Core Engineering Group • Fire • Risk • Emergency Management

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Fire Safety Strategy

Oakdale East - Austral Plant & Warehouse Development

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Report Details

Project: Oakdale East - Austral Plant & Warehouse Development
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Document: Fire Safety Strategy
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Report Revision History

REV	DATE ISSUED	COMMENT	PREPARED BY	REVIEWED BY	VERIFIED BY
01	09/11/18	Draft Issue for comment	**Dean Watt** *BEng (Chemical Engineering) (Hons)*	**Graham Morris** *MEng (Structural and Fire Safety)* *MIEAust, CPEng, NER (Fire Safety)*	
02	03/12/18	Updated Estate Drawings			
03	05/02/19	Final Issue (Updated Estate Drawings)			**Sandro Razzl** *BE (Building)* *Grad Dip (Performance Based Building & Fire Codes)* *Accredited Fire Engineer* *BPB 0501* *FIEAust* *CPEng 2180287* [redacted]

EXECUTIVE SUMMARY

CORE Engineering Group have been engaged by Goodman Limited to develop a Fire Safety Strategy (FSS) for the proposed Austral masonry plant and warehouse development estate at Oakdale East in Horsley Park. This FSS provides an overview of the construction and management requirements considered necessary to achieve an acceptable level of life safety within the building.

Due to the complexity of the building design, a fully prescriptive approach of complying with the Building Code of Australia 2016 (BCA) [1] Deemed-to-Satisfy (DtS) provisions for occupant egress, fire resisting construction, fire services, and fire brigade intervention is unlikely to satisfy the desired architectural and client aspirations. As such, Performance Solutions to satisfy the Performance Requirements of the BCA have been proposed to account for the following issues which have been identified in the BCA Compliance Report not to comply with the DtS Provisions:

- C2.4 – Perimeter vehicular access paths with minor non-conformances
- D1.4 – Extended travel distances to the nearest exit within the warehouse
- D1.5 – Extended travel distances between alternative exits within the warehouse
- E1.3 – External hydrants positioned beneath awnings
- E2.2 – Manual smoke clearance system installed in lieu of an automatic smoke exhaust system

This FSS provides a holistic summary of the fire and life safety measures anticipated to be necessary in developing the above listed Performance Solutions. These measures include passive and active fire protection systems, egress provisions, occupant first aid firefighting, fire brigade intervention, and future building management provisions.

The complete fire engineering analysis will be included within the Fire Engineering Report (FER), undertaken in accordance with the International Fire Engineering Guidelines (IFEG), and as such is not documented herein.

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1 INTRODUCTION

1.1 OVERVIEW

This Fire Safety Strategy has been undertaken to nominate proposed Performance Solutions for assessing compliance with the nominated Performance Requirements of the Building Code of Australia 2016 (BCA) [1] in accordance with the methodologies defined in the International Fire Engineering Guideline IFEG [3].

In order to develop and assess the nominated non-compliances the following flowchart process is to be adopted.

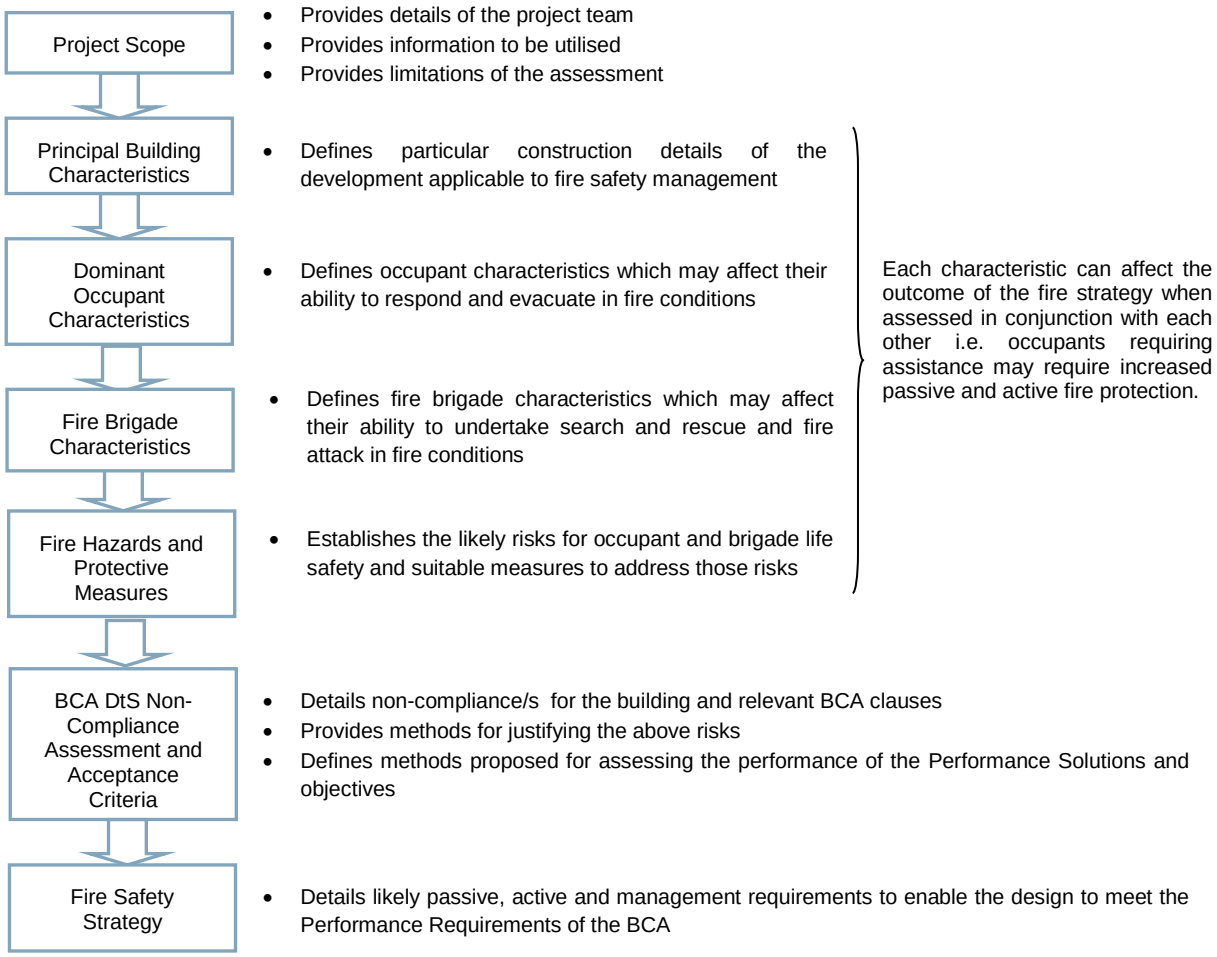


Figure 1-1: Fire Safety Strategy Process

The scope of the FSS is to detail the nominated departures that do not prescriptively meet the Deemed-to-Satisfy (DtS) Provisions of the BCA, assess these in regard to the appropriate Performance Requirements, and provide methodologies for establishing a workable and safe FSS through a trial design.

1.2 FIRE SAFETY OBJECTIVES

This FSS highlights the proposed Performance Solutions to be considered in the fire engineering assessment, for the development of a Fire Engineering Report (FER). This fire engineering assessment is one which will satisfy the performance requirements of the BCA whilst maintaining an acceptable level of life safety, protection of adjacent property, and provide adequate provisions for fire brigade intervention. At a community level, fire safety objectives are met if the relevant legislation and regulations (such as the BCA) are complied with. As stated in the BCA, "*A Building Solution will comply with the BCA if it satisfies the Performance Requirements*". In addition to this, certain non-regulatory objectives exist as detailed below.

1.2.1 Building regulatory objectives

The following items are a summary of the fire and life safety objectives of the BCA:

- **Life safety of occupants -** the occupants must be able to leave the building (or remain in a safe refuge) without being subject to hazardous or untenable conditions. The objective of the Fire Engineering Assessment is to demonstrate that the proposed building design and fire safety systems would minimise the risk of exposing building occupants to hazardous or untenable conditions in an event of a fire.
- **Life safety of fire fighters -** firefighters must be given a reasonable time to rescue any remaining occupants before the onset of hazardous conditions or building collapse occurs. The objective of the fire engineering assessment is to demonstrate that the proposed building design and fire safety systems would facilitate fire brigade intervention and minimise the risk of exposing firefighters to hazardous or untenable conditions in an event of a fire.
- **Protection of adjoining buildings** - structures must not collapse onto adjacent property and fire spread by radiation should not occur. The objective of the fire engineering assessment is to demonstrate that the proposed building design and fire safety systems would minimise the risk of fire spreading from one building to another.

1.2.2 Fire Brigade objectives

The overall philosophical Fire Brigade objectives throughout Australia are to protect life, property and the environment from fire according to the Fire Brigade Intervention Model (FBIM) [7] as per the Fire Services State and Territory Acts and Regulations.

Over and above the requirements of the BCA, the Fire Brigade has functions with regard to property and environmental protection and considerations regarding occupational health and safety for its employees.

1.2.3 Non-prescribed objectives

Fire Engineering has an overarching benefit to many facets of the built environment where non-prescribed objectives can have an influence on the FSS adopted. Although not assessed within, the following can be considered if requested.

- **Business continuity -** will the loss of a particular facility due to fire / smoke damage result in excessive financial impact on the client? For example, is the facility critical to business continuity?
- **Public perception -** should a fire occur within the facility is there likely to be questionable public perception about the safety and operation of the facility?
- **Environmental protection -** fires of excessive sizes can have significant effects on the environment which may require a detailed risk assessment to minimise such outcomes.
- **Heritage salvation -** buildings can have a heritage value for both cultural and educational purposes which can be destroyed by insufficient fire protection.
- **Risk mitigation / insurance limitations -** are there specific limitations on insurance with respect to risk mitigation and fire safety design? i.e. Does the relevant insurer have concerns with respect to open voids through the building?
- **Future proofing (isolation of systems) -** what flexibility is required in the overall design to allow for future development or changes in building layout?
- **Occupational Health and Safety (OHS) requirements -** buildings may have specific fire safety requirements pertaining to OHS requirements.

1.3 REGULATORY FRAMEWORK OF THE FIRE ENGINEERING ASSESSMENT

1.3.1 Building Code of Australia

One of the goals of the BCA is the achievement and maintenance of acceptable standards of safety from fire for the benefit of the community. This goal extends no further than is necessary in the public interest and is considered to be cost effective and not needlessly onerous in its application.

Section A0.3 of the BCA [1] outlines how compliance with the Performance Requirements can be achieved. These are as follows:

(a) formulating a Performance Solution which –

  (i) complies with the Performance Requirements; or

  (ii) is shown to be at least equivalent to the Deemed-to-Satisfy Provisions; or

(b) complying with the Deemed-to-Satisfy Solutions; or

(c) a combination of (a) and (b).

Section A0.5 of the BCA provides several different methods for assessing that a Performance Solution complies with the Performance Requirements. These methods are summarised as follows:

(a) Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy Provision.

(b) Verification Methods such as:

  (i) the Verifications Methods in the NCC; or

  (ii) such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements.

(c) Expert Judgement.

(d) Comparison with the Deemed-to-Satisfy Provisions.

Section A0.7 of the BCA provides methods for complying with Provision A1.5 (to comply with Sections A to J of the BCA inclusive). The following method must be used to determine the Performance Requirements relevant to the Performance Solution: These methods are summarised as follows:

(a) Where a Performance Requirement is satisfied entirely by a Performance Solution:

  (i) Identify the relevant Performance Requirement from the Sections or Part to which the Performance Solution applies.

  (ii) Identify Performance Requirements from other Sections of Parts that are relevant to any aspects of the Performance Solution proposed or that are affected by the application of the Performance Solution.

(b) Where a Performance Requirement is satisfied by a Performance Solution in combination with a Deemed-to-Satisfy Solution:

  (i) Identify the relevant Deemed-to-Satisfy Provisions of each Section or Part that is to be the subject of the Performance Solution.

  (ii) Identify the Performance Requirements from the same Section or Part that are relevant to the identified Deemed-to-Satisfy Provisions.

  (iii) Identify Performance Requirements from the other Sections and Parts that are relevant to any aspects of the Performance Solution proposed or that are affected by the application of the Deemed-to-Satisfy Provisions that are the subject of the Performance Solution.

1.3.2 International Fire Engineering Guidelines

The IFEG [3] document has been developed for use in fire safety design and assessment of buildings, and reflects international best practice. The document is intended to provide guidance for fire engineers as they work to develop and assess strategies that provide acceptable levels of safety.

