPB-EC-2-75W	Building Extent Comparison Plans	1	31/05/2013
WGPB-EC-3-75W	Building Extent Comparison Elevations	2	06/06/2013
WGPB-EC-4-75W	Building Extent Comparison Elevations	2	06/06/2013
WGPB-EC-5-75W	Building Extent Comparison Sections	2	06/06/2013
WGPB-P-1-75W	Plan Level 1	3	18/06/2013
WGPB-P-2-75W	Plan Level 2	2	06/06/2013
WGPB-P-3-75W	Plan Level 3	1	07/06/2013
WGPB-P-4-75W	Plan Level 4	1	07/06/2013

Drawing no.	Title	Issue no.	Date
WGPH-P-5-75W	Plan Level 5	2	18/06/2013
WGPH-P-6-75W	Plan Level 6	2	18/06/2013
WGPH-P-7-75W	Plan Level 7	2	18/06/2013
WGPH-P-8-75W	Plan Level 8	1	07/06/2013
WGPH-P-B1-75W	Plan Basement Level 1	4	18/06/2013
WGPH-P-B2-75W	Plan Basement Level 2	4	18/06/2013
WGPH-P-B3-75W	Plan Basement Level 3	4	18/06/2013
WGPH-P-G-75W	Plan Ground Floor	5	18/06/2013
WGPH-P-S-75W	Plan - Site Plan	2	07/06/2013
WGPH-REN-1-75W	Rendering	2	07/06/2013
WGPH-REN-2-75W	Rendering	1	07/06/2013
WGPH-REN-3-75W	Rendering	2	18/06/2013
WGPH-REN-4-75W	Rendering	1	07/06/2013
WGPH-SE-1-75W	Section - east west	3	18/06/2013
WGPH-SE-2-75W	Section - north south	3	18/06/2013

2 BUILDING DESCRIPTION

The proposed building comprises an eight-storey hospital. The hospital will contain minor retail areas, a basement car park, health-care services and associated administrative support services.

The total building floor area is in the order of 33,000 m², based on the following floor areas for each storey noted on the referenced architectural drawings:

- Basements 1, 2 & 3 car park: approx. 4,100 m² per storey
- Ground Floor: approx. 1,900 m²
- Level 1 & Level 2: approx. 2,900 m² per storey
- Level 3, Level 4 & Level 5: approx. 2,700 m² per storey
- Level 6 & Level 7: approx. 2,100 m² per storey
- Level 8: approx. 900 m²

Referring to Figure 2.1 below, the site features frontages to Crown Street to the south and Urunga Street to the north. Private land abuts to the east and west.



Figure 2.1 – Development siting

Pursuant to the BCA, type A construction is applicable for a building having a rise in storeys of eight.

The following uses are proposed for each level, as indicated in the sectional elevation presented in Figure 2.2:

- Basement 1 – car park and plant areas
- Basement 2 – car park and plant areas
- Basement 3 – car park and plant areas
- Ground Floor – entry lobby, retail areas, commercial tenancy space and back-of-house areas, including kitchen
- Level 1 – intensive care, coronary care, operating theatres and patient wards
- Level 2 – birthing suites, patient wards, nursery, staff stations, central sterile supply department and plant room
- Level 3 – patient wards, staff stations
- Level 4 – patient wards, staff stations
- Level 5 – office administration areas, oncology treatment area and medical suites
- Level 6 – medical suites
- Level 7 – medical suites
- Level 8 – plant areas and lift motor room

