



# FIRE SAFETY STRATEGY

<b>Project:</b>	West Yiribana Logistics Estate	<b>Ref No.:</b>	F201897_West Yiribana_FSS_02
<b>Address:</b>	771-781 Mamre Road, Kemps Creek NSW 2178	<b>Date:</b>	6 December 2022
		<b>Issue:</b>	Final Issue

**To:** Tom Falconer, GPT Group

**RE: Fire Safety Strategy – Final Issue**

## 1. INTRODUCTION

### 1.1 OVERVIEW

CORE Engineering Group has been engaged by GPT Group to prepare a Fire Safety Strategy for the proposed warehouse development on 771-781 Mamre Road, Kemps Creek NSW 2178.

### 1.2 SCOPE

The purpose of this report is to document the proposed fire safety strategy for the building, including guidance on the likely fire engineering trial design which has been established based on review of the proposed site plan and CORE Engineering Group's previous experience. This documented is intended to be a guidance document for the design team to inform detailed design documentation and shall be further developed as necessary through ongoing consultation.

The specific details included are:

- The proposed Performance Solutions to address identified non-compliances.
- The proposed fire engineering requirements.

### 1.3 SOURCES OF INFORMATION

- Site and Warehouse Plans by SBA Architects:
  - DA Masterplan: 21246-MP02 Revision B, dated 09 December 2022.
  - Site & Warehouse 1 Plan: 21246-DA110 Revision A, dated 09 December 2022.
  - Site & Warehouse 2 Plan: 21246-DA210 Revision A, dated 09 December 2022.

### 1.4 LIMITATIONS AND ASSUMPTIONS

- This document represents the opinions of Core Engineering Group based on the information known at the time of preparation of this document. Opinions, findings, and recommendations detailed in this document are based on our understanding and interpretation of current statutory and regulatory obligations and standards and should not be construed as legal opinions.
- This report does not constitute a fire engineering report (FER) that addresses the Performance Requirements of the BCA. Any recommendations herein are subject to detailed fire engineering analysis, and the relevant approval process.
- This document has been prepared as a guidance document only, and should not be used as the basis for construction documentation or pricing.
- This document has been prepared prior to the engagement and input of a BCA consultant. The fire engineering strategy and associated requirements of the Performance Solution are therefore subject to change following receipt of this advice.

## 2. PROPOSED WORKS

### 2.1 SITE LOCATION

The proposed project entails the construction of two warehouse buildings (1A & 1B) along Mamre Road in the West Yiribana Estate (Figure 2-2).

Both warehouses are accessed from “Collector Road 01” from the west, which shall connect back to Bakers Ln to the north and Mamre Rd to the south (Figure 2-1). The site is bounded by Mamre Road to the east and adjoining allotments along the northern and western boundaries. Future development of the estate is proposed to the west of “Collector Road 01”.