The document is particularly useful in providing guidance in the design and assessment of Performance Solutions against the Performance Requirements of the BCA. The prescribed methodology set out in the IFEG will be generally adopted in the FER.

2 PROJECT SCOPE

2.1 OVERVIEW

CORE Engineering Group has been engaged to develop a FSS for the construction of Oakdale East - Austral Plant & Warehouse Development at 224-398 Burley Road, Horsley Park NSW 2175. The purpose of this FSS is to outline the fire engineering principles that will be utilised in ensuring that the prescriptive DtS non-compliances identified in the BCA report are resolved in order to conform to the building regulations and permit development approval.

The complete fire engineering analysis will be included within the FER, and as such is not documented herein. This document does however outline the construction and management requirements considered necessary to achieve an acceptable level of life safety within the building as a result of the Performance Solution and to satisfy the Performance Requirements of the BCA.

2.2 RELEVANT STAKEHOLDERS

This Performance Solution has been developed collaboratively with the relevant stakeholders as identified below:

Table 2-1: Relevant Stakeholders

ROLE	NAME	ORGANISATION
Planning Manager	Guy Smith	Goodman Limited
Principal Certifying Authority/BCA Consultant	Dean Goldsmith Tom Johnston	Blackett Maguire + Goldsmith
Architect	Greg Baird	SBA Architects
Fire Safety Engineer	Dean Watt Graham Morris	CORE Engineering Group
C10 Accredited Fire Engineer	Sandro Razzi	

It should be noted that at times some parties may have a vested interest in the outcome of the Fire Engineering assessment. Such parties can include local fire brigades, insurers, Environmental Protection Authority (EPA), project control groups, end users and community representatives. Although not always a legislative requirement, the design team should give due consideration to their inclusion in the Fire Engineering process. Where not required by legislation it is the client's decision to involve such parties, especially local fire brigade, to ensure a transparent and adequate fire safety solution for all. Where we are not notified of the inclusion of such parties it is assumed the client / representative has given due consideration to the above.

2.3 SOURCES OF INFORMATION

The following sources of information have been provided by the design team:

- BCA Compliance report prepared by Blackett Maguire + Goldsmith. Project No. 180427 Revision 1, dated 7 March 2019.
- Bushfire Protection Assessment by Australian Bushfire Protection Planners (Report No. B183246), dated 7 March 2019.
- Architectural plans provided by SBA Architects, as indicated in Table 2-2.

Table 2-2: Drawings

DRAWING NO.	DESCRIPTION	ISSUE	DATE
OAK-E MP01	Cover Sheet & Location Plan	E	04/02/19
OAK-E MP02	SSDA Masterplan	D	24/01/19
OAK-E MP03	SSDA Site Plan	H	04/02/19
OAK-E DA10	Warehouse Building 1 Site Plan / Floor Plan	F	04/02/19
OAK-E DA20	Warehouse Building 2 Site Plan / Floor Plan	E	24/01/19
OAK-E DA30	Warehouse Building 3 Site Plan / Floor Plan	D	24/01/19
OAK-E DA40	Masonry Plant Site Plan / Floor Plan	D	24/01/19
OAK-E DA50	Warehouse Building 4 Site Plan / Floor Plan	F	24/01/19

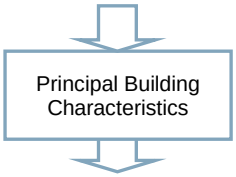
2.4 LIMITATIONS AND ASSUMPTIONS

In this instance the FSS is developed based on applicable limitations and assumptions for the development which are listed as follows:

- The report is specifically limited to the project described in Section 3.
- The report is based on the information provided by the team as listed above in Section 2.3.
- Building and occupant characteristics are as per Section 3 and 4 respectively of this report. Variations to these assumptions may affect the FSS and FER, and therefore should be reviewed by a suitably qualified Fire Engineer should they differ.
- As per any building design, DtS or otherwise, the report is limited to the fire hazards and fuel loads as prescribed in the IFEG [3]. The report does not provide guidance in respect to areas which are used for Dangerous Goods (DG) storage, processing of flammable liquids, explosive materials, multiple fire ignitions, or sabotage of fire safety systems.
- The development complies with the fire safety DtS provisions of the BCA [1] with all aspects in regards to fire and life safety unless otherwise stated in this report. Where not specifically mentioned, the design is expected to meet the BCA DtS requirements of all relevant codes and legislation at the time of construction and/or at the time of issue of this report.
- The assessment is limited to the objectives of the BCA and does not consider property damage such as building and contents damage caused by fire, potential increased insurance liability, and loss of business continuity.
- Malicious acts or arson with respect to fire ignition and safety systems are limited in nature and are outside the objectives of the BCA. Such acts can potentially overwhelm fire safety systems and therefore further strategies such as security, housekeeping, and management procedures may better mitigate such risks.
- This report is prepared in good faith and with due care for information purposes only, and should not be relied upon as providing any warranty or guarantee that ignition or a fire will not occur.
- The FSS and FER is only applicable to the completed building. This report is not suitable, unless approved otherwise, to the building in a staged handover.
- Where parties nominated in Section 2.2 have not been consulted or legislatively are not required to be, this report does not take into account, nor warrant, that fire safety requirements specific to their needs have been complied with.

3 PRINCIPAL BUILDING CHARACTERISTICS

3.1 OVERVIEW



Building characteristics are assessed as part of the fire engineering assessment due to the following:

1. The location can affect the time for fire brigade intervention and potential external fire exposure issues.
2. The structure will impact on the ability to resist a developing fire and support condition to allow occupants to escape the building and the fire brigade to undertake firefighting to the degree necessary.
3. The floor area determines the potential fire size and area required to be evacuated in the event of a fire.
4. BCA details such as Type of Construction, Class and Height will dictate passive and active fire safety systems.

3.2 SITE LOCATION

The development site is located in Horsley Park, approximately 42 km west of Sydney's central business district. The Austral masonry plant and warehouse development at the Oakdale East industrial estate consists of the masonry plant, five warehouse buildings and a storage hardstand to serve the masonry plant.

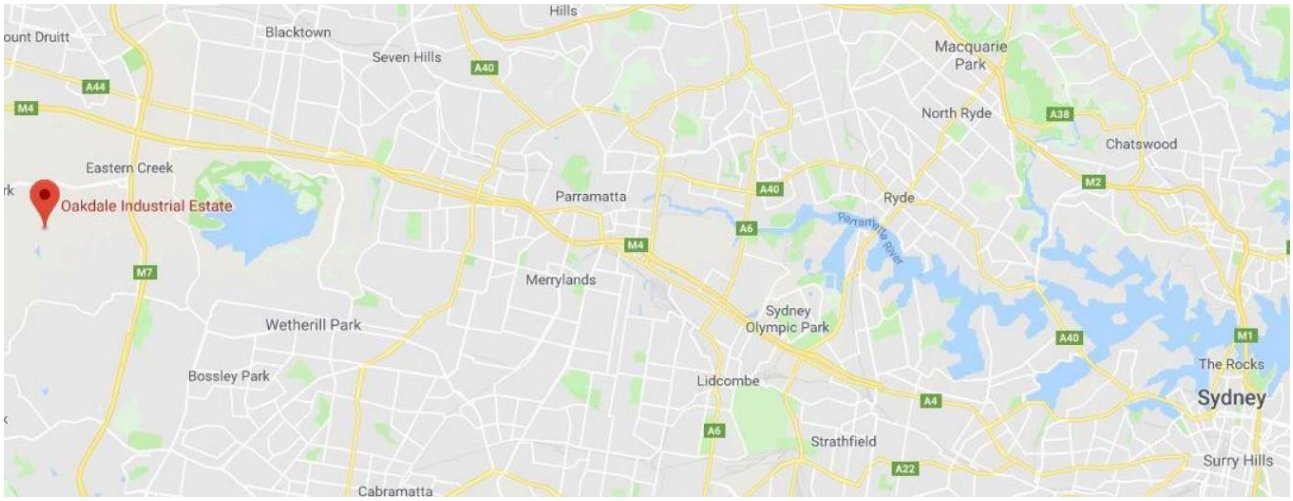


Figure 3-1: Oakdale East Site Location

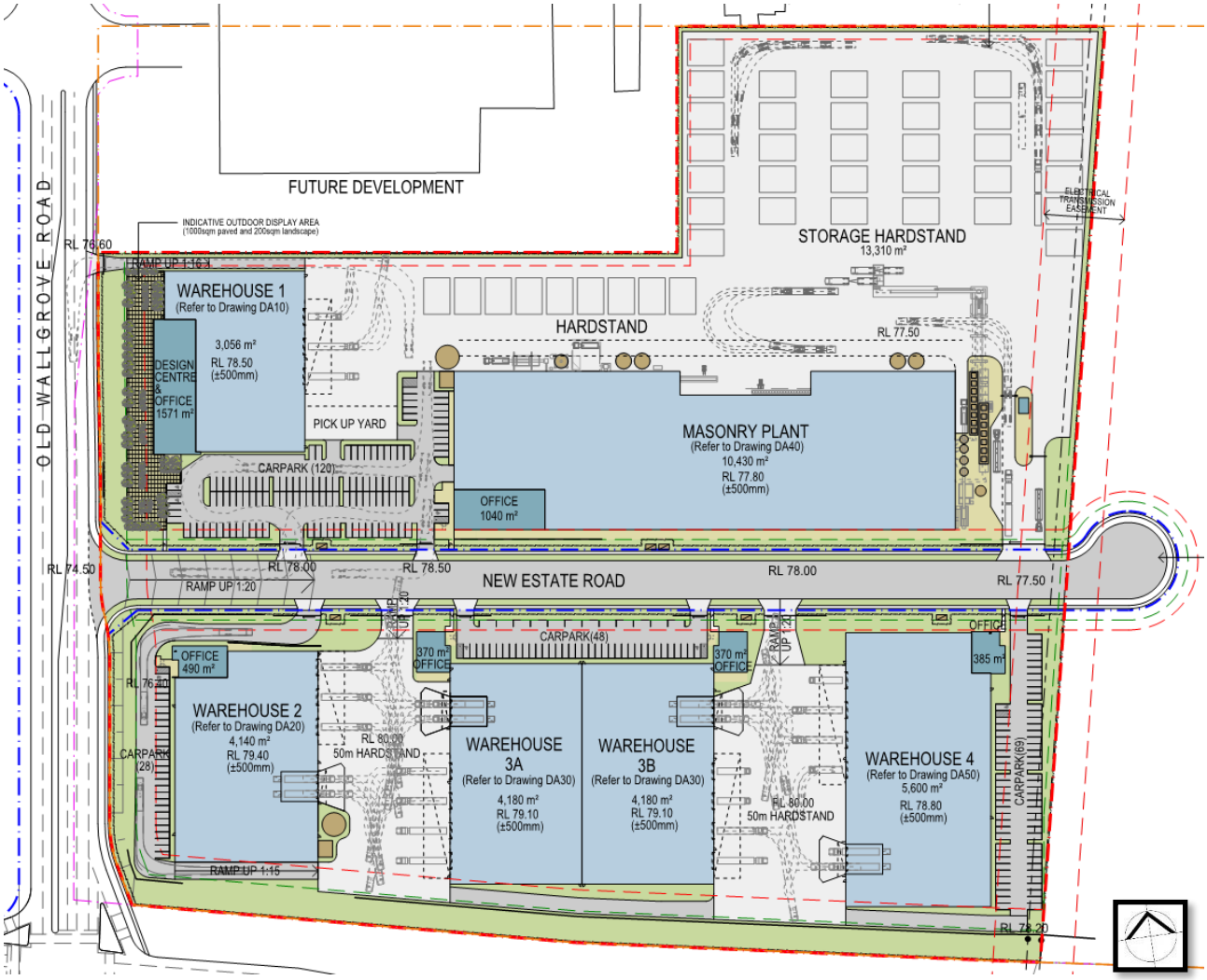


Figure 3-2: Oakdale East Estate Plan – Austral Masonry Plant & Warehouse Development

The building site influences the likely fire brigade intervention times, and given the close proximity to the nearest fire station is expected to facilitate a relatively convenient and expedient fire brigade response. Furthermore being located in an outer suburb of a major city, the development is provided with the services and facilities expected in an urban setting. The two nearest fire brigade stations provided with permanent staff are Huntingwood and Smithfield, which are approximately 8.5 km and 14 km from the site respectively when considering actual driving directions.

