Report

Fire Safety Strategy

PORT BOTANY INDUSTRIAL ESTATE – STAGE 1

Goodman Limited

Report

CONFIDENTIAL

Revision: 1.2 - FOR ISSUE
Issued: 1 October 2014

Norman Disney & Young

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1 EXECUTIVE SUMMARY

This Fire Safety Strategy details the Fire Engineering recommendations that are required to be provided in the buildings to demonstrate compliance with the nominated Performance Requirements of the Building Code of Australia (BCA) as part of the Fire Engineering Report.

Note: The Fire Engineering recommendations in this strategy are subject to change pending a detailed Fire Engineering analysis being undertaken.

Port Botany Industrial Estate Stage 1 is located at McPherson Street & Coal Pier Road, Botany. The proposed development consists of two warehouse buildings with ancillary two-level offices and mezzanine storage, hardstands and truck access, recessed loading docks and on-grade car parking.

The site of the proposed Stage 1 development is illustrated in blue in the diagram below.

Site Location Plan – Port Botany Industrial Estate

1.1 Building Description

Both Warehouse A and B are proposed to be classified as large isolated buildings and will separately exceed 18,000m ² in area and 108,000m³ in volume, with an internal clear height exceeding 12m.

The site is bounded to the north and east by undevelopable land and flood storage provisions, McPherson Street to the south and Coal Pier Road to the west. Vehicle access to site is available from both McPherson Street and Coal Pier Road, with perimeter vehicle access provided to both buildings. A 55m hardstand separates the two buildings, with recessed docks to each warehouse.

As part of the flood storage provisions in the area, a separate narrow allotment is located between the site and McPherson Street, with two easements provided for access.

A summary of the building attributes is given in the following table, based upon the preliminary drawings provided:

Building Attributes

Attribute	Number or Type
Classification	Class 7b (warehouse) with 5 (office) & 7a (undercroft parking) parts
Number of storeys contained	3
Rise in storeys	3 (Ground warehouse, Level 1 office & Mezzanine storage)
Type of construction	B
Effective height	<12m
Maximum fire compartment size	Greater than 18,000m² and 108,000m³ (large isolated building)

1.2 Proposed Alternative Solution

Based on the BCA Assessment Report received from Blackett Maguire + Goldsmith, reference 140382 Revision 1, dated 1 October 2014, a number of non-compliances have been identified that are proposed to be addressed via Alternative Solution.

A Fire Engineering assessment will be undertaken to demonstrate the suitability of the fire safety systems within Warehouses A & B of Stage 1 at Port Botany Industrial Estate, Botany and compliance with the nominated performance criteria of the Building Code of Australia (BCA).

The Alternative Solution will be determined by a systematic performance-based evaluation generally complying with the International Fire Engineering Guidelines from the Australian Building Codes Board.

The non-compliances with the BCA Deemed-to-Satisfy Provisions identified at this stage of the project are summarised below. The table provides details of the following for each identified non-compliance:

- Relevant BCA clause
- BCA Performance Requirement
- International Fire Engineering Guidelines (IFEG) sub-system
- Issue/non-compliance
- Assessment methodology

The alternative solutions developed for the identified non-compliances are subject to acceptance by Fire & Rescue NSW and the relevant authority having jurisdiction.