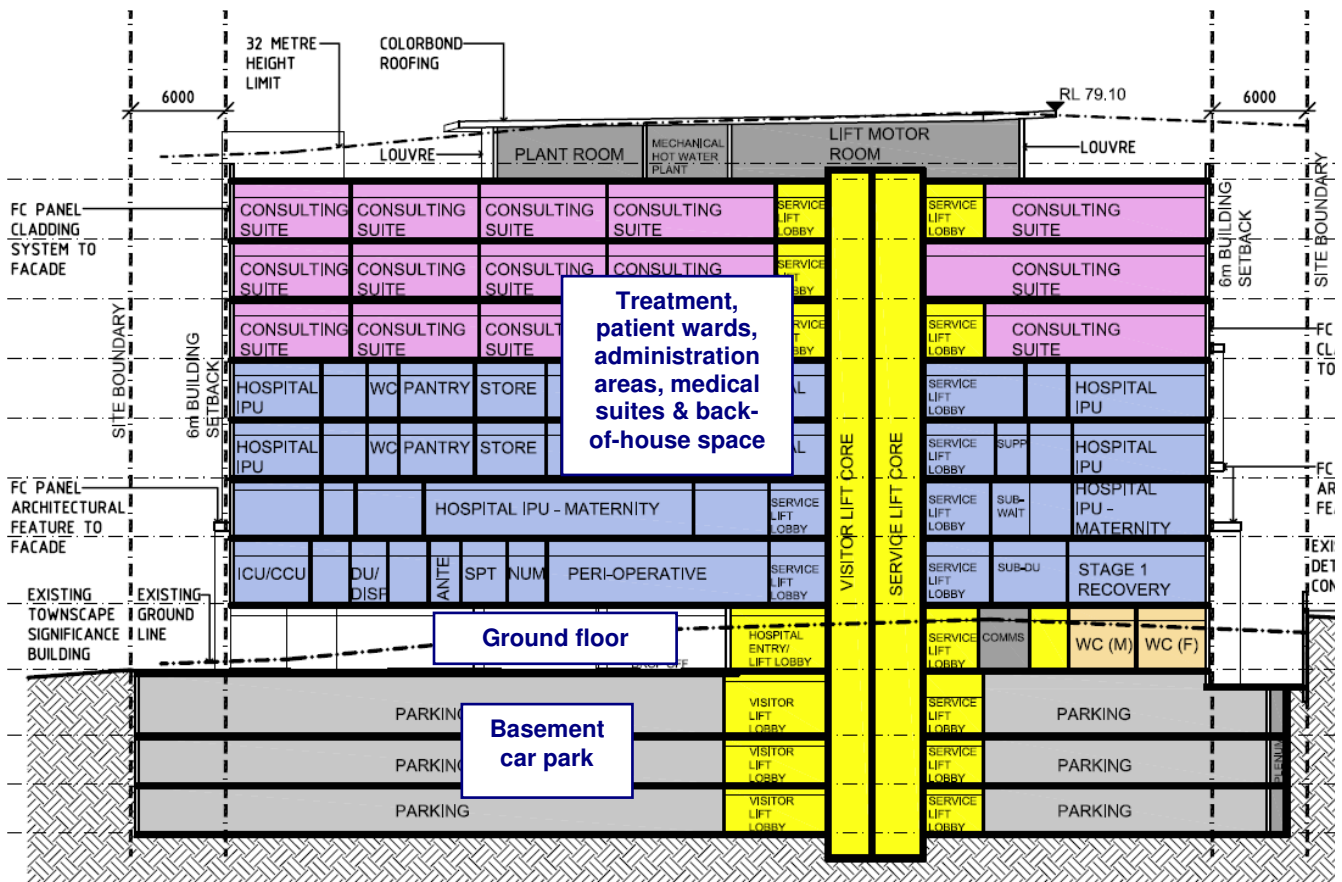


Figure 2.2 – Sectional elevation indicating proposed building use

3 PRELIMINARY TRIAL CONCEPT DESIGN

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

3.1 FIRE RESISTANCE & COMPARTMENTATION

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

- (i) The concrete-framed building structure (i.e. load-bearing walls, floors and columns) are to achieve a fire resistance level (FRL) generally of 120/120/120. Where the top storey is to be constructed of lightweight materials, such as steel framed construction, the structure can be of non-fire-resisting elements.
- (ii) Fire walls, having an FRL of 120/120/120, are to be provided on each storey containing class 9a use to result in fire compartments of generally not more than 2,000 m² each. Minor variations in fire compartment floor area can be considered as part of an alternative solution
- (iii) Smoke-proof walls, complying with BCA Specification C2.5, are to be provided on each storey containing class 9a use to result in smoke compartments of generally not more than 500 m² each. Minor variations in smoke compartment floor area can be considered as part of an alternative solution, which may result in a lower number of intra-storey compartments for rationalisation and simplification of the zone smoke control system.
- (iv) Non-required circulation stairways connecting two storeys within a patient-care area, with fire separation provided at only one of the connected storeys, can be considered as part of an alternative solution.
- (v) Surface finishes and linings are to comply with BCA Specification C1.10a.