3.3 SITE LAYOUT

The Austral masonry plant and warehouse buildings within the Oakdale East estate are depicted within Figure 3-2. The total area of the development site is approximately 108,000 m² which contains the following facilities, as detailed within Table 3-1:

- Storage Hardstand that covers an area of approximately 13,310 m².
- Masonry Plant with a floor area of approximately 10,430 m².
- Various warehouse tenancies, up to a floor area of 5,600 m², with a ridge height of 13.7 m.
- Each warehouse tenancy and the Masonry Plant building is provided with a dedicated two-storey main office space.

Onsite external carparking is available to either the west, east or north of each tenancy. Loading docks and an associated hardstand are provided for each warehouse tenancy and the Masonry Plant, as depicted within Figure 3-2. The presence and location of dock offices has yet to be determined at this stage in the development.

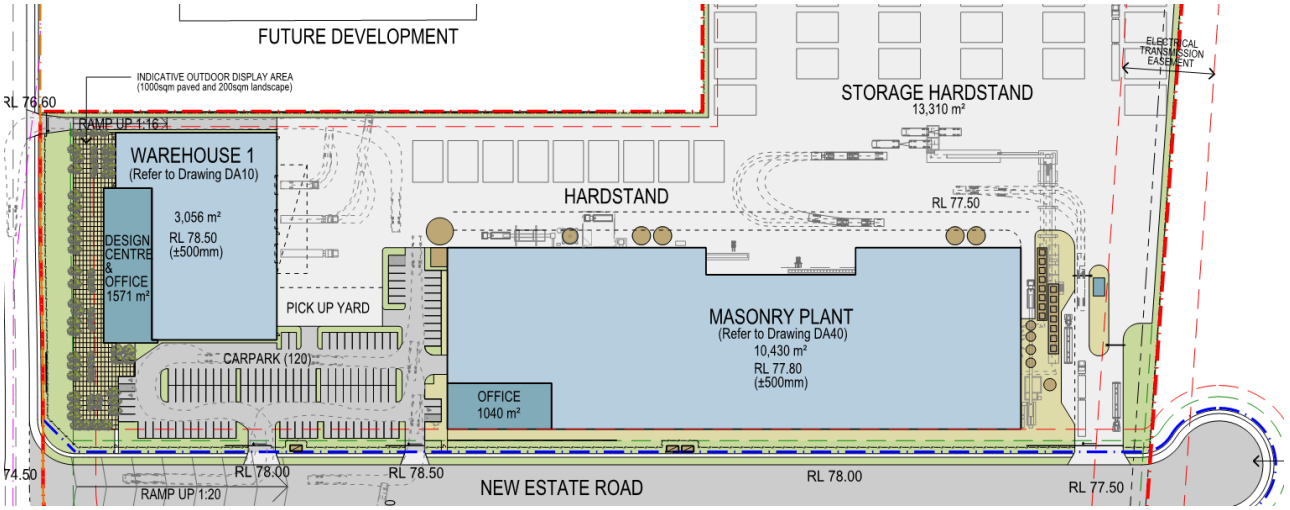


Figure 3-3: Warehouse 1 & Masonry Plant – Site Plan

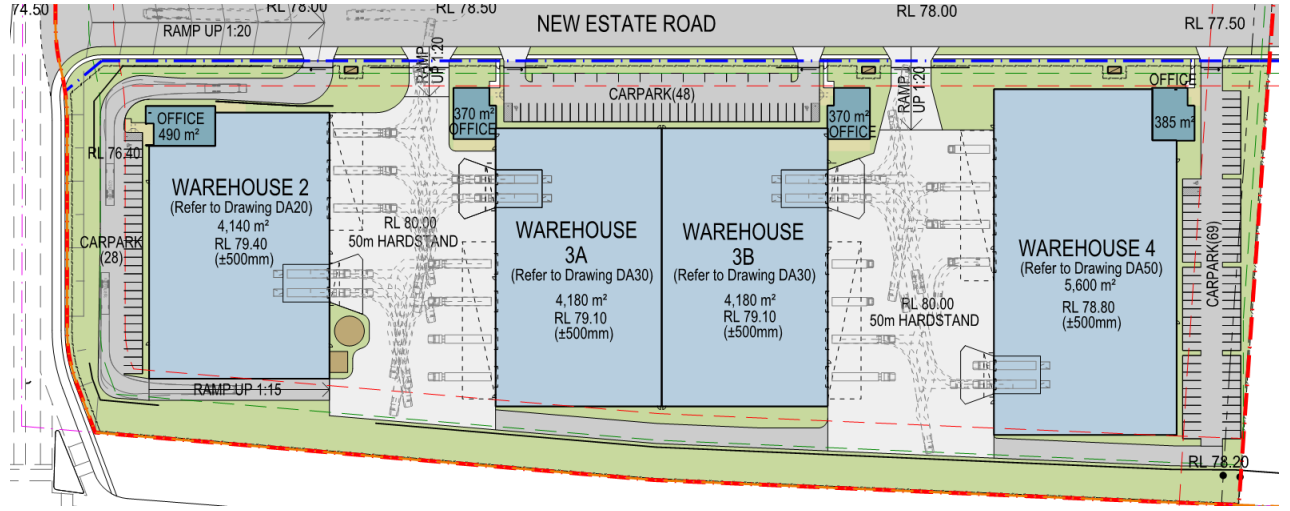


Figure 3-4: Warehouses 2, 3 & 4 – Site Plan

3.4 BUILDING STRUCTURE

The warehouses shall be constructed as steel portal frame structures with dado panel walls and a metal sheet roof. All materials and elements should achieve the requisite Fire Resistance Levels (FRL) and fire hazard properties associated with Type C construction.

3.5 BCA ASSESSMENT SUMMARY

Table 3-1: BCA Building Characteristics – Masonry Plant

CHARACTERISTIC	DESCRIPTION
Classification	Class 8 (Masonry Manufacturing Plant); Class 5 (Office)
Construction Type	Type C required, Large Isolated Building
Rise in Storeys	Two (2)
Effective Height	Less than 12 m
Floor Area	Masonry Plant: 10,430 m² Masonry Plant Main Office: 1,040 m² *Storage Hardstand: 13,310 m²*
Volume	Greater than 108,000 m³

Table 3-2: BCA Building Characteristics – Warehouse 1

CHARACTERISTIC	DESCRIPTION
Classification	Class 7b (Storage); Class 5 (Office)
Construction Type	Type C required, Large Isolated Building
Rise in Storeys	Two (2)
Effective Height	Less than 12 m
Floor Area	Warehouse 1: 3,056 m² Warehouse 1 Main Office: 1,571 m²
Volume	Less than 108,000 m³

Table 3-3: BCA Building Characteristics – Warehouse 2

CHARACTERISTIC	DESCRIPTION
Classification	Class 7b (Storage); Class 5 (Office)
Construction Type	Type C required, Large Isolated Building
Rise in Storeys	Two (2)
Effective Height	Less than 12 m
Floor Area	Warehouse 2: 4,140 m² Warehouse 2 Main Office: 490 m²
Volume	Less than 108,000 m³

Table 3-4: BCA Building Characteristics – Warehouse 3

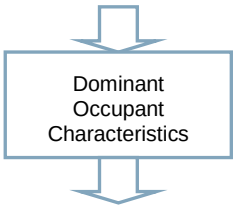
CHARACTERISTIC	DESCRIPTION
Classification	Class 7b (Storage); Class 5 (Office)
Construction Type	Type C required, Large Isolated Building
Rise in Storeys	Two (2)
Effective Height	Less than 12 m
Floor Area	Warehouse 3A: 4,180 m² Warehouse 3B: 4,180 m² Warehouse 3A Main Office: 370 m² Warehouse 3B Main Office: 370 m²
Volume	Less than 108,000 m³

Table 3-5: BCA Building Characteristics – Warehouse 4

CHARACTERISTIC	DESCRIPTION
Classification	Class 7b (Storage); Class 5 (Office)
Construction Type	Type C required, Large Isolated Building
Rise in Storeys	Two (2)
Effective Height	Less than 12 m
Floor Area	Warehouse 4: 5,600 m² Warehouse 4 Main Office: 385 m²
Volume	Less than 108,000 m³

4 DOMINANT OCCUPANT CHARACTERISTICS

4.1 OVERVIEW



The occupant characteristics are assessed within the Fire Safety Strategy due to the following:

1. Population numbers can dictate the time required to evacuate the building and the required life safety systems to be provided due to evacuation times.
2. Physical and mental attributes affect the occupants' capacity to respond to various fire cues and react accordingly.
3. Familiarity of occupants can affect the time taken to evacuate the building and subsequent active / passive requirements.

4.2 OCCUPANT NUMBERS AND DISTRIBUTION

The BCA assumes the following occupant densities per an area's function and use according to Table D1.13 [1]:

- Factory: 50 m² per person
- Warehouse: 30 m² per person
- Office: 10 m² per person

In the absence of specific occupant numbers provided by the tenant, populations estimated from the above densities will be utilised in the analysis, therefore providing a conservative population in the warehouse parts.

4.3 OCCUPANT ATTRIBUTES

Occupants in the buildings may be of mixed age, although the elderly and children are generally not expected to be present. The population is therefore expected to be that of the general working public and be adults between the ages of 16 to 70. Due to the expected nature of the work conducted the majority of occupants are assumed to be able bodied people with a small number of less mobile occupants requiring assistance during an evacuation.

All occupants are expected to be awake and alert adults or in the direct company of an adult, capable of entering the leaving the buildings under their own volition. Occupants in all of these areas are not expected to be adversely impaired by drugs, alcohol, fatigue or other adverse conditions to degrees greater than in other warehouse and office buildings.

- ***Staff and Security*** are expected to be mobile with normal hearing and visual abilities, and occupants in this group are considered to take and implement decisions independently, and require minimal assistance during evacuation in a fire emergency. This occupant group is expected to be awake and fully conscious at all times when inside the building; and
- ***Clients / Visitors*** are expected to be mobile with normal hearing and visual abilities, this occupant group are expected to be capable of making and implementing decisions independently however may require assistance in locating the nearest and safest egress path in an emergency; and
- ***External Maintenance Contractors*** are expected to be mobile with normal hearing and visual abilities and occupants in this group are considered to take and implement decisions independently and require minimal assistance during evacuation in a fire emergency. The contractors are expected to be awake and aware of their surroundings at all times when inside the building; and
- ***FRNSW*** are expected to be equipped with safety equipment and will be educated in firefighting activities and the dangers associated with fire incidents. This occupant group would be expected to be in a position to assist other occupants requiring assistance to evacuate. It is not expected that this occupant group would be present in the building at the time of fire ignition; however, they are expected to enter the building at a later stage to assist with the evacuation of occupants, if required, and to undertake fire suppression activities.

4.4 OCCUPANT FAMILIARITY

The majority of occupants within the building are expected to be staff and therefore the population in general are likely to react favourably in an emergency situation.

- ***Staff, Maintenance and Security*** can be expected to have a good familiarity with the building and the fire safety systems provided and may be trained in emergency procedures; and

- ***Clients / Visitors*** may or may not be familiar with the layout of the building and may require assistance in locating the exits; and
- ***External Maintenance Contractors*** this occupant group is expected to have a reasonable familiarity with the building as they would have to undergo site specific induction prior to commencement of work on site; and
- ***FRNSW*** are not expected to have any familiarity of the building layout, however are assumed to obtain the required information from the site block plans and tactical fire plans available prior to entering the building. Notwithstanding this they will be equipped with breathing apparatus and specialist equipment to prevent them from being adversely affected by fire hazards.

4.5 EMERGENCY TRAINING

Occupants should be familiar with escape procedures through fire drills and designated fire wardens being appointed to mitigate risks under Workplace Health and Safety legislation (AS 3745:2010). Clear escape routes should be maintained with doors unlocked, and no obstructions or rubbish to hinder evacuation.

Staff and visitors are not expected to have fire suppression training and such training is not relied upon for this building population; however staff are expected to possibly attempt to extinguish a fire or limit fire spread by removing objects in the vicinity of the fire in order to defend their belongings.

5 FIRE BRIGADE CHARACTERISTICS

5.1 OVERVIEW

Fire brigade characteristics are assessed within the FSS as brigade characteristics can dictate the time required for fire brigade intervention including search and rescue, and fire attack.

5.2 FIRE BRIGADE ASSESSMENT

Figure 5-1 to Figure 5-5 illustrate the location of dedicated fire services provided for each building. These include the Main Fire Indicator Panels (FIP), sprinkler boosters, sprinkler tanks, pump rooms, and available perimeter vehicular access paths for brigade intervention.