Figure 2-1: Context of Access to Estate

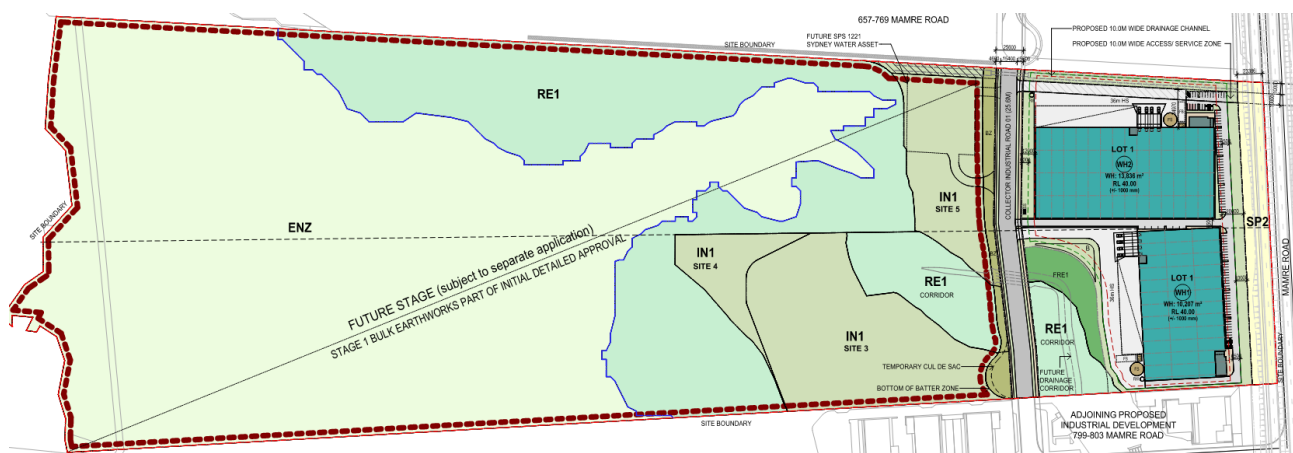


Figure 2-2: Context of Site within Estate Masterplan

## 2.2 PROPOSED WORKS

The sites are approximately 22,640 m<sup>2</sup> and 23,595 m<sup>2</sup> in total area across Lots 1A and 1B, respectively. One warehouse is proposed on each of the two sites:

- Warehouse 1A– 10,210 m<sup>2</sup> with a two-storey ancillary office (400 m<sup>2</sup>) and 50 m<sup>2</sup> dock office.
- Warehouse 1B– 13,840 m<sup>2</sup> with a two-storey ancillary office (400 m<sup>2</sup>) and 50 m<sup>2</sup> dock office.

Both buildings are proposed as large-isolated buildings with a perimeter vehicular access path provided to serve each building.