BCA and IFEG Parameters

Alt Sol	BCA Clause	IFEG SS	Non-Compliances to DtS Solution	Performance Requirement	Method
A	C1.1, Spec C1.1	SS A SS C SS F	Table 4 of Specification C1.1 requires Class 7b buildings of Type B construction to have internal load-bearing walls and columns achieve an FRL for structural adequacy of 240 minutes. It is proposed to reduce the FRL of the columns and internal walls supporting the first and second floor levels to 120 minutes. Specification C1.1 requires any external wall within 3.0m of the allotment boundary to achieve a Fire Resistance Level (FRL). The southwest corner of Warehouse B is adjacent to the boundary to the separate Orica flood storage allotment and is not proposed to achieve an FRL.	CP1 CP2	A0.5(b)(i) A0.9(b)(ii)
B	C2.4	SS F	Perimeter vehicular access is provided with the following deviations from Clause C2.4, as indicated in the diagram below: ▪ Vehicle access is more than 18m from the western elevation of both buildings and part of the southern elevation of Warehouse B; ▪ Vehicle access to the east of Warehouse A is not provided, however suitable turning provisions are provided to the north and south sides to facilitate brigade operations; ▪ Vehicle access will be built upon by security gates; and ▪ Vehicle access to the site requires crossing the separate Orica flood storage allotment to the south via a Right of Carriageway.	CP9	A0.5(b)(i) A0.9(b)(ii)
C	D1.4 D1.5 D1.10	SS A SS B SS D SS E SS F	The egress system in each building contains the following non-compliances: ▪ Travel distance to a single exit from the Mezzanine storage areas will up to 30m in lieu of 20m; ▪ Travel distances to one of two exits from the warehouse areas will be up to 70m in lieu of 40m; ▪ Travel distances between alternative exits within the warehouse areas will be up to 120m in lieu of 60m; and ▪ Discharge from Warehouse B requires travel via the easement over the adjoining Orica flood storage allotment to the south to reach the public road.	DP4 EP2.2	A0.5(b)(i) A0.9(b)(ii)

Alt Sol	BCA Clause	IFEG SS	Non-Compliances to DtS Solution	Performance Requirement	Method
D	E1.3	SS C SS D SS F	Due to the configuration of the buildings, the single fire hydrant booster assembly serving the site will not be located within sight of the main entrance to each building. In addition, as the buildings are sprinkler-protected, it is not proposed to provide fire-rated construction to protect external hydrants located within 10m of the buildings. Hydrants located under the hardstand awnings are considered internal however will require two lengths of hose to provide compliant coverage as permitted from external hydrants.	EP1.3	A0.5(b)(i) A0.9(b)(ii)
E	E2.2 Spec E2.2b	SS B SS E SS F	A performance-based rationalised smoke exhaust system will be provided to the warehouse areas to meet the Performance Requirements of the BCA.	EP2.2	A0.5(b)(i) A0.9(b)(ii)

NOTES:

The following Sub-systems of the International Fire Engineering Guidelines (IFEG) are referenced above:

SS A – Fire Initiation & Development & Control

SS B – Smoke Development & Spread & Control

SS C – Fire spread & Impact & Control

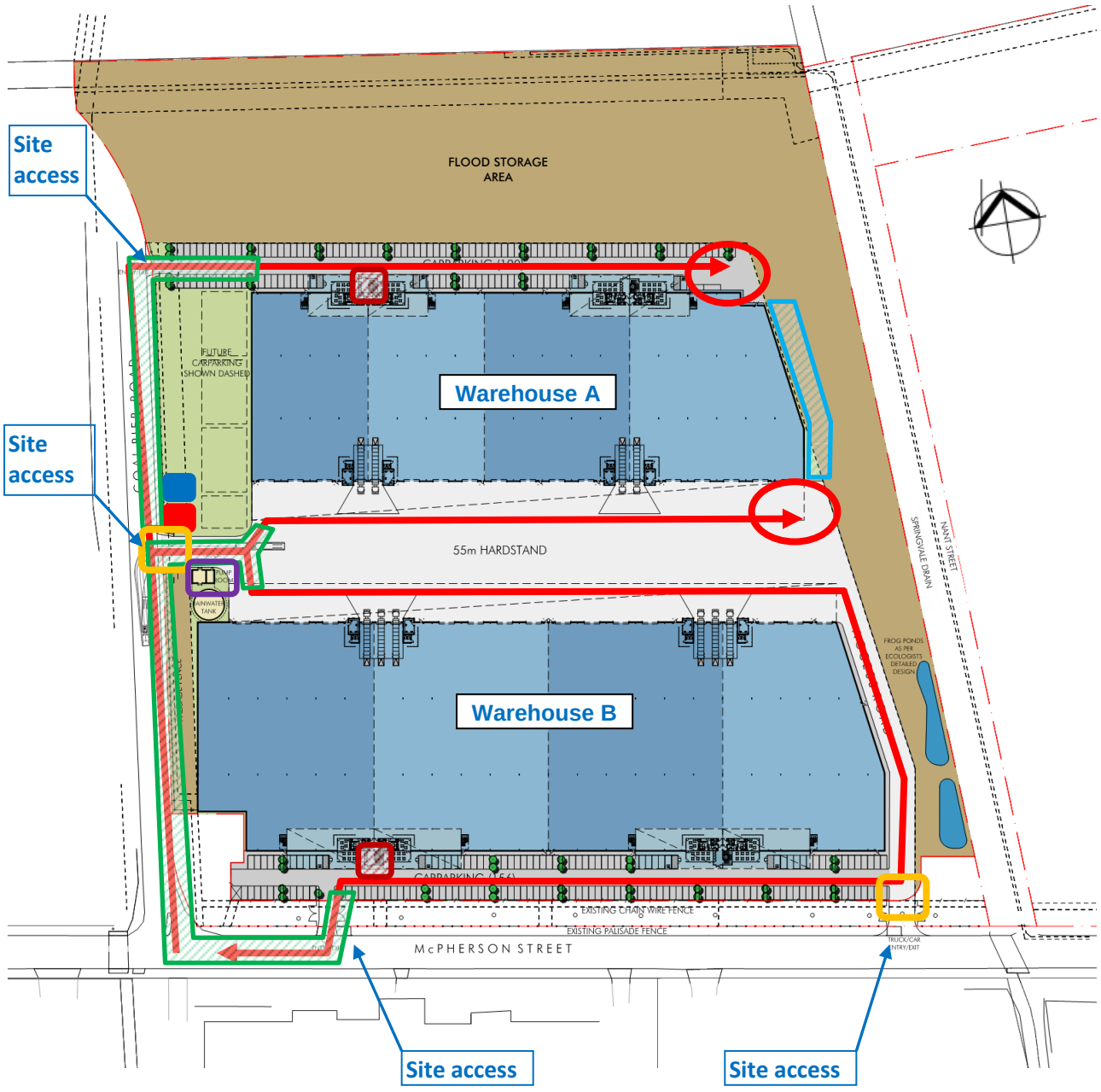
SS D – Fire Detection, Warning & Suppression

SS E – Occupant Evacuation & Control

SS F – Fire Services Intervention

The perimeter vehicle access provisions to the site are indicated in the following diagram.

Perimeter Vehicle Access for Emergency Vehicles



- Access route built upon by gates
- Vehicle access >18m from the building
- Vehicle access not provided to elevation
- Location of Fire Services Pump Room
- Indicative location of sprinkler booster
- Fire Brigade access
- Vehicle turning provisions complying with Policy No. 4
- Indicative Fire Control Centre locations
- Indicative location of fire hydrant booster

1.3 Objectives

1.3.1 BCA Objectives

The goal of the BCA is to achieve and maintain acceptable standards of structural sufficiency, safety (including safety from fire), health and amenity for the benefit of the community.

The BCA extends no further than is necessary in the public interest, is cost effective, easily understood, and is not needlessly onerous in its application.

1.3.2 Objectives of the Fire Safety Strategy

The objectives of this Fire Safety Strategy are to:

- Agree the design objectives of the project brief;
- Establish the Fire Safety Concept Design to meet the design objectives; and
- Agree with stakeholders the assessment methodology necessary to demonstrate that the proposed development complies with the Performance Requirements of the BCA.

1.4 Relevant Stakeholders

The Fire Engineering Design Team included the following stakeholders:

Fire Engineering Design Team

Role	Team Member	Organisation
Client	Adrian Tesoriero Guy Smith	Goodman Limited
Principal Certifying Authority (PCA)	Steven Rodriguez	Blackett Maguire + Goldsmith
Architect	TBA	NettletonTribe
Fire Engineer	Garth Thomas Damien Flynn (C10)	Norman Disney & Young
Fire Brigade	TBA	Fire & Rescue NSW

1.5 Fire Safety Strategy Revision History

Fire Safety Strategy Revision History

Revision	No.	Date Issued	Comment
First Issue	1.0	29 August 2014	Draft for stakeholder review
Second Issue	1.1	25 September 2014	For Issue incorporating updated design
Third Issue	1.2	1 October 2014	For Issue incorporating updated BCA Report

2 FIRE ENGINEERING REQUIREMENTS

2.1 General

The recommendations in this section shall be implemented to achieve the objectives of the fire safety strategy for the building. This section is designed to be a checklist that identifies the necessary fire safety systems and other fire engineering requirements that should be included in the building design.