3.2 EGRESS

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

- (i) Exit travel distances, considerate of future fit-out works, can exceed the BCA DtS provisions, being as follows:
 - a) class 9a (patient-care) use – up to 12 metres to a point of choice of alternative exits; up to 30 metres to an exit; and up to 45 metres / not less than 9 metres between alternative exits; and
 - b) all other classifications – up to 20 metres to a single exit; up to 20 metres to a point of choice of alternative exits; up to 40 metres to an exit where alternative exits are provided; and up to 60 metres / not less than 9 metres between alternative exits.
- (ii) All exit stairways serving the upper storeys and basement car park are to be contained within fire-isolated shafts achieving an FRL of 120/120/120.
- (iii) Doorways with sliding doors in patient-care areas fitted can be considered as part of an alternative solution.
- (iv) Required fire-isolated exits are to discharge in accordance with BCA clause D1.7. Minor variations in discharge design can be considered as part of an alternative solution.
- (v) Fire safety management procedures and emergency control organisation and procedures are to be developed and implemented, using AS 3745–2002 for guidance.

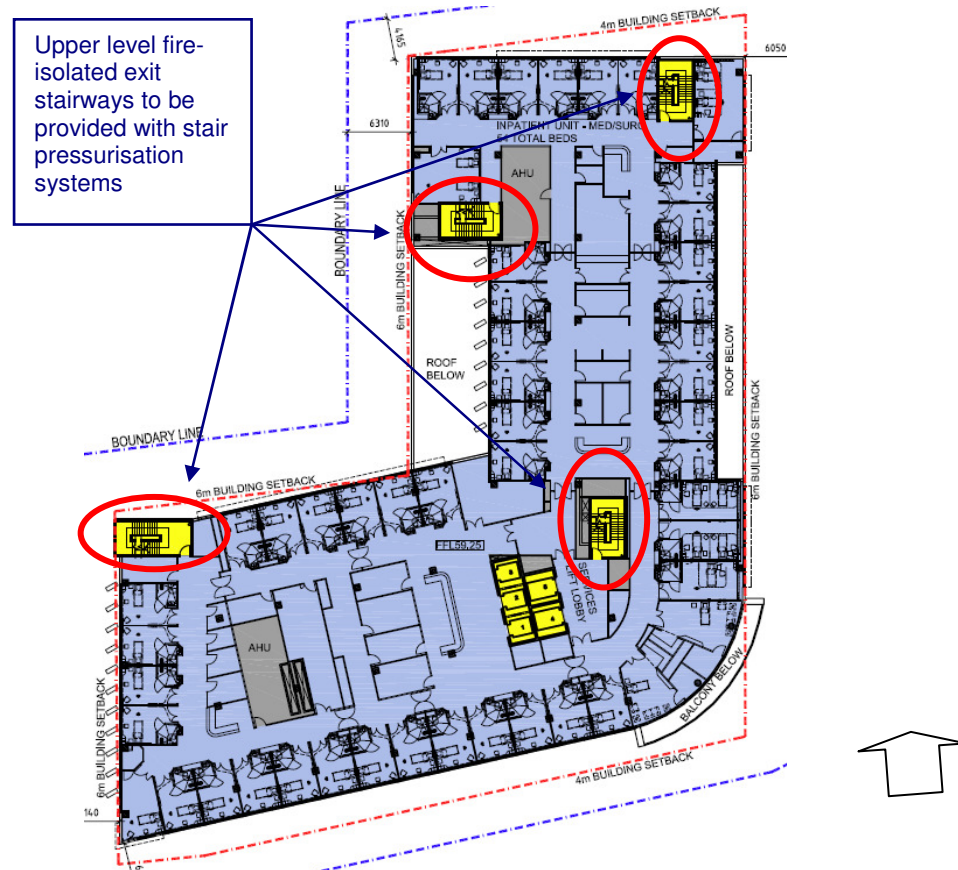


Figure 3.1 – Fire-isolated stairways serving upper levels

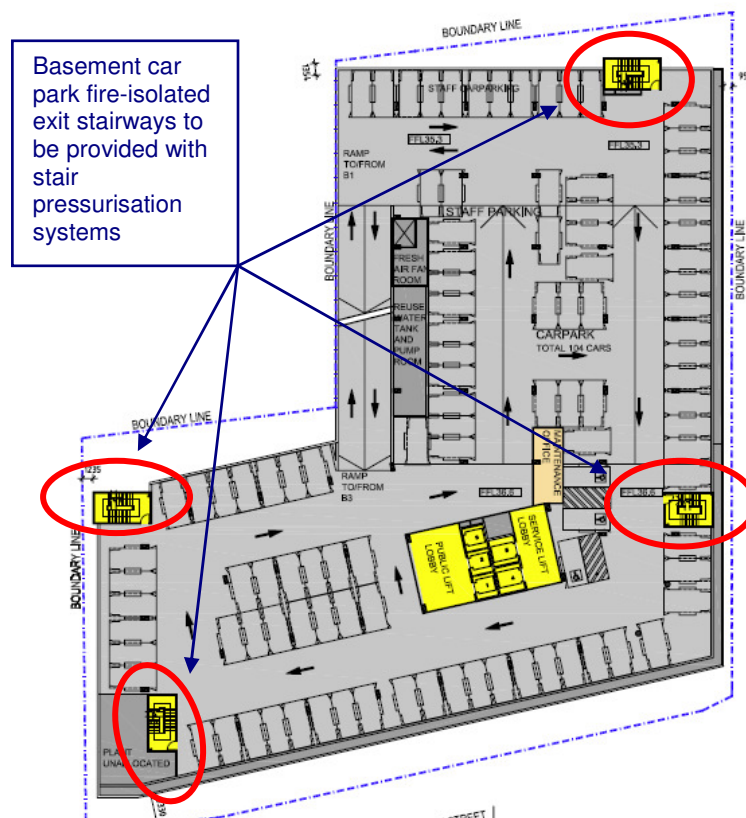


Figure 3.2 – Fire-isolated stairways serving basement car park

3.3 FIRE SERVICES & EQUIPMENT