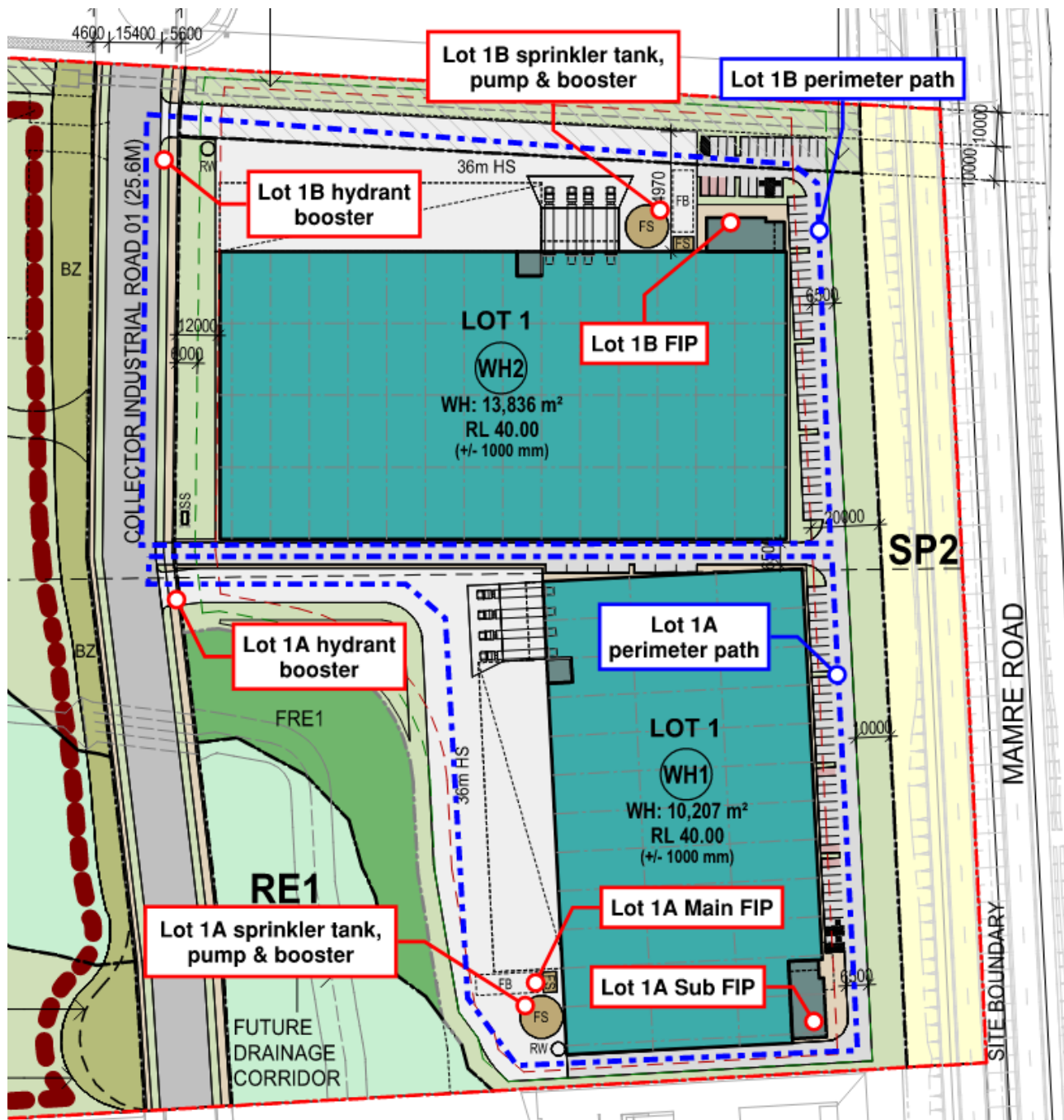


Figure 2-3: Proposed Site Plan Showing Fire Brigade Infrastructure

<b>WH1 AREA SCHEDULE</b>	
SITE AREA	53,772 m <sup>2</sup>
CARPARKING SPACES	46
WAREHOUSE 1	10,207 m <sup>2</sup>
OFFICE 1 (2 Levels)	405 m <sup>2</sup>
DOCK OFFICE	50 m <sup>2</sup>
TOTAL GFA	10,662 m <sup>2</sup>

<b>WH2 AREA SCHEDULE</b>	
SITE AREA	53,772 m <sup>2</sup>
CARPARKING SPACES	57
WAREHOUSE 2	13,836 m <sup>2</sup>
OFFICE 2 (2 Levels)	405 m <sup>2</sup>
DOCK OFFICE	50 m <sup>2</sup>
TOTAL GFA	14,291 m <sup>2</sup>

*Figure 2-4: Proposed Area Schedules*

## 2.3 BUILDING BCA CHARACTERISTICS

The following BCA characteristics are assumed for the buildings.

*Table 2-1: Building BCA Characteristics*

CHARACTERISTIC	WAREHOUSE 1A	WAREHOUSE 1B
Classification	Class 7b (warehouse), Class 5 (office)	Class 7b (warehouse), Class 5 (office)
Rise in Storeys	Two (2)	Two (2)
Type of Construction	Type C (Large-isolated building)	Type C (Large-isolated building)
Effective height	Less than 12m	Less than 12m
Total building floor area	Approx. 10,660 m <sup>2</sup>	Approx. 14,290 m <sup>2</sup>
Total building volume	Greater than 108,000 m <sup>3</sup>	Greater than 108,000 m <sup>3</sup>

## 3. PROPOSED PERFORMANCE SOLUTIONS

### 3.1 SUMMARY

In particular, the fire safety assessment and fire engineering analysis shall be focused on the following identified Performance Solutions.