It is noted that some of these locations such as the those for the fire hydrant boosters and some sprinkler facilities are yet to be shown on the architectural drawings and therefore are to be confirmed.

The estate is located within the Fire and Rescue New South Wales (FRNSW) jurisdictional turnout area. The closest two fire stations to the site that are provided with permanent staff are located in Huntingwood and Smithfield, which are approximately 8.5 km and 14 km away from the site, respectively.

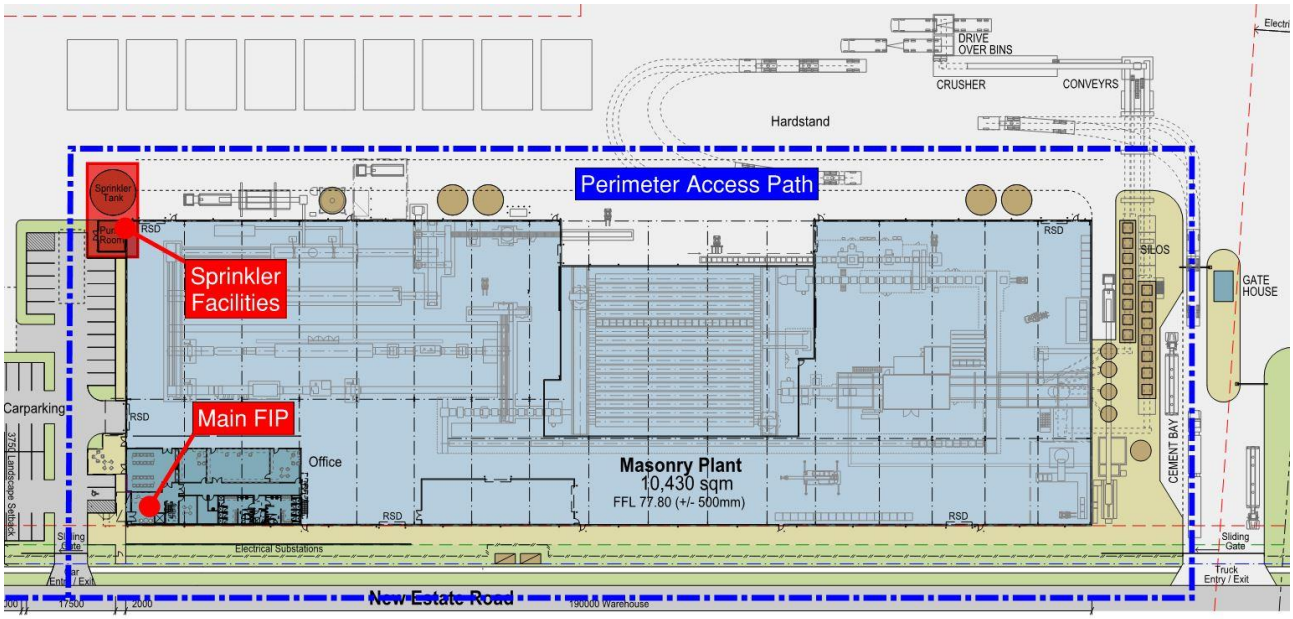


Figure 5-1: Fire Brigade Access and Site Facilities – Masonry Plant 1

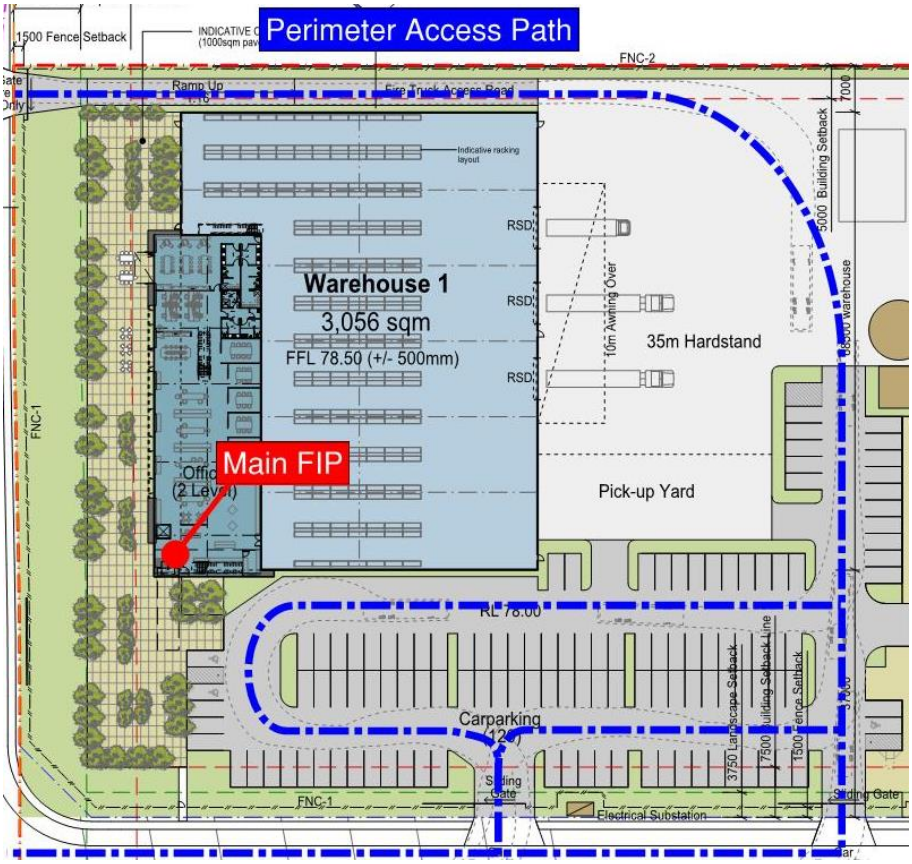


Figure 5-2: Fire Brigade Access and Site Facilities – Warehouse 1

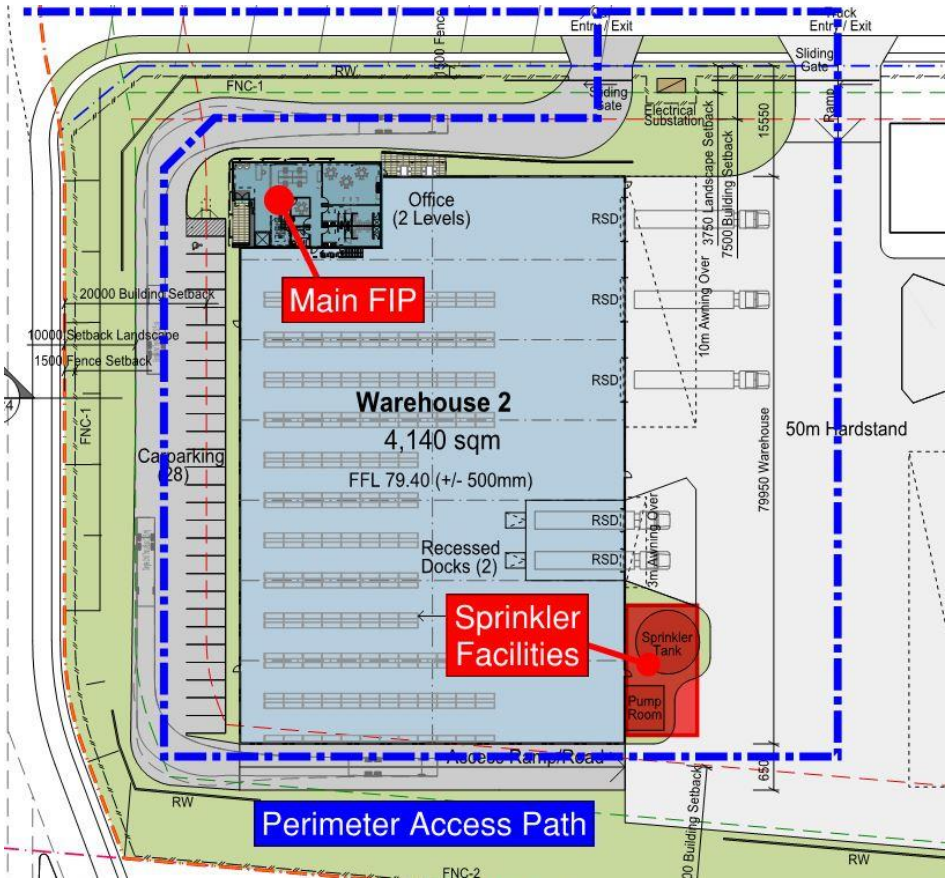


Figure 5-3: Fire Brigade Access and Site Facilities – Warehouse 2

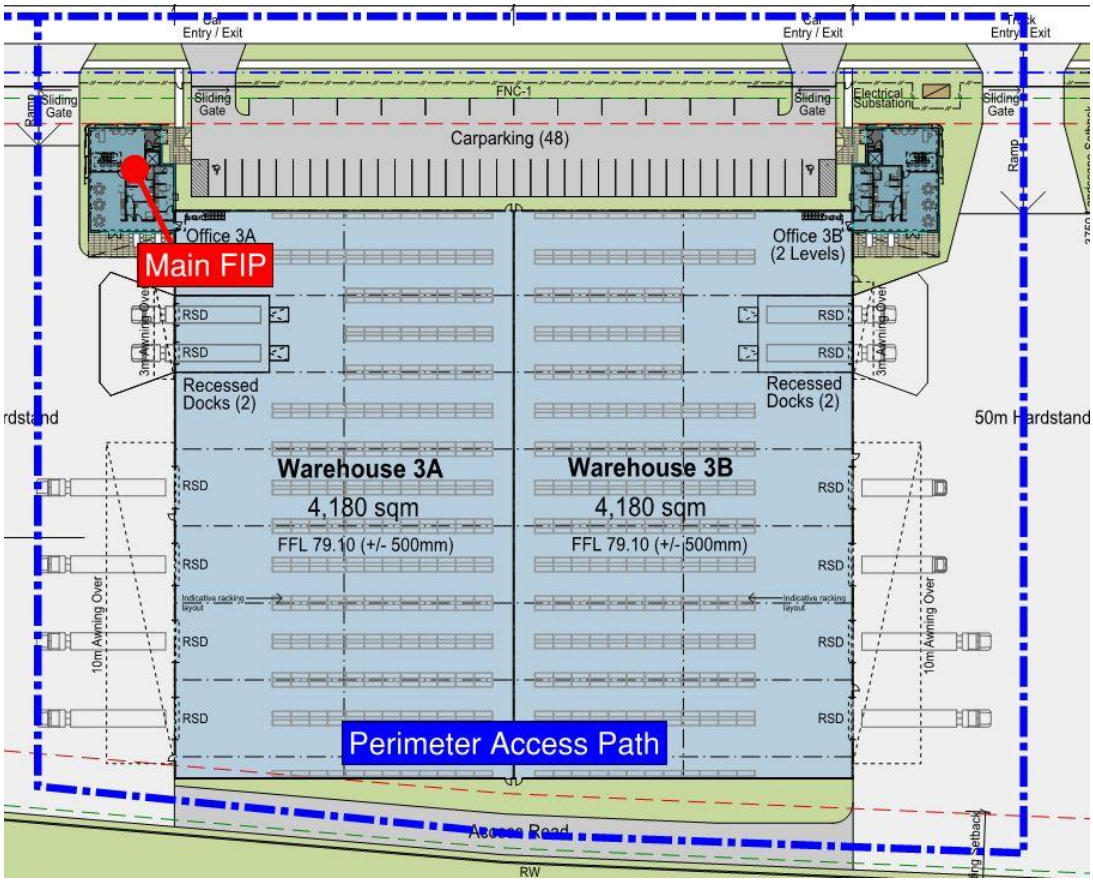


Figure 5-4: Fire Brigade Access and Site Facilities – Warehouse 3

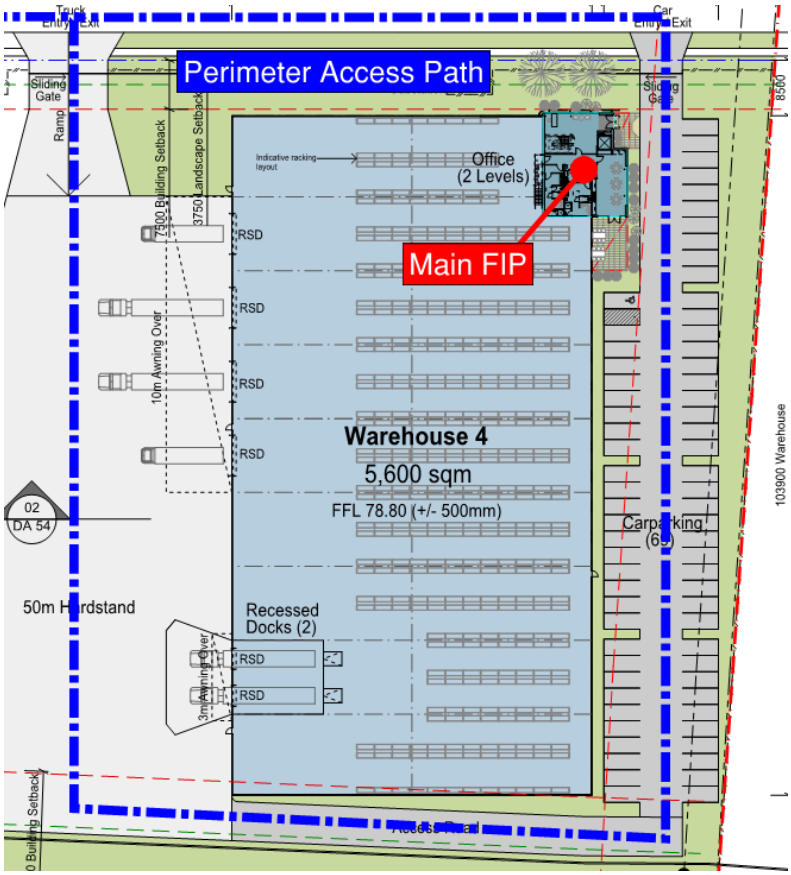


Figure 5-5: Fire Brigade Access and Site Facilities – Warehouse 4

6 FIRE HAZARDS AND PROTECTIVE MEASURES

6.1 OVERVIEW

The fire hazard analysis forms the basis for the review of non-compliances within the building. In assessing expected and statistically validated hazards, preventative and protective measures are developed commensurate with those expected risks. The following section reviews applicable hazards and recommends possible measures to address those risks. Furthermore, the hazards identified can form a justified basis for selected scenarios.

6.2 FIRE HAZARDS

Subsequent to a review of the relevant fire statistics [5,6,7] and hazards, the fire hazards specific to this development are summarised below.

6.2.1 General Layout

Exits are provided around the buildings' perimeter to allow for multiple alternative egress opportunities. With respect to the Masonry Plant building, final exits locations are to accommodate internal plant arrangements. Due to the open nature of the warehouse buildings, there are limited dead end travel routes to exits, however due to the buildings' large areas, extended travel distances to the nearest exit and between alternative exits are present.

No hazards to adjoining buildings have been identified and internal hazards are minimal. Due to the open space and multiple egress opportunities, internal fire exposures are also expected to be minimal as occupants in the area of fire origin are likely to immediately become aware of fire and are likely to commence evacuation.

6.2.2 Activities

Within the Masonry Plant, manufacturing processes will incorporate kilns and other high temperature machinery. However, it is not expected that regular hot work processes, use of highly flammable materials, manufacturing processes or operation of high friction or high temperature machinery will be performed within the warehouse buildings. These warehouse buildings function as storage facilities, and are likely to contain a large number of high-piled combustibles within racking.

6.2.3 Ignition Sources

Ignition sources relevant to this site, in order of occurrence are as follows:

Industrial & Manufacturing Facilities

- Unintentional
- Equipment/heat source failure
- Unclassified cause
- Intentional

Warehouse

- Intentional
- Electrical distribution / lighting
- Heating equipment
- Shop tools / industrial equipment

Office

- Intentional
- Electrical distribution / lighting
- Heating equipment

6.2.4 Fuel Sources

Quantity of Materials

- Masonry Plant – 40 MJ/m² for kilns and drying rooms, 200 MJ/m² for brick pressing and up to 1,000 MJ/m² when wooden grates are present.
- Warehouse – The racked storage areas are likely to have the densest fire load, with between 200 MJ/m² – 1,700 MJ/m² expected depending on the type of items stored. Racking containing rubber and paper products can be higher than this expected range and is dependent on how high the products are stacked.
- Office – 800 MJ/m² with isolated peak values reaching 1,600 MJ/m².

Dangerous Goods

Dangerous goods cannot be discounted from being present in the building. However the quantity will be limited by the space available and relevant workplace health and safety regulations will apply governing storage allowances (quantity) and requirements.

Location of Materials

Significant fuel loads will be limited to racking within the warehouse tenancies. Products will be distributed about the high storage racking, store rooms, and waste and rubbish containers, but are anticipated to be the densest within the racking aisles of the warehouse space. The lobbies and stairways are to be maintained clear of furniture, stored items and the like and constructed with materials and assemblies in accordance with C1.10 to reduce fire spread and smoke production in the event of fire in common areas.

Fire Behaviour

Fire growth rates will vary with fuel type and conditions of ventilation and compartmentation. The most likely outcome of any fire outbreak within the buildings is a sprinkler-controlled fire. This would be expected to grow at an ultra-fast time-squared fire growth rate until sprinkler activation in the manufacturing and warehouse areas, at which point the sprinklers are expected to suppress or control the fire. A medium t^2 fire growth rate is expected in the office areas.

6.3 PREVENTATIVE AND PROTECTIVE MEASURES

6.3.1 Fire Initiation and Development and Control (Sub-System A)

To minimise the risk of fires initiating and growing to a size which may impact on the building occupants, fire safety systems are to be utilised within the building as listed in the following sections.

6.3.2 Smoke Development and Spread and Control (Sub-System B)

It is recognised that smoke is one of the most serious threats to life safety in the event of a fire. Whilst this warehouse will not be fitted with an automatic smoke exhaust system:

- The volume of the masonry plant and warehouse tenancies will act as a large smoke reservoir to increase the available evacuation time for occupants.
- A manual smoke clearance system is to be provided for those warehouses that would prescriptively require an automatic smoke exhaust system.

6.3.3 Fire Spread and Impact and Control (Sub-System C)

To limit the extent and impact of fire spread through the buildings, the following are to be implemented in the building.

- Type C construction
- Sprinkler systems documented in Sub System D
- The distances from the nearest fire source feature (site boundary) are greater than 3 m on all sides.

6.3.4 Fire Detection, Warning and Suppression (Sub-System D)

The following active systems are to be used within the buildings to facilitate occupant warning and suppress a potential fire.

- Occupant warning system
- Storage mode sprinkler system at roof level within the masonry plant and warehouse tenancies