The following summarises the fire safety trial concept design in relation to the provision of fire services and equipment, with preliminary infrastructure locations being as indicated on the Ground Floor plan presented in Figure 3.3:

- (i) An automatic fire sprinkler system, featuring residential sprinklers throughout patient ward areas and a grade 1 water supply, is to be provided throughout the building, in accordance with BCA Specification E1.5 and AS 2118.1, with the exception that a sprinkler tank size of 25,000 litres on Level 8 (in lieu of 75,000 litres) can be considered as part of an alternative solution. The following applies:
 - (a) monitored, subsidiary control valves are to be connected to the fire indicator panel on each sprinkler branch pipe serving each floor, located within services cupboards accessible without a ladder and containing appropriate signage; and
 - (b) sprinkler alarm valves are to be located in a secure room or enclosure that has direct access to a road or open space.
- (ii) A monitored, analogue-addressable fire detection system is to be provided throughout the building, including the office areas, carpark areas and plant areas, in accordance with BCA Specification E2.2a and AS 1670.1, with the exception that smoke detectors located within the car parking levels adjacent to fire-isolated stairway doors and lift landing doors, in lieu of throughout each car parking level as stipulated by AS/NZS 1668.1, can be considered as part of an alternative solution.

Note: the fire indicator panel (FIP) is to be located within the fire control centre on Ground Floor.