**Table 3-1: Summary of proposed performance solutions**

#	DTS PROVISION	TITLE	NON-COMPLIANCE(S)	PROPOSED PERFORMANCE SOLUTION
1	C2.4	Perimeter Access	<ul style="list-style-type: none"> <li>Warehouse 1A – the path is discontinuous at the north-western corner of the building and requires travel back onto the main estate road.</li> <li>Warehouse 1B – the path is greater than 18 m from the building along the western and northern perimeters.</li> </ul>	<ul style="list-style-type: none"> <li>Hardstand and carpark serving each warehouse are loadbearing for specialist brigade appliances.</li> </ul>
2	D1.4, D1.5, E2.2	Warehouse travel distances and smoke hazard management	<ul style="list-style-type: none"> <li>Warehouse 1A – up to 60 m to the nearest exit and 120 m between alternative exits.</li> <li>Warehouse 1B – up to 65 m to the nearest exit and 130 m between alternative exits.</li> <li>Rationalised smoke hazard management systems.</li> </ul>	<ul style="list-style-type: none"> <li>Automatic smoke exhaust systems for both warehouses with 1 air change per hour, initiating on sprinkler activation.</li> <li>Sprinkler system throughout.</li> <li>Detailed CFD analysis for both warehouses.</li> </ul>
3	E1.3	Fire hydrant system design	<ul style="list-style-type: none"> <li>External hydrants located beneath warehouse awnings.</li> <li>External hydrants without heat shields.</li> </ul>	<ul style="list-style-type: none"> <li>Hydrant design to AS2419.1:2021.</li> <li>Sprinklers throughout, including beneath awnings.</li> <li>Fall back hydrants.</li> </ul>
4	E1.5	Sprinkler booster location	<ul style="list-style-type: none"> <li>The sprinkler booster serving warehouses 1A &amp; 1B are not located at the site entry.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate hardstands provided, to not obstruct perimeter access path.</li> </ul>

## 4. PROPOSED FIRE ENGINEERING TRIAL DESIGN REQUIREMENTS

The below summarises the proposed fire engineering requirements to satisfy the performance requirements of the BCA.

### 4.1 STRUCTURE AND COMPARTMENTATION

#### 4.1.1 Structure

All buildings are required to be of Type C construction so there is no requirement for any structural elements to achieve an FRL.

#### 4.1.2 Compartmentation

As large-isolated buildings, no fire compartmentation is required.

#### 4.1.3 Insulated Sandwich Panels

Any insulated sandwich panels that are proposed to be used within the buildings must be PIR type (or equivalent approved), achieving a Group 1 rating to AS/ISO 9705 or Class 1 to FM 4880.

The installation of the panels must adhere to the IPCA code of practice, insofar as:

- Installed by and certified by an IPCA approved installer.
- A key diagram is located at the FIP showing the location and type of all ISPs in the building (refer to Annex B of CoP).
- Labelling is to be provided at doorways into each enclosure (refer to Annex B of CoP).

*Note: the IPCA code of practice is primarily aimed at EPS core products. As such, where deviations can be substantiated by an approved designer / installer for the PIR type panels, this may be acceptable.*