- Sprinkler system to offices, car parks, and beneath awnings
- Fire hose reels
- Fire extinguishers

6.3.5 Occupant Evacuation and Control (Sub-System E)

The building is to be provided with the following systems to assist in the evacuation of occupants:

- Emergency lighting
- Exit signage
- Multiple exits located on all four sides of the building
- Emergency management plan

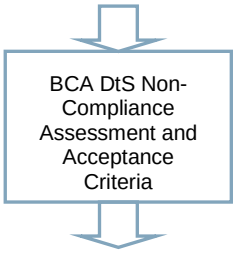
6.3.6 Fire Services Intervention (Sub-System F)

Each building is to be provided with the following systems to assist in fire brigade intervention:

- Fire hydrants & hydrant booster valve
- Sprinkler booster valve
- Automatic link to fire brigade
- Control & Indicating Equipment
- Perimeter vehicular access with minor non-conformances

7 BCA DTS NON-COMPLIANCE ASSESSMENT

7.1 OVERVIEW



In this instance the BCA DtS non-compliances have been formulated based on the regulatory review as provided by the principal certifying authority. Where not listed herein the building is required to achieve compliance with relevant DtS provisions or if existing, comply with relevant codes, reports and / or Standards approved at the time of consideration.

The following table lists the departures from the DtS provisions of the BCA for the proposed building and the analysis methodology proposed for the Fire Engineering assessment, which is to be generally in accordance with the IFEG [3].

7.2 BCA DTS NON-COMPLIANCE ASSESSMENT

Table 7-1: Summary of Performance Solutions

BCA DTS PROVISIONS	DETAILS OF PERFORMANCE BASED SOLUTION

Vehicular Perimeter Access
 	
BCA DtS Provisions
Clause C2.4: Requirements for open spaces and vehicular access
 	
Performance Requirements
CP9
	Relevant BCA DtS Provisions
	Clause C2.4: The building must be provided with continuous perimeter vehicular access with no part of the roadway less than 6 m in width and no more than 18 m from the building. The pathway must also permit the passage and operations of fire brigade appliances.
	DtS Variation
	The following non-compliances are present on the site:
	• The perimeter access path is greater than 18 m from the building in the following instances:
	  ◦ Eastern perimeter of the Masonry Plant.
	  ◦ Western perimeter of Warehouse 1.
	  ◦ Northern perimeter of Warehouse 3.
	  ◦ Northern perimeter of Warehouse 4.
	• The perimeter pathway is discontinuous around the entrance to Warehouse 2.
	• The perimeter pathway is reduced to a 4 m width along the northern perimeter of Warehouse 1.
	Performance Solution
	Perimeter access is provided in a forward direction around the entirety of the site. Alternative vehicular access for the smaller brigade appliances and personnel is available via the carparks provided and the brigade is afforded the ability to stage at all four corners of each building. Any gates in this pathway shall be openable by fire authorities to facilitate access.
	Assessment Methodology
	The assessment methodology follows Clauses A0.3(a)(i) and A0.5(b)(ii) of the BCA. An absolute and qualitative approach shall be used in order to establish that the design matches the relevant Performance Requirements so that efficient and uninhibited access around the building can be achieved to facilitate the intervention of the fire brigade and other emergency services.

Extended Travel Distances and Smoke Hazard Management	**Relevant BCA DtS Provisions** Clause D1.4: Travel distances to the nearest exit must not exceed 40 metres. Clause D1.5: Travel distances between alternative exits must not exceed 60 metres. Clause E2.2 (Table E2.2a): Requires a large isolated building greater than 108,000 m^3 in volume be provided with an automatic smoke exhaust system with extraction rates as detailed in BCA Specification E2.2b and smoke zones not greater than 2,000 m^2.

BCA DTS PROVISIONS	DETAILS OF PERFORMANCE BASED SOLUTION
BCA DtS Provisions Provision D1.4: Distance to the nearest exit. Provision D1.5: Distance between alternative exits Provision E2.2: Smoke hazard management **Performance Requirements** DP4 & EP2.2	**DtS Variation** The following non-compliances have been identified over the estate: • Masonry Plant: Travel distances extend up to 90 m to the nearest exit and 120 m between alternative exits. • Warehouse 1: Travel distances extend up to 70 m between alternative exits. • Warehouse 2: Travel distances extend up to 65 m between alternative exits. • Warehouse 3: Travel distances extend up to 50 m to the nearest exit and 95 m between alternative exits. • Warehouse 4: Travel distances extend up to 50 m to the nearest exit and 95 m between alternative exits. • A manual smoke clearance system shall be installed within the Masonry Plant building, in lieu of an automatic smoke exhaust system. • Smoke zones shall exceed 2,000 m². **Performance Solution** The Performance Solution will rely upon the sprinkler protection and the volume of the enclosures to act as a smoke reservoir for hot combustion products with significant reserve so as to provide the population with adequate time to safely evacuate the building prior to the onset of untenable conditions. **Assessment Methodology** The analysis shall be absolute, quantitative and deterministic in nature in accordance with Clauses A0.3(a)(i) and A0.5(b)(ii) of the BCA. CFD analysis is utilised to model the expected smoke behaviour in the warehouses and subsequently an ASET/RSET time-line analysis is undertaken to determine safe occupant evacuation.
External Hydrants **BCA DtS Provisions** Provision E1.3: Fire Hydrants **Performance Requirements** EP1.3	**Relevant BCA DtS Provisions** Clause E1.3: requires that a fire hydrant system is provided and installed in accordance with AS2419.1, which in turn requires an internal hydrant to achieve coverage from a single hose length. **DtS Variation** Hydrants that may be located beneath warehouse awnings shall be treated as external hydrants, thereby allowing two hose lengths for coverage. External hydrants shall not be afforded the full height protection of a 90/90/90 FRL radiant heat shield. **Performance Solution** The hydrants located beneath the awnings are to have all the requirements of an external hydrant per AS2419.1:2005, except that they are located under the building footprint and are not provided with 90/90/90 FRL heat shields. The building is provided with sprinkler protection, and dado wall panelling provides radiant heat protection up to a height of 2.4 m. **Assessment Methodology** The analysis shall be comparative and quantitative in nature, with a supporting absolute argument in accordance with Clauses A0.3(a)(i),(ii) and A0.5(b)(ii),(d) of the BCA. The analysis will demonstrate that considering these hydrants as external hydrants shall not negatively impact the safety of the warehouse. Therefore, intervention by firefighters shall be adequately facilitated by the hydrant layout provided.