- (iii) A zone smoke control system is to be provided to all storeys other than the basement car park in accordance with AS/NZS 1668.1, with the exception that:
 - a) non-provision of a pressure difference of 20 Pa between compartments within which operating theatres are situated (on account of the special air-handling system operational needs associated with theatres) can be considered as part of an alternative solution; and
 - b) motorised fire and smoke dampers (excluding thermal links) being provided to compartment wall penetrations in lieu of horizontal subducts can be considered as part of an alternative solution.
- (iv) Air-handling systems not forming part of a smoke control system, such as the zone smoke control system, are to be automatically shut down in fire mode. Air-handling systems serving operating theatres and other critical treatment areas that do not shut down in fire mode can be considered as part of an alternative solution.
- (v) A stair pressurisation system is to be provided to each fire-isolated stairway, including the stairways serving the basement levels, in accordance with AS/NZS 1668.1, as shown in Figure 3.1 and Figure 3.2.

Note: the stair pressurisation system design and commissioning requirements relating to the number of doors to a single fire compartment to be open when measuring air-flow across a doorway in that all three basement car park levels will comprise a single fire compartment.

- (vi) A fire hydrant system, including a fire brigade booster assembly located in the external façade of the building, is to be provided in accordance with BCA clause E1.3 and AS 2419.1, with the exception that the siting of the fire hydrant booster pump(s) within a level where direct access to open space is not provided via a fire-isolated stairway only (i.e. where access involves traversal of a fire-isolated corridor in addition to a fire-isolated stairway) can be considered as part of an alternative solution.

Note: Internal hydrants are to be provided within the floor plate on each storey where coverage is not achieved from the hydrants within the fire-isolated stairways, including locational signage placed within each stairway, immediately outside each stairway, at each change of direction along a main corridor / pathway and at each hydrant. This is understood to be the preferred approach in lieu of reliance on additional hose lengths that would form part of an alternative solution, based on our recent experience and an informal discussion on the matter held with Fire and Rescue NSW.

- (vii) A fire hose reel system is to be provided in accordance with BCA clause E1.4 and AS 2441, with fire hose reels located within 4 metres of an exit, with the exception that minor variations in the proximity of fire hose reels to exits (i.e. greater than 4 metres) can be considered as part of an alternative solution.
- (viii) Portable fire extinguishers are to be provided in accordance with AS 2444 to address any of the risks outlined within BCA clause E1.6.
- (ix) Emergency lifts are to be provided in accordance with BCA clause E3.4.
- (x) Emergency lighting and exit signs are to be provided to the nominated parts of the building in accordance with BCA Part E4 and AS 2293.1.
- (xi) A sound system and intercom system for emergency purposes is to be provided throughout the building in accordance with BCA clause E4.9 and AS 1670.4, with the exception that:

- a) non-provision of speakers within patient ward areas, intensive care units (other than corridors), operating theatres and specialist isolation rooms (to avoid patient trauma) can be considered as part of an alternative solution;
 - b) speakers installed within corridors outside patient ward rooms at extended spacing can be considered as part of an alternative solution, subject to sound pressure levels in the corridors remaining compliant; and
 - c) non-compliance with the nominated speech intelligibility provisions of AS 1670.1 within the basement car park, due to the hard, rectilinear surfaces associated with the structure, can be considered as part of an alternative solution.
- (xii) A fire control centre, for direction or control of fire-fighting operations that containing controls, panels and the like associated with the building's required fire services, is to be situated at a floor level not varying by more than 300 mm from the adjoining roadway or open space. The fire control centre must not be used for any purpose other than the control of fire-fighting activities and measures concerning occupant safety.

Note: a fire control room is only required in a building more than 50 metres in effective height.