#### 4.1.4 Vehicular Perimeter Access

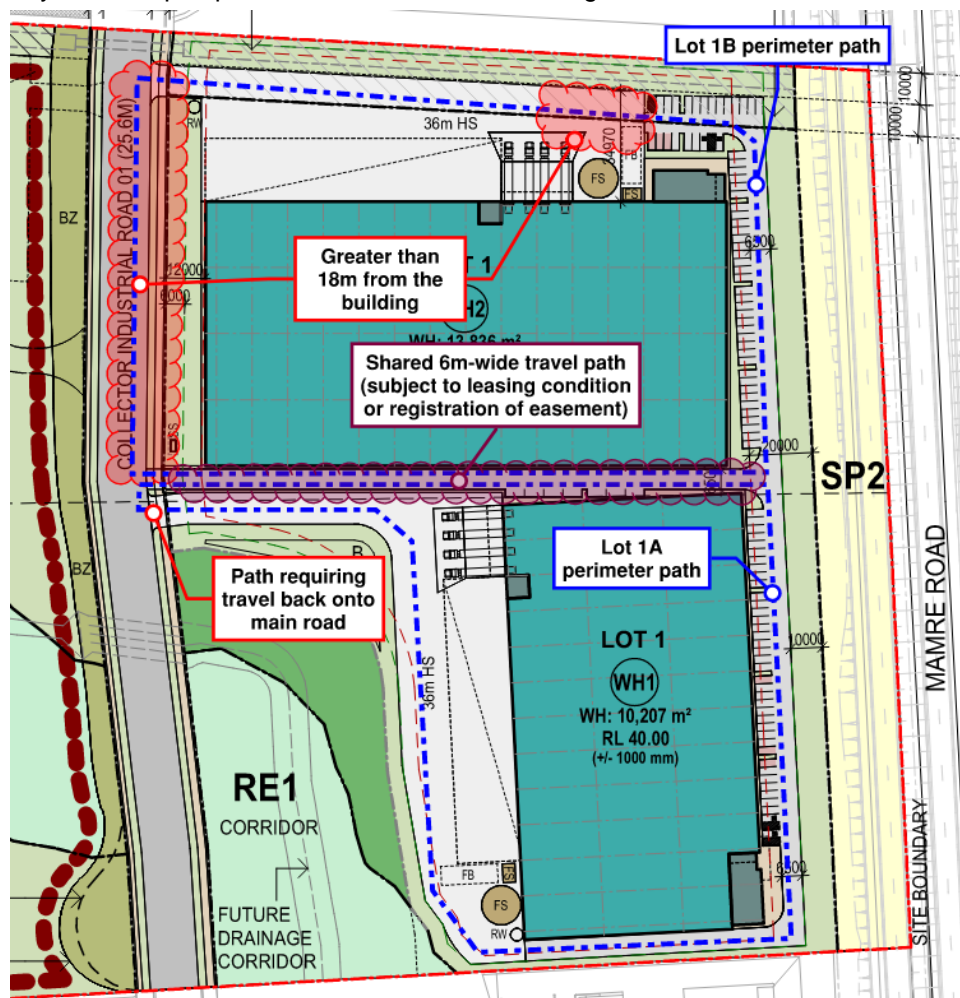
As a large-isolated building, a 6 m wide perimeter vehicular access path is required around each building within these two precincts.

The following non-compliances are evident on the current site plan (Figure 4-1):

- Warehouse 1A – the path is discontinuous at the north-western corner of the building and requires travel back onto the main estate road.
- Warehouse 1B – the path is greater than 18 m from the building along the western and northern perimeters.

To facilitate these non-compliances under performance solutions:

- Car parks are to be designed with loadbearing capacity and swept paths for specialist fire brigade appliances.
- Depending on whether Lots 1A and 1B are separate or shared lots, either: a restriction-on-use condition written into the lease and listed on the AFSS for minimum 6 m width perimeter access path along the north of Lot 1A and south of Lot 1B; or if separate lots, an 88b restriction-on-use and right-of-carriageway for emergency access easement.
- Sprinkler booster suction connections must be designed with a dedicated hardstand 18 m x 6 m in which a fire truck can connect, whilst still allowing additional appliances to pass by.
- Gates in the perimeter access path to be on loose chain openable by 003 key, auto unlatch on fire trip, or copies of keys and swipes provided to the two local fire brigade stations.



**Figure 4-1: Perimeter Access Path and Proposed Requirements for Performance Solution**

## 4.2 EGRESS

### 4.2.1 Travel Distances - Warehouses

Given the size of the buildings, extended travel distances to the nearest exit and between alternatives will be present, of approximately:

- Warehouse 1A – up to 60 m to the nearest exit and 120 m between alternative exits.
- Warehouse 1B – up to 65 m to the nearest exit and 130 m between alternative exits.