8 PROPOSED FIRE SAFETY STRATEGY

8.1 OVERVIEW

The FSS outlined below has been proposed to satisfy the fire and life safety objectives specified for this project by the relevant stakeholders. In addition, the FSS is required to adequately address the specific fire and life safety hazards identified for the proposed development, and as such have been generally derived from the preventative and protective measures outlined within the BCA, and fire engineering literature and research. Where items of non-compliance have not been identified by the design team in the concept design phase, it is expected that those items will be DtS solutions.

This section provides guidance for the design and application of fire safety measures. It highlights specific design considerations for a range of fire safety measures that will undergo analysis as part of the FER to ascertain whether the relevant Performance Requirements of the BCA are satisfied. Design guidance (general informative details and specific requirements) for a range of specific fire safety measures is provided. This list is not exhaustive and the use of other fire safety measures including new technologies will require additional review.

8.2 PASSIVE FIRE PROTECTION

8.2.1 Type of Construction Required

The buildings shall be built in accordance with the BCA DtS provisions for Type C fire-resisting construction, as large-isolated buildings.

Separation and setback zones (12 m from southern boundary and 25 m from eastern boundary) are to be adhered to and provided as per the Bushfire Protection Assessment by Australian Bushfire Protection Planners (Report No. B183246), dated 9 October 2018.

8.2.2 Insulated Sandwich Panelling

Where insulated sandwich panelling is utilised within the building, it is to be installed in accordance with the requirements of the IPCA Code of Practice.

- Any insulated sandwich panelling must have a Group 1 Certificate when tested to AS ISO 9705-2003, or an FM Class 1 Certificate when tested to FM 4881.
- The insulated sandwich panelling is to be listed on the Fire Safety Schedule for the building.
- The location of any insulated sandwich panelling is to be nominated on an architectural plan or similar, mounted at the FIP.
- In accordance with the Annexure B of the Code of Practice, labels must be placed on all doors leading into the building, compartments and rooms that have utilised insulated sandwich panel systems.

8.3 EGRESS PROVISIONS

8.3.1 Evacuation Strategy

Activation of any sprinkler heads or detectors should initiate the evacuation of all areas within the respective building. Dedicated fire wardens from the warehouse and office areas should ensure that all clients, visitors, and staff are promptly evacuated.

8.3.2 Travel Distances

In the warehouse, the travel distances to the nearest exit and between alternative exits must be compliant with the BCA DtS requirements with the following exceptions:

- Masonry Plant: Travel distances extend up to 90 m to the nearest exit and 120 m between alternative exits.
- Warehouse 1: Travel distances extend up to 70 m between alternative exits (see Figure 8-1 for recommended exit door locations).
- Warehouse 2: Travel distances extend up to 65 m between alternative exits.
- Warehouse 3: Travel distances extend up to 50 m to the nearest exit and 95 m between alternative exits.
- Warehouse 4: Travel distances extend up to 50 m to the nearest exit and 95 m between alternative exits.

These travel distance non-conformances shall be addressed through a Performance Solution that demonstrates that occupants have sufficient time to evacuate from the Masonry Plant and warehouse tenancies due to the volume of each compartment.

Exits are to be located so as to minimise the extent of extended travel distances and reduce the likelihood for smoke detection within the buildings. Particularly considering the layout and access within the Masonry Plant, occupants are to be provided with compliant travel distances to a point of choice.

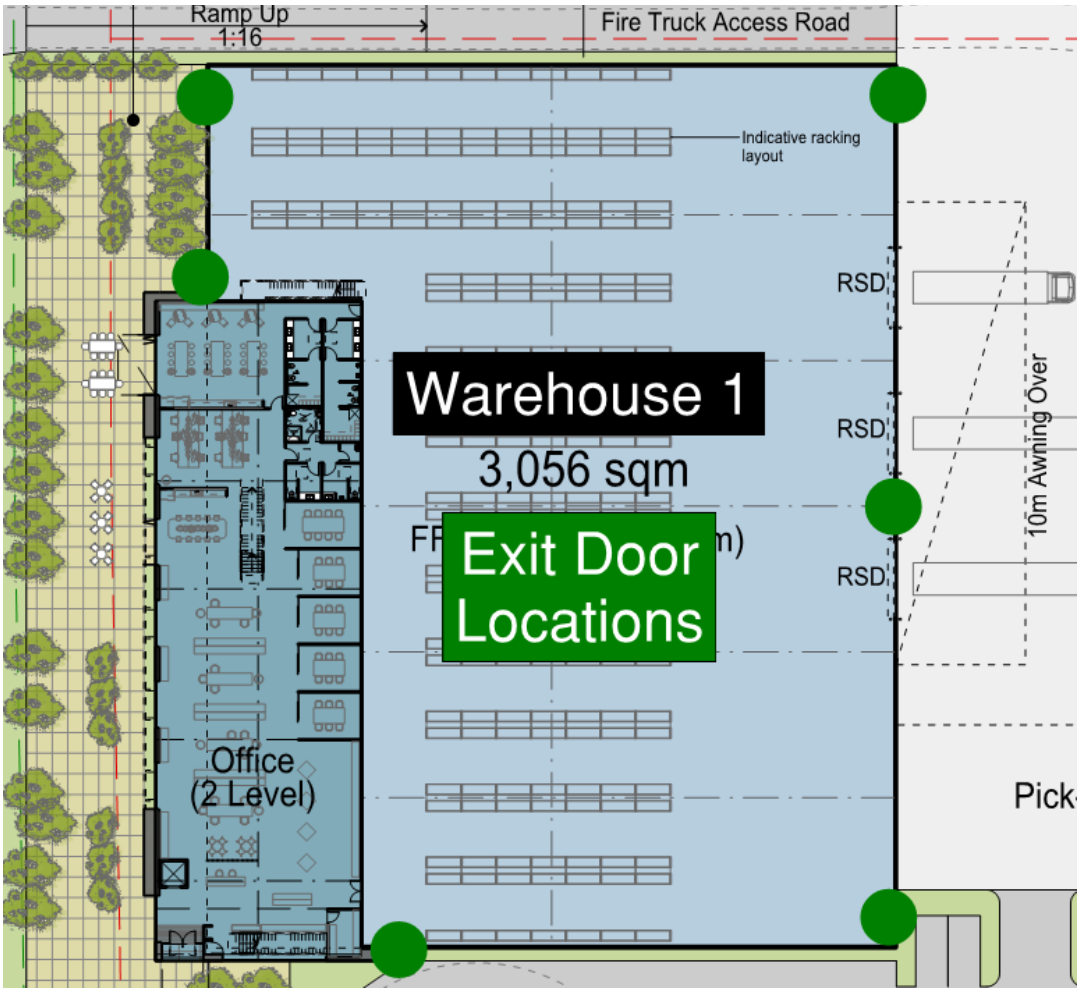


Figure 8-1: Warehouse 1 – Exit Door Locations

8.3.3 Door Hardware, Operation and Mechanisms

All exit doors and doors in a path of travel to an exit are required to be DtS compliant throughout the building. This includes the swing of doors, the applied latching and locking mechanisms and the force required on mechanism used to open sliding doors.

8.3.4 Signage and Lighting

Emergency lighting is to be provided throughout the building in accordance with DtS Provisions E4.2 and E4.4 of the BCA and AS2293.1:2005.

Exit signage is to be provided throughout the building in accordance with the DtS Provisions E4.5, E4.6, E4.8 and AS2293.1:2005 with the directional signage at the end of the racking aisles and above block storage areas permitted to be installed at a height of 2.7 m or a height specifically agreed to by the Authority Having Jurisdiction, as per Clause 6.8.1 of AS2293.1:2005.

8.4 ACTIVE FIRE PROTECTION SYSTEMS

8.4.1 Building Occupant Warning System

A building occupant warning system should be provided throughout all parts of the building. The system should be in accordance with the prescriptive requirements of Specification E1.5 and Clause 6 of Specification E2.2a of the BCA and AS1670.1:2015.

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

8.4.2 Smoke Detection System

Due to the small volume of Warehouse 1, Warehouse 2 and Warehouse 3 tenancies, a smoke detection system for occupant warning may be necessary to facilitate occupant evacuation. This will be verified through detailed fire engineering analysis and smoke modelling. The extent of travel distances will also have an impact upon whether smoke detection is determined to be necessary or not.

In the event of travel distances in excess of the DtS Provisions being present in the main offices on the estate, detection will likely be required throughout each affected office in accordance with AS1670.1:2015.

8.4.3 Fire Sprinkler System

A fire sprinkler system shall be provided throughout the building in accordance with the relevant regulatory requirements. Each building is to be provided with an independent system with dedicated fire pump, water supply tanks and booster assemblies.

Note that at the time of the construction certificate application, it is likely that the adoption of the new sprinkler standard AS2118.1:2017 will be necessary. Although this may be read to imply that the sprinkler booster must be located at the site entry (as per the hydrant booster), this is not considered to be the intent. As such, the sprinkler booster can be located with the pump and tanks, typically at the rear of the site.

- In the offices and beneath the warehouse awnings the system shall comply with BCA Specification E1.5 and AS2118.1:1999.
- In the warehouses a storage mode system shall be provided in accordance with BCA Specification E1.5 and AS2118.1:1999, with the sprinkler head location, spacing and design capacity in accordance with Factory Mutual Guidelines 2-0 and 8-9 (or NFPA regulations). Sprinkler activation temperature must be no greater than 101°C and have a Response Time Index (RTI) of no greater than 50 $m^{1/2}s^{1/2}$ (i.e. fast response type).
- Upon sprinkler activation the building occupant warning alarm shall be initiated throughout the building and the direct brigade notification activated.

8.5 FIRST AID FIRE FIGHTING

8.5.1 Fire Hose Reels

Fire hose reels shall be provided throughout the building in accordance with Clause 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).

If required, a Performance Solution can be developed to permit hose reel coverage to be achieved by the utilisation of 50 m-length hose reels. This would be on the basis of the following requirements:

- Staff training will be undertaken on site so as to familiarise staff with the additional weight of 50 m hoses.
- The 50 m hose reel system will be designed to comply with the pressure and flow requirements of AS2441.
- Hose reel coverage is to be achieved without requiring more than 2 bends of the hose to reach a fire.

8.5.2 Portable Fire Fighting Equipment

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.

8.6 FIRE BRIGADE INTERVENTION

8.6.1 Control and Indicating Equipment

Each building should be provided with a Main FIP at the entry to the main offices. The Main FIP must be installed in accordance with BCA Specification E2.2a and AS1670.1:2015 and have the following capabilities:

- The FIP must be capable of isolating, resetting, and determining the fire location within the building.
- A red strobe should be installed at the entry door to the FIP to alert arriving fire brigade of the fire alarm origin and FIP location.
- Where a manual smoke clearance system is installed (for the Masonry Plant), smoke clearance fan controls should be provided at the FIP. If a separate fire fan control panel is provided, it should include a display to indicate the operation or otherwise of the fans.
- Pending future discussions and consultation with FRNSW, a Sub-FIP or Mimic Panel may be required within the additional offices for Warehouse 3B; however based on recent precedent, this is not expected.

8.6.2 Fire Hydrants

A dedicated hydrant system with independent booster assembly must be provided for each building on the estate, in accordance with BCA Clause E1.3 and AS2419.1:2005 with the following specifications:

- The locations of the hydrant booster assemblies are currently undetermined, but it is likely that they will be located at the entrance to the site along the estate road, within sight of the main building entry.
- An external hydrant should be provided adjacent to or within close proximity of each external entry/exit point around the building.
- As far as possible, the hydrant system should consist of external hydrant points. Where the size and design of a building requires the provision of internal fire hydrants (Clause 3.2.3.3 of AS2419.1:2005) 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.
  - 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 per the request of FRNSW.
  - 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, per the request of FRNSW.