No justification for non-compliance with the 'Deemed to Satisfy' (DtS) Provisions of the Building Code of Australia (BCA) is given in this section. All non-compliances shall be justified in the Fire Engineering Report (FER).

2.2 The Application of the BCA DtS Provisions

Any building feature that is not referred to or affected by this report shall comply with the DtS Provisions of the BCA, relevant Australian Standards, National, State and local legislation as applicable.

Any changes to the building design or layout during the design or construction process must be assessed against the FER. All future modifications, changes or layouts to the building must be reassessed against the FER.

2.3 Summary

The building designs contain a series of non-compliances that shall be addressed in the FER. To support the alternative solutions, a series of fire safety systems shall be installed in the development in accordance with the FER and the recommendations of the BCA.

The fire safety systems in each building shall include:

- A smoke detection and alarm system designed in accordance with BCA Specification E2.2a Clause 5, Clause 7 and AS/NZS 1668.1-1998.
- A building occupant warning system (BOWS) designed in accordance with BCA Specification E2.2a Clause 6 and AS 1670.1-2004.
- An automatic sprinkler system with fast-response sprinkler heads installed throughout the building in accordance with AS 2118.1-1999.
- A performance-based smoke hazard management system comprising of a rationalised smoke exhaust system in the warehouse areas.
- A fire hydrant system in accordance with BCA Clause E1.3 and AS 2419.1-2005.
- A fire hose reel system in accordance with BCA Clause E1.4 and AS 2441-2005.
- Fire extinguishers in accordance with BCA Clause E1.6 and AS 2444-2001.
- Emergency lighting in accordance with BCA Part E4 and AS 2293.1-2005.
- Exit signage in accordance with BCA Part E4 and AS 2293.1-2005.

2.4 Structural Fire Resistance

Both Warehouse A & B are required to be provided with Type B Construction in accordance with the DtS Provisions in the BCA. The table below identifies the necessary fire protection required to the building structure in accordance with Type B Construction.

Note: a reduction of FRLs to internal columns supporting the Level 1 office and Mezzanine levels from 240 mins to 120 mins is included in the proposed alternative solution.

The fire protection is specified as follows: structural adequacy / integrity / insulation. For example, 90/90/90 indicates that the building elements should be provided with 90 minutes fire protection in terms of structural adequacy, integrity and insulation.

Structural Fire Protection Requirements

Building Element (And Distance from Fire Source Feature In Metres)	Warehouse A & B Class 5 and 7a parts	Warehouse A & B Class 7b parts
External Wall (including any column and other building element incorporated therein) –		
For loadbearing parts -		
< 1.5m	120/120/120	240/240/240
1.5 to < 3.0m	120/90/60	240/180/120
3.0m to < 9.0m	120/30/30	240/90/60
9.0m to < 18.0m	120/30/-	240/60/-
≥ 18.0m	-/-/-	-/-/-
For loadbearing parts -		
< 1.5m	-/120/120	-/240/240
1.5 to < 3.0m	-/90/60	-/180/120
≥ 3.0m	-/-/-	-/-/-
External Column – Not incorporated in an external wall		
For loadbearing columns -		
< 18.0m	120/-/-	240/-/-
≥ 18.0m	-/-/-	-/-/-
For non-loadbearing columns -	-/-/-	-/-/-
Common Walls and Fire Walls	90/90/90	240/240/240
Internal Walls –		
Fire-resisting lift and stair shafts –		
Loadbearing	120/120/120	240/120/120 **(Note 1)**
Fire-resisting stair shafts –		
Non-loadbearing	-/120/120	-/120/120

Building Element (And Distance from Fire Source Feature In Metres)	Warehouse A & B Class 5 and 7a parts	Warehouse A & B Class 7b parts
Bounding public corridors, public lobbies and the like –		
Loadbearing	120/-/-	240/-/- **(Note 1)**
Non-loadbearing	-/-/-	-/-/-
Between or bounding sole-occupancy units –		
Loadbearing	120/-/-	240/-/- **(Note 1)**
Non-loadbearing	-/-/-	-/-/-
Other Loadbearing Internal Walls and Columns	120/-/-	240/-/- **(Note 1)**
Roofs	-/-/-	-/-/-

1. **NOTE:** This is proposed to be reduced to 120 mins for the columns and internal walls supporting the Level 1 offices and Mezzanine in both Warehouse buildings, as part of the Alternative Solution.
2. **NOTE:** UPS room(s) shall comply with the fire separation requirements of Clause C2.12 of the BCA, as applicable.