### 4.2.2 Travel Distances Offices

Both main offices are proposed to be two-storeys. Depending on the final fitout and proposed stair location, it is possible that the distance of travel to the single exit from Level 1 would exceed 20 m, likely being up to 25 m. To achieve a DtS-compliant solution, the design should consider the inclusion of an additional stair (into the warehouse), or locating the single stair centrally within the office. Alternatively, a Performance Solution is possible, which would rely on the provision of a smoke detection system within the office in question.

## 4.3 FIRE FIGHTING EQUIPMENT

### 4.3.1 Fire Hydrants

A separate hydrant system is to be provided to serve each building in accordance with BCA Provision E1.3 and AS2419.1:2021. The following additional guidance is provided for each building:

- As far as possible, the hydrant system should consist of external hydrants.
- Where the size and design of a building requires the provision of internal fire hydrants to achieve floor coverage in accordance with the requirements of AS2419.1, such hydrants should be located to allow progressive movement of firefighters towards the central parts of the building, per the request of FRNSW.
  - When working from an external hydrant, the next additional hydrant should be located into the building not more than 50 m from the external hydrant.
  - When working from an internal hydrant (either from within a fire isolated exit or passageway, within 4 m of an exit or another additional hydrant), the next additional hydrant should be located not more than 25 m from that hydrant.<sup>1</sup>
  - An external hydrant should be provided adjacent to or within close proximity of each external entry/exit point around the building.
- Hydrants located beneath the warehouse awnings can be considered external for coverage purposes, by way of a Performance Solution.
  - In this case, coverage of the area beneath the awnings must be provided by compliant external hydrants i.e. additional fallback hydrants.
- Each system must incorporate a ring main around the relevant building, with isolation valves that are external to the building and numbered with the corresponding numbers indicated on the block plan at the booster assembly.
- All hose connections in the system are to be fitted in accordance with FRNSW Technical information sheet – FRNSW compatible hose connections (available at [firesafety.fire.nsw.gov.au](https://firesafety.fire.nsw.gov.au)). These couplings should be tested as part of the system when the commissioning tests are undertaken.
- At a minimum, system capacity must be capable of allowing 3 hydrants to operate simultaneously (i.e. 30 L/s). The presence of additional hazards due to fit-out (i.e. mezzanines, Dangerous Goods, automated racking, lithium-ion battery storage) presents an approval risk with FRNSW and may drive the requirement to consider additional flow capacity.
- Each hydrant booster assembly is proposed to be located at the entrance to the lot within sight of the main building entry. The boosters must also be located greater than 10 m from any substation, and located outside the exclusion zone of the building as per Appendix C of AS2419.1:2021.

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<sup>1</sup> 25 m and 50 m distances have been recommended to make allowance for shorter-than-standard hoses (repairs etc.) and unknown variables in the building layout and fixtures etc.

### 4.3.2 Fire Hose Reels

Fire hose reels shall be provided throughout the buildings in accordance with Provision E1.4 of the BCA and AS2441:2005.

All points on the floor should be within reach of a 4 m hose stream issuing from a nozzle at the end of the hose laid on the floor with a hose length not exceeding 36 m (i.e. a maximum of 40 m from the hydrant location).

However, should it be desired, it is possible to present a Performance Solution to enable the installation of 50 m fire hose reels – generally to enable hose reels located around the building perimeter only, or to limit the installation of hose reels in cold stores. Additional requirements to permit the use of 50 m hose reels are as follows:

- 50 m fire hose reels must be tested and certified to AS/NZS1221.
- The pressure and flow at the nozzle of the 50 m hose reel is to achieve compliance with the pressure and flow requirements of AS2441.1-2005.
- Coverage is to be achieved with no more than two bends in the hose.
- Staff training in the use of the 50 m length fire hose reels is to occur at least every 12 months to maintain occupant familiarity with the increased weight and length of the extended hose reels.