    Note: 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.
  - A localised block plan should be provided at each external hydrant pictorially and numerically illustrating the location of the next available hydrant. These localised block plans should be of a size appropriate to their notice and location, and be of all-weather fade-resistant construction.
- Should hydrants be located beneath the warehouse awnings, they are to be designed and installed in accordance with the provisions for external fire hydrants, via a Performance Solution.
  - Coverage of the areas beneath awnings must be provided by compliant external hydrants i.e. additional fallback hydrants.
- On the basis of sprinkler protection being provided, a Performance Solution is proposed to omit prescriptive radiant heat shield protection to external hydrants (inclusive of hydrants under the awning) with the expectation that the concrete dado wall panelling will be present up to a height of 2.4 m.
- Gates are to be provided within the external fence along the southern perimeter of the Masonry Plant to ensure that brigade personnel are able to access hydrants without delay (as depicted in Figure 8-2).
- The system should incorporate a ring main 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). These couplings should be tested as part of the system when the commissioning tests are undertaken.

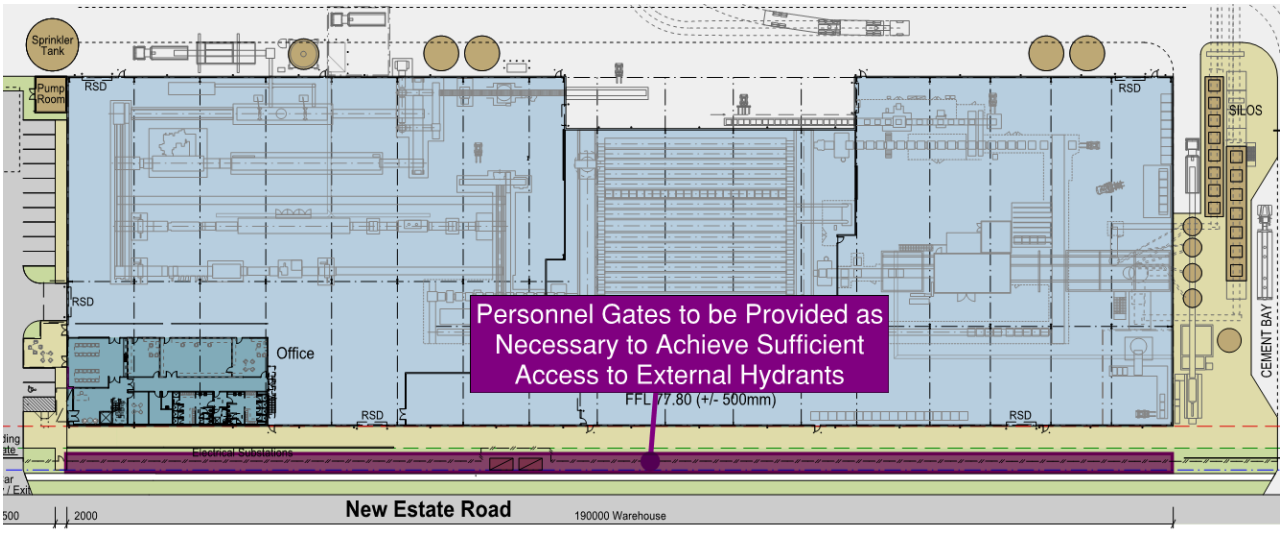


Figure 8-2: Masonry Plant – Access to External Hydrants

8.6.3 Manual Smoke Clearance System

Due to the volume of the Masonry Plant building exceeding 108,000 m³, an automatic smoke exhaust system is prescriptively required. However through a holistic Performance Solution, a manual smoke clearance system is proposed. The smoke clearance system should be designed to achieve the following minimum requirements:

Note: Should Warehouse 3 exceed a volume of 108,000 m³, this building will also require a manual smoke clearance system for each tenancy.

- System capacity must be capable of an exhaust rate equal to one enclosure air change per hour.
- Adequate make-up air should be provided at low level to facilitate the clearance system's designed operational capacity. 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 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.
- Initiation switches should be located at the FIP.
- Signs and a mechanical block plan alerting the fire brigade to the operation of the smoke clearance system must be provided.
- 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.

8.6.4 Vehicular Perimeter Access

The vehicular perimeter access pathway should be provided around the whole of the building. These should be designed and constructed with an all-weather surface capable of supporting all FRNSW appliances in accordance with BCA Clause C2.4 and FRNSW Policy No. 4 '*Guidelines for Emergency Vehicle Access*', available at http://www.fire.nsw.gov.au/gallery/files/pdf/guidelines/vehicle_access.pdf with the following exceptions permitted:

- The perimeter access path is greater than 18 m from the building in the following instances:
  - Eastern perimeter of the Masonry Plant.
  - Western perimeter of Warehouse 1.
  - Northern perimeter of Warehouse 3.
  - Northern perimeter of Warehouse 4.
- The perimeter pathway is discontinuous around the entrance to Warehouse 2.
- The perimeter pathway is reduced to a 4 m width along the northern perimeter of Warehouse 1.

To justify the above non-compliances, the Performance Solution is reliant upon the following measures:

- Access around the Masonry Plant, Warehouse 1, Warehouse 2 and Warehouse 4 requires travel through designated pedestrian carparks. The design of these carparks must also consider the manoeuvrability of FRNSW vehicles and thus adhere to "Policy No. 4 'Guidelines for Emergency Vehicle Access" developed by FRNSW.

  Note: the traffic engineer is to confirm all swept paths for brigade appliances around the perimeter access pathway.
- Access to the northern face of Warehouse 3 is available through the designated carpark for pedestrians and smaller emergency vehicles.
- Sprinkler tank suction points must be located such that the connected brigade appliance(s) do not obstruct vehicular access around the building.
  - Additionally, dedicated bays with line-marking are to be provided for these brigade appliance(s).
- All gates, security fencing, and boom gates should be readily openable by the fire authorities. This can be achieved through one, or a combination of, the following:
  - Fitted with locks that are openable with a 003 key; and/or
  - Fitted with locks / latches that are openable with a master key, swipe, or badge with copies of these keys/swipes/badges provided to the two local fire brigade stations; and/or
  - Mechanical gates and boom gates should open on fire trip and power failure.

Note: regarding the electrical transmission easement (see Figure 8-8), consultation with FRNSW during the FEBQ process will require information regarding easement width, span widths, clearance heights and the nominal maximum voltage. Additionally, sprinkler facilities and anticipated brigade operations are to not be located within this easement.

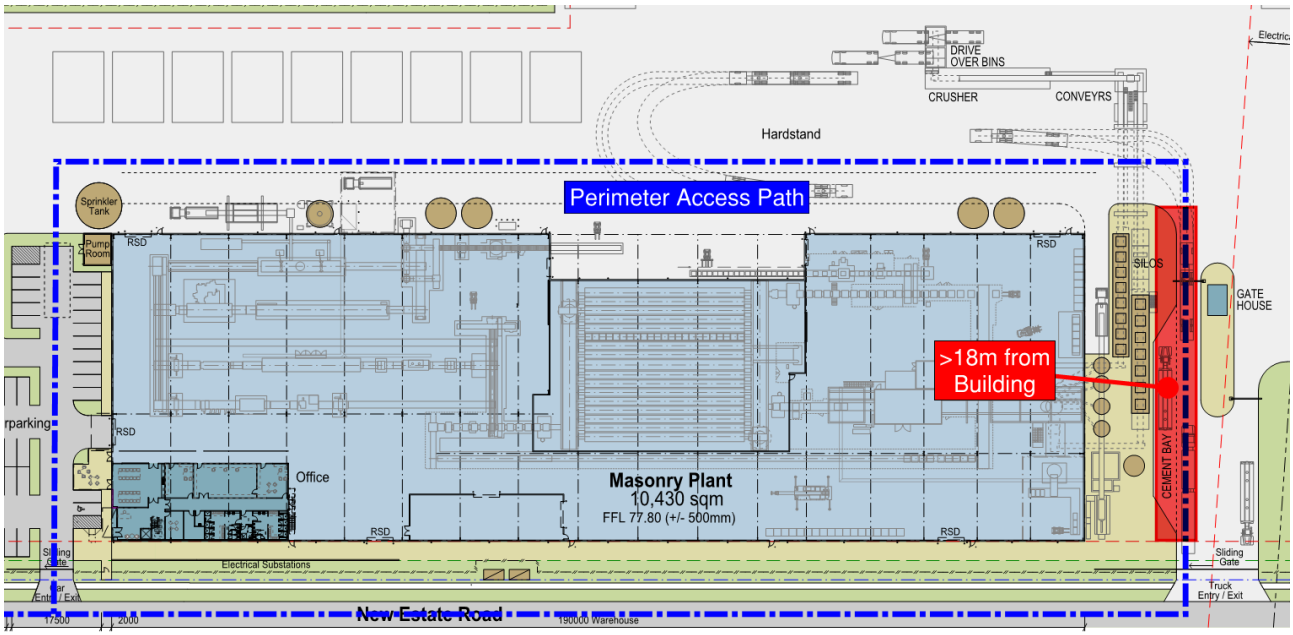


Figure 8-3: Vehicular Perimeter Access Path – Masonry Plant

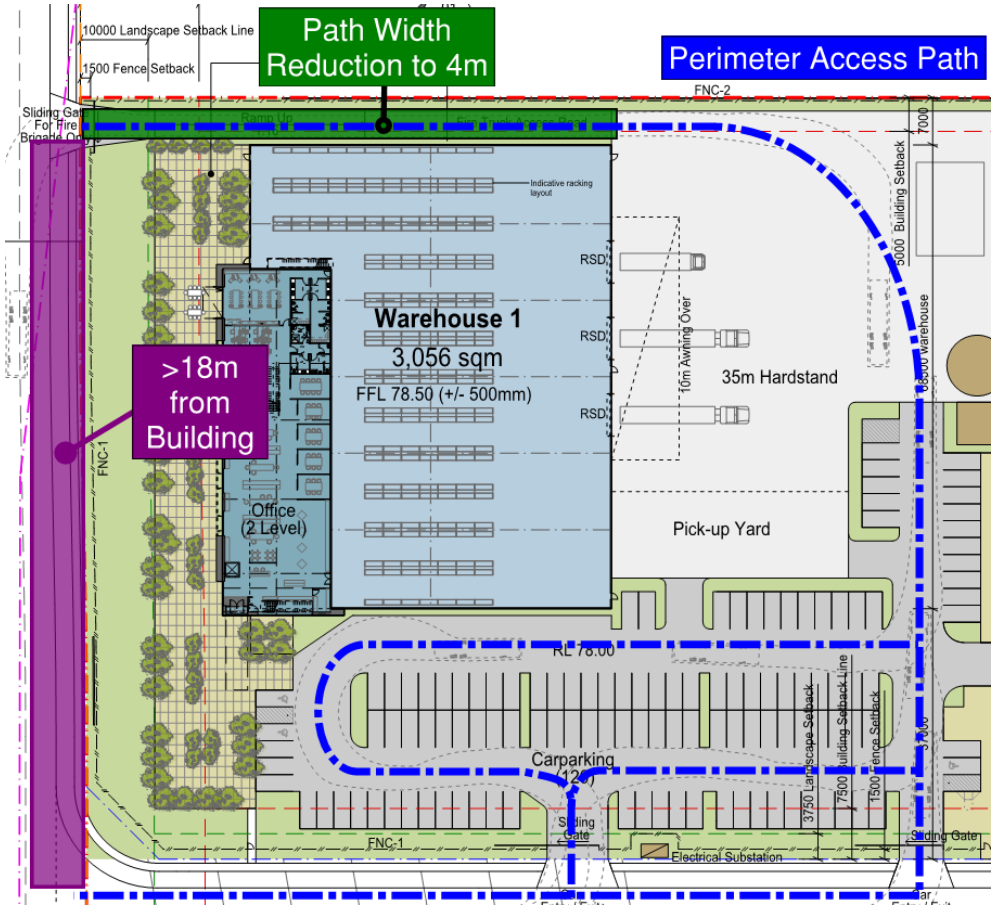


Figure 8-4: Vehicular Perimeter Access Path – Warehouse 1

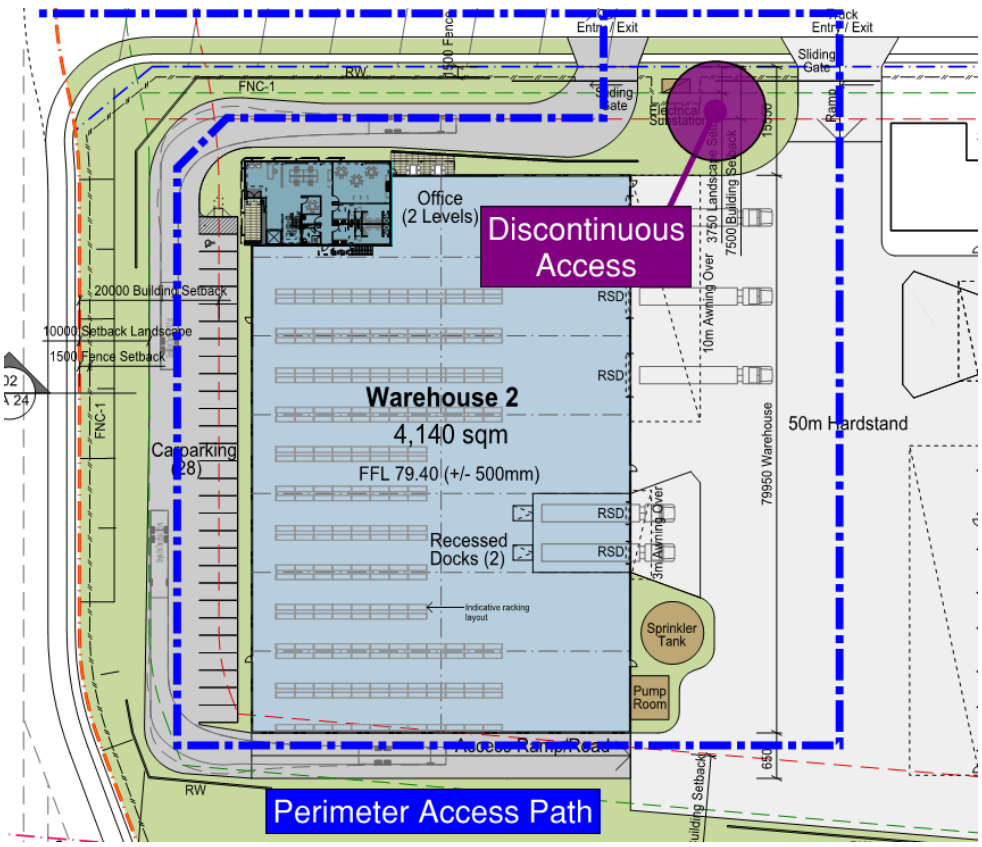


Figure 8-5: Vehicular Perimeter Access Path – Warehouse 2

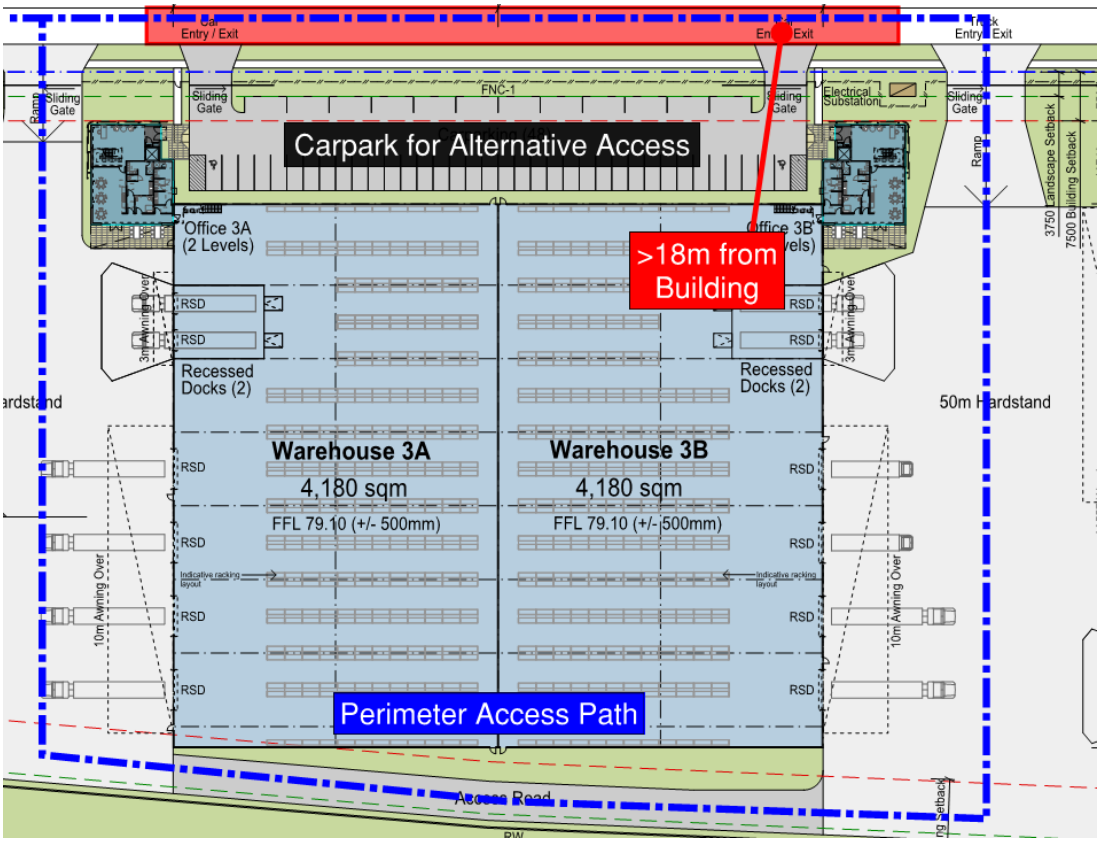


Figure 8-6: Vehicular Perimeter Access Path – Warehouse 3

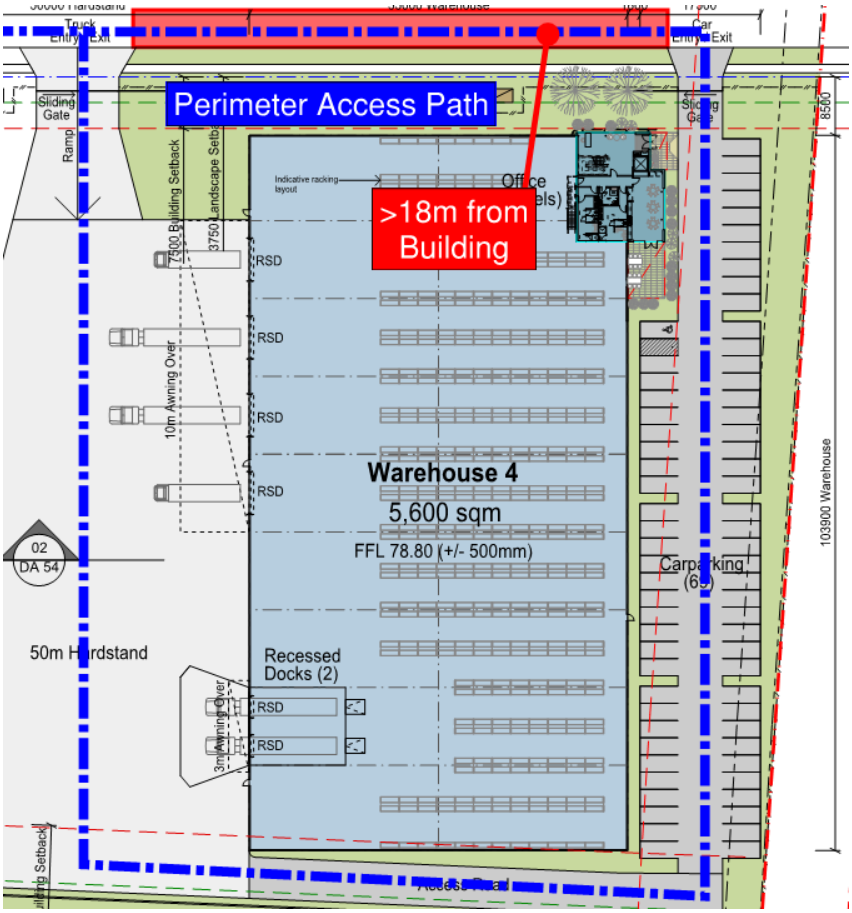


Figure 8-7: Vehicular Perimeter Access Path – Warehouse 4

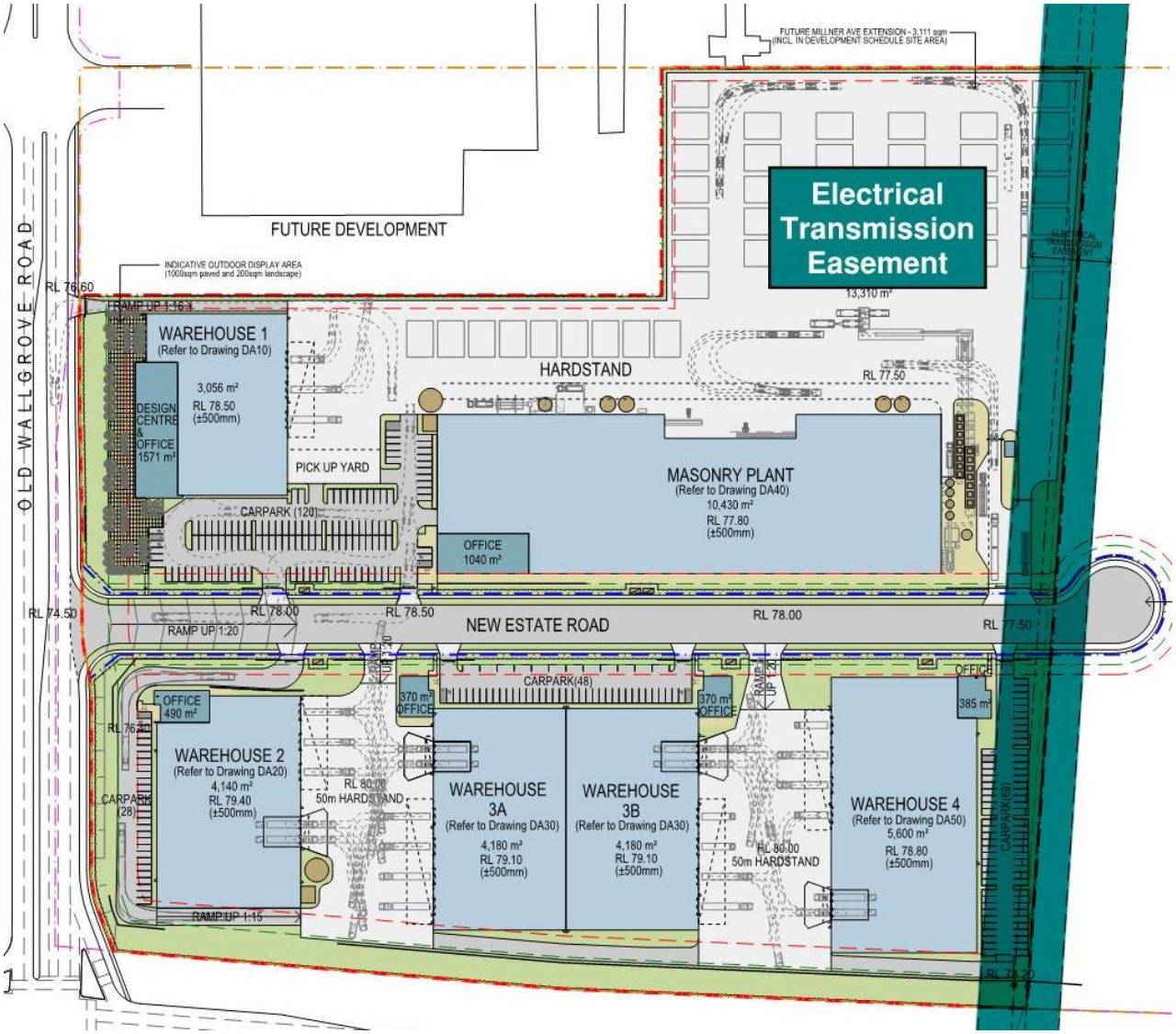


Figure 8-8: Location of Electrical Transmission Easement

8.7 BUILDING 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.

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

8.7.2 Evacuation Plan

An emergency management plan should be developed for the site in accordance with AS3745:2010.

9 NOMENCLATURE

ACRONYM	EXPANSION
ABCB	Australian Building Codes Board
AFSS	Annual Fire Safety Statement
ASET	Available Safe Evacuation Time
BCA	Building Code of Australia
CFD	Computational Fluid Dynamics
DtS	Deemed-to-Satisfy
EPA	Environmental Protection Authority
FCC	Fire Control Centre
FER	Fire Engineering Report
FIP	Fire Indicator Panel
FRL	Fire Resistance Level
FRNSW	Fire Rescue NSW
FSS	Fire Safety Strategy
IFEG	International Fire Engineering Guidelines
NCC	National Construction Code
NFPA	National Fire Protection Association
OHS	Occupational Health and Safety
RSET	Required Safe Evacuation Time
RTI	Response Time Index

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