2.5 Fire Indicator Panel (FIP)

The Fire Indicator Panels (FIP) shall be positioned so that access by Fire & Rescue NSW (FRNSW) is readily available. The FIP shall be located and installed at the main entrance to each building in accordance with AS 1670.1-2004 and contain the Fire Fan Control Panel which should be labelled accordingly.

2.6 Fire Detection and Alarm System

- Separate fire detection and alarm systems shall be installed in each building. Below ceiling smoke detectors of the analogue/addressable type will be installed in accordance with BCA Specification E2.2a Clause 5 and AS/NZS 1668.1-1998 extended spacing (i.e. 20m grid throughout the building).
- The smoke detectors will be of the photoelectric type.
- The alarm verification delay shall not exceed 20 seconds in accordance with the requirements of AS 4428.1-1998.
- The smoke detection system must be connected to a fire alarm monitoring system connected to a fire station or approved fire station dispatch centre in accordance with BCA Specification E2.2a Clause 7 and AS 1670.3-2004.
- The fire detection and alarm system shall transmit coded signals via the Fire Indicator Panel (FIP) to the Fire Brigade, building occupant warning system and mechanical air handling systems.

2.7 Building Occupant Warning System (BOWS)

- A building occupant warning system shall be installed throughout each building in accordance with BCA Specification E2.2a Clause 6 and shall comply with the requirements of Clause 3.22 of AS 1670.1-2004. The evacuation signal shall include a verbal message and operate simultaneously throughout the building.
- The occupant warning system shall initiate upon smoke detection, sprinkler activation or manual call point activation anywhere in the building.

2.8 Automatic Fire Sprinkler System

- An automatic sprinkler system with fast response sprinkler heads in accordance with the requirements of AS 2118.1-1999 shall be installed throughout the building.
- All sprinkler heads shall have an RTI no greater than 50 $(ms)^{1/2}$.
- The sprinkler heads in the warehouse roof areas shall have a maximum activation temperature of 93°C.
- Sprinkler heads in the hardstand canopy areas and under any outdoor awning or similar shall have a maximum activation temperature of 93°C.
- All other sprinkler heads throughout the building shall have a maximum activation temperature of 68°C.
- A minimum of a Grade 03 water supply shall be provided in accordance with AS 2118.1-1999.
- Sufficient access must be provided to allow a Fire Brigade aerial appliance to safely manoeuvre past a Fire Brigade pumping appliance which is connected to the sprinkler tank suction connection. Fire & Rescue NSW Guide Sheet No. 5 - Hardstand Areas for FRNSW Appliances provides guidance regarding the minimum space requirements for a FRNSW hard suction connection (see Appendix A).

2.9 Automatic Mechanical Smoke Exhaust System

Smoke exhaust fans shall be provided to the warehouse areas of both buildings to remove smoke as part of the occupant escape and Fire Brigade intervention strategy. Smoke exhaust fans shall be distributed evenly through the warehouse area of each building, located within the roof or ceiling space serving each tenancy.

The total system exhaust rate for each building will be confirmed once a detailed fire engineering assessment has been undertaken, however a preliminary total capacity is suggested for each building as follows:

Warehouse A: 80m^3/s

Warehouse B: 100m^3/s

NOTE: Consideration must be given by the Mechanical Design Engineer to the effective extract opening size to prevent “plug holing” during operation of the smoke exhaust system i.e. to avoid extracting air from below the smoke layer.