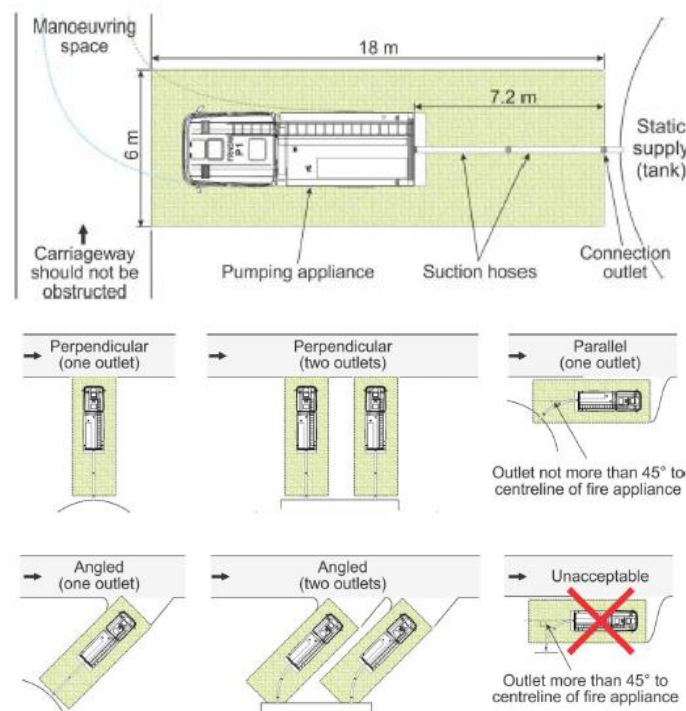
### 4.3.3 Fire Sprinkler System

A fire sprinkler system shall be provided throughout each building in accordance with the relevant regulatory requirements, being Provision E1.5 of the BCA and AS2118.1:2017.

In the warehouses, a storage system shall be provided in accordance with BCA Specification E1.5 and AS2118.1:2017. Sprinkler activation temperature must be no greater than 101°C and have a Response Time Index (RTI) of less than  $50 \text{ m}^{1/2}\text{s}^{1/2}$  (i.e. fast response type). Sprinklers are also to be provided beneath awnings in accordance with AS2118.1:2017.

Upon sprinkler activation the building occupant warning alarm shall be initiated throughout the building and the direct brigade notification activated.

At each fire sprinkler booster, a dedicated hardstand for fire brigade appliances is required. As per FRNSW Guideline For Emergency Vehicle Access this hardstand should be designed to be 18 m long by 6 m wide, whilst allowing other fire brigade appliances to pass (refer to extract in Figure 4-2). A Performance Solution is possible to assess the location of the sprinkler booster in the indicated locations, being an approval risk subject to FRNSW review.



**Figure 4-2: Extract from FRNSW Guideline - Rigid Suction Connection Hardstand**

#### 4.3.4 Portable Fire Extinguishers

Portable fire extinguishers are to be provided throughout the building in accordance with Table E1.6 of the BCA and selected, located, and distributed in accordance with AS2444:2001.

#### 4.3.5 Control and Indicating Equipment

The FDCIE serving the developments is to be provided in the following arrangement:

- Lot 1A: Main FIP located within an acoustically sealed enclosure adjacent to the pump room, with a Sub-FIP located within the main office of Warehouses 1A. This is for the reason that the Sub-FIP is not visible from Collector Road 01.
- Lot 1B: Main FIP located within the main office of Warehouse 1B.

In each instance, the Main FIP must be installed in accordance with BCA Specification E2.2a and AS1670.1:2018 and have the following capabilities.

- The FIP panel must be capable of isolating, resetting, and determining the fire location within the building.
- A red strobe shall be installed at the entry door to the FIP to alert arriving fire brigade of the fire alarm origin and FIP location.
- Smoke exhaust fan controls shall be provided at the FIP which shall include clear signalling of the operational status of the fans.

### 4.4 SMOKE HAZARD MANAGEMENT

#### 4.4.1 Smoke Detection System

A smoke detection system for occupant warning is unlikely to be required throughout the warehouses due to their large volume.