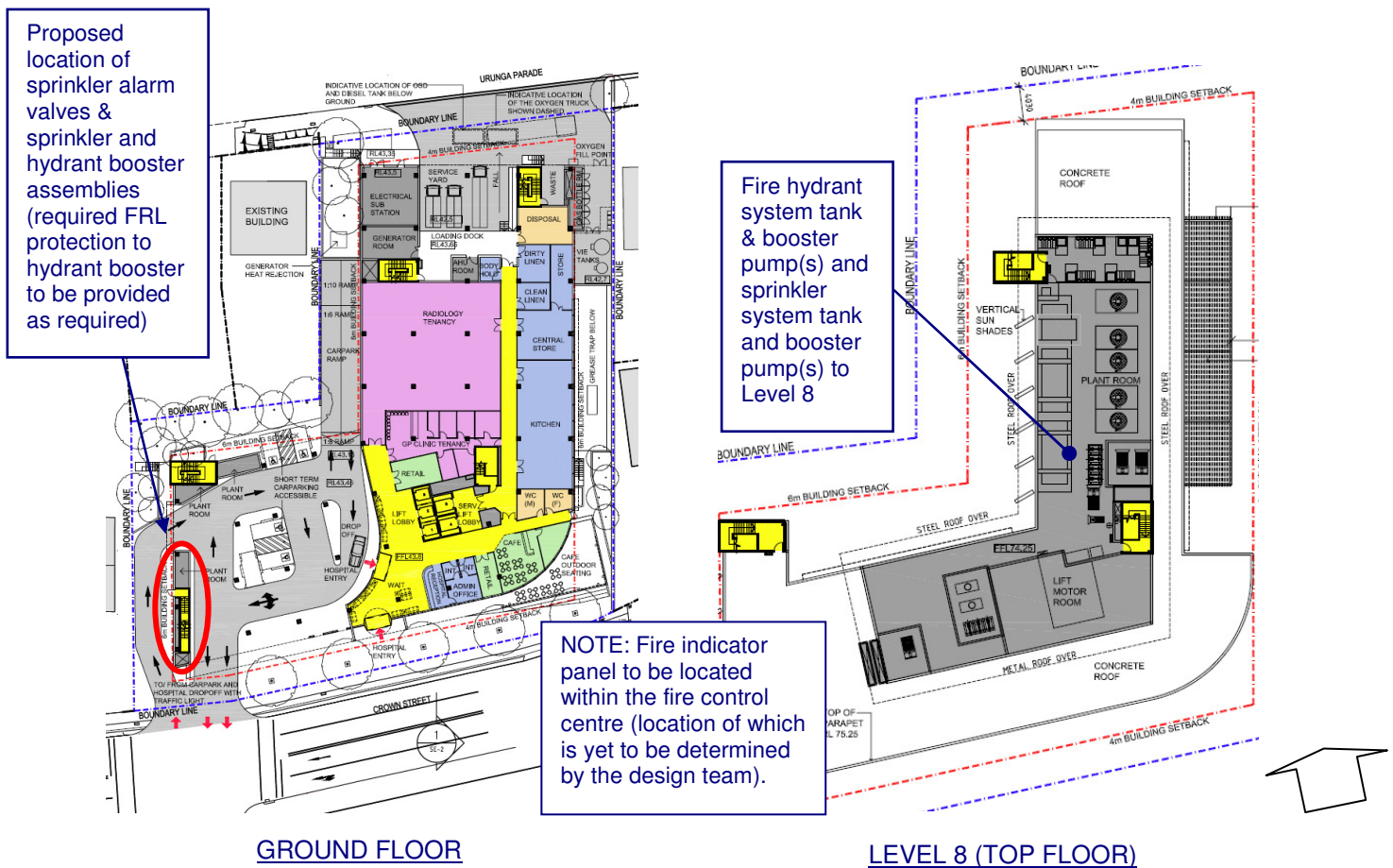


Figure 3.3 – Fire protection system infrastructure

4 CONCLUSION

This fire safety engineering preliminary trial concept design details the fire safety engineering strategy that can be developed in relation to the proposed Wollongong Private Hospital development, based on the current architectural drawings for this phase of the project. In all other respects, the building is to comply with the prescriptive, fire-safety-related deemed-to-satisfy provisions of the BCA.

The fire safety engineering alternative 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 Building Code of Australia 2013.

Note that the proposed alternative 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 authorities having jurisdiction) 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 would normally include the relevant certifying authority and Fire and Rescue NSW.

Yours faithfully



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For and on behalf of Exova Warringtonfire Aus Pty Ltd.