The smoke exhaust systems shall include the following:

- Smoke exhaust fans shall be provided evenly in the main warehouse areas of each building, within the roof or ceiling space serving each tenancy.
- Each smoke exhaust fan (complete with its drive, flexible connections, control gear and wiring) must:
    - (i) be constructed and installed with fire rated fans and fan cabling to be capable of continuous operation at a temperature of 200°C for 60 minutes; and
    - (ii) be rated to handle the required volumetric flow rate at ambient temperature to be capable of exhausting cool smoke during the early stages of a fire and to allow routine testing; and
    - (iii) have any high temperature overload devices installed, automatically overridden during smoke exhaust operation; and
    - (iv) be supplied by power supply wiring complying with AS/NZS 1668.1-1998.
- Activation of the smoke exhaust fan(s) shall occur automatically upon smoke detector or sprinkler activation anywhere within the warehouse area or on manual control at the Fire Fan Control Panel located at the FIP.

- Manual override controls for the smoke exhaust fans in the warehouse shall be located at the main FIP for use by the Fire Brigade. Signage shall be provided at the Fire Fan Control Panel (located at the FIP) to assist the user.
- Make-up air shall be provided via permanent openings or automatic opening louvres, roller shutter doors or similar, located evenly around the exterior walls. Automatic opening louvres and/or doors shall failsafe open upon fire detection by either the detection or sprinkler systems serving the warehouse. Final make-up air requirements will be confirmed once detailed smoke modelling has been carried out.
- Hot Air Layer Extract (HALE) fans may be combined with smoke exhaust fans provided they meet the requirements for smoke exhaust fans.
- All mechanical air-handling systems e.g. High Volume Low Speed (HVLS) fans or evaporative cooling/air conditioning systems must shut down on fire detection as per AS/NZS 1668.1-1998.

2.10 Fire Hydrant and Fire Hose Reel System

- The fire hydrant system shall be installed to each building in accordance with Clause E1.3 of the BCA and AS 2419.1-2005, except the booster assembly need not be located within sight of the main entrance.
- The fire hydrant system shall incorporate a ring main for each building.
- Fire hose reels shall be provided throughout the buildings in accordance with BCA Clause E1.4 and AS 2441-2005.
- Storz hermaphrodite Aluminium alloy delivery fire hose couplings must be fitted to all fire hydrants and fire hydrant booster assembly connections as required by Appendix E of AS 2419.1-2005. The Storz fittings must be manufactured and installed in accordance with Clauses 7.1 and 8.5.11.1 of AS 2419.1-2005. Blank caps must be provided in accordance with Clause 3.10 of AS 2419.2-2005.
- Fire hydrants must be a minimum of 10m from any substation.
- The fire hydrant ring main shall have isolation valves to enable the system for each building to be isolated in 25% increments as required by AS 2419.1-2005.
- The isolation valves shall be located at a height so as to permit ready access by fire brigade personnel.
- Where the ring main is installed at high level, the isolation valves must be at a height not exceeding 2.1m to be readily accessible for fire brigade personnel. Preference is given to providing these isolation valves adjacent to the exits.
- The isolation valves shall be tagged, numbered and secured as required by AS 2419.1-2005.
- The tag numbers shall be identified on the hydrant block plan.

2.11 Portable Fire Extinguishers

Portable fire extinguishers shall be provided throughout the building for use by appropriately trained members of staff for special risk protection against potential ignition sources. Portable fire extinguishers must be certified as meeting the requirements of AS/NZS 1841.1-2007 and AS/NZS 1841.5-2007 and installed in accordance with AS 2444-2001.

2.12 Emergency Lighting and Exit Signage

Emergency lighting and egress signage shall be installed throughout the building in accordance with BCA Part E4 and AS 2293.1-2005.

2.13 Egress System

- All egress doors are necessary for occupant evacuation. Any doors required for egress which may be locked shall unlock on general fire alarm and shall be wired to fail safe (unlock) with the exception of the main entrance roller shutter door.
- Any power-operated door serving as a required exit or in a path of travel to a required exit must open on general fire alarm anywhere in the building. Any power-operated doors must be openable manually under a force of not more than 110N in the event of malfunction or failure of the power source.
- Any sliding door serving as a required exit or in a path of travel to a required exit must be manually openable under a force of not more than 110N.

2.14 Fire Brigade Access

The FER shall demonstrate that access for Fire Brigade vehicles meets the Performance Requirements of the BCA. The access arrangements are acceptable provided that, where Fire Brigade access roads are built upon by gates, security personnel are on site at all times to provide entry to the site or the gates shall be provided with locks that are opened with:

(i) 003 keys; or
(ii) keys are provided to the local fire stations.

Where the perimeter vehicular access passes underneath an awning or canopy, a minimum clear height of 4.5 m shall be retained throughout. Vehicle turning provisions shall comply with Policy No. 4 (Appendix B).

2.15 Approval and Certification

2.15.1 Commissioning and Certification

The following inspections of the completed building works will form part of the commissioning and certification phase of the building:

1. An inspection by an NDY Fire Engineer for the purposes of reviewing the consistency of the fire safety installations and architectural features with the Alternative Solution presented as the basis of the Fire Engineering Report, with supporting certification from the relevant designers and installers to be provided, where necessary.
2. Inspections by the project stakeholders, where necessary, to determine that the fire safety installations and architectural features comply with the Alternative Solution presented as the basis of the Fire Engineering Report.
3. An inspection by Fire & Rescue NSW, pursuant to clause 152 of the EP&A Regulation, as advised by the Principle Certifying Authority.

All responsible contractors shall ensure that the installed fire safety systems have been commissioned tested and results recorded. Commissioning results should be forwarded to the Principle Certifying Authority for approval. The details of the Fire Engineering Report should be included within the building's fire safety schedule to assist future essential services auditing of the building.

2.15.2 Relevant Information for Fire & Rescue NSW Review

Relevant certificates, inspections reports, commissioning results and as-built drawings shall be obtained from the responsible contractors and consultants. Information shall contain operational Performance Requirements, design standards in reference to the Fire Engineering Report (where relevant), and any other determination made by an approval authority. This information should be made available for review by the Fire & Rescue NSW for the purposes of EP&A Regulation 2000, Clause 152.

3 INFORMATION SOURCES

3.1 References

- National Construction Code (NCC) Volume One, Building Code of Australia (BCA) 2014, 'Class 2 to Class 9 Buildings', Australian Building Codes Board (ABCB) 2014.
- National Construction Code (NCC) Guide To Volume One, Building Code of Australia (BCA) 2014, 'Class 2 to Class 9 Buildings', Australian Building Codes Board (ABCB) 2014.
- BCA Assessment Report by Blackett Maguire + Goldsmith, reference 140382, Revision 1 dated 1 October 2014.
- Australian Building Codes Board, 'International Fire Engineering Guidelines', Edition 2005, dated March 2005.
- SFPE Handbook of Fire Protection Engineering. 3rd Edition, DiNenno, P. J.; Drysdale, D.; Beyler, C. L.; Walton, W. D., Editor(s), 2002.
- NSW Fire Brigades Guide Sheet No. 5 "Hardstand Areas for NSWFB Appliances", Version 01, released 15 February 2010.
- NSW Fire Brigades Policy No. 4 "Guidelines for emergency vehicle access", Version 02, published 27 October 2010.

3.2 Architectural Drawings

Architectural drawings listed below by Nettleton Tribe Architects.

Architectural Drawings

Drawing No	Description	Amendment No	Date
4244_DA-01	Master Plan – Ground	B	29/09/2014
4424_DA-02	Site Plan - Ground	B	29/09/2014
4424_DA-03	Site Plan – Roof	B	29/09/2014
4424_DA-11	Ground Floor Plan	B	29/09/2014
4424_DA-12	Roof Plan	B	29/09/2014
4424_DA-17	Typical Office Floor Plan – Warehouse A	B	29/09/2014
4424_DA-18	Typical Office Floor Plan – Warehouse B	B	29/09/2014
4424_DA-19	Typical Mezzanine Level	B	29/09/2014
4424_DA-20	Street Elevations	A	29/09/2014
4424_DA-21	Building Elevations – Sheet 1	A	29/09/2014
4424_DA-22	Building Elevations - Sheet 2	A	29/09/2014
4424_DA-31	Building Sections	A	29/09/2014

4 LIABILITY AND LIMITATIONS

4.1 Liability

This Fire Safety Strategy report is applicable to Goodman Port Botany Industrial Estate, Sydney, which is a new development consisting of