- In the event of future subdivisions of warehouse buildings into smaller tenancies, there might arise a need for smoke detection due to the reduced smoke reservoir volumes.
- In the event of travel distances in excess of the DtS Provisions being present in the building offices, detection will likely be required throughout each affected office in accordance with AS1670.1:2018.

#### 4.4.2 Automatic Smoke Exhaust System

Warehouses 1A & 1B should each be provided with a rationalised automatic smoke exhaust system, which should be designed to achieve the following minimum requirements in each instance.

- System capacity must be capable of an exhaust rate equal to one enclosure air change per hour.
- Initiation switches should be located in the main offices, being:
  - At the Sub-FIP for Warehouse 1A.
  - At the Main FIP for Warehouse 1B.
- A mechanical block plan depicting the arrangement of the smoke exhaust system must be provided.
- Adequate make-up air should be provided at low level to facilitate the clearance system's designed operational capacity, whilst ensuring the inlet velocity does not exceed 2.5 m/s. The make-up air should be provided at a low level by:
  - Permanently open natural ventilation louvers; and/or
  - Perforated roller shutters; and/or
  - Mechanically operated louvers / roller shutters that open upon activation of the fans. All motors and cables to automatic louvers, vents or supply fans must be fire rated to operate at 200°C for a period of 60 minutes.
- Fire rated fans and fire rated cabling should be designed to operate at 200°C for a period no less than 60 minutes.
- It is recommended that multiple fans be provided and be evenly distributed to otherwise comply with the requirements of Specification E2.2b Clause 5 of the BCA.
- The fans must be served by an essential power supply.
- The essential services board must be provided within a fire-rated enclosure, if located within the building.

#### 4.4.3 Building Occupant Warning System

A building occupant warning system should be provided throughout all parts of each building. The system should be in accordance with the prescriptive requirements of Specification E1.5 and Clause 7 of Specification E2.2a and AS1670.1:2018.

- The occupant warning alarm should be sounded throughout all areas of the relevant building in alarm upon activation of the smoke detection or sprinkler systems.

#### 4.4.4 System Monitoring

Automatic signalling equipment should be provided that sends notification to fire brigade on alarm.

### 4.5 VISIBILITY IN AN EMERGENCY, EXIT SIGNS AND WARNING SYSTEMS

Emergency lighting and exit signage is to be provided throughout the building in accordance with DtS Provisions E4.2 and E4.4 and AS2293.1:2018.

Whether through adjudication by the authority having jurisdiction (AHJ) or via a Performance Solution, it is anticipated that the directional signage at the end of the racking aisles and above block storage areas can be installed at a height greater than 2.7 m. Should a Performance Solution be desired, it shall consider the following:

- Exit signs and directional signs shall be “Jumbo size” to increase the visibility to occupants.
- The final height and location of the directional exit signs shall be determined through the fire engineering analysis.

### 4.6 BUILDING AND CONSTRUCTION MANAGEMENT PROCEDURES

The ongoing management of the building is as important in maintaining a high level of life safety as the provisions recommended during the design phase of the building.

#### 4.6.1 Maintenance of Fire Safety Equipment

The fire safety systems should be tested and maintained in accordance with Australian Standard AS1851 or other relevant testing regulatory.

The smoke clearance system should be tested in accordance with the AS1851 requirements for an automatic smoke exhaust system as applicable.

#### 4.6.2 Emergency Plan

An emergency management plan should be developed for the site in accordance with AS3745:2010. Where required, CORE Engineering Group can assist with the development of this document.

## 5. CONCLUSION

The fire safety strategy presented herein is considered capable of meeting the Performance Requirements of the BCA, subject to validation and verification of any assumptions made through detailed fire engineering analysis.

Through ongoing design development, the strategy proposed herein shall be amended and adapted based on consultation with the design team to develop the scope for the Fire Engineering Brief, and ultimately for the Fire Engineering Report for Construction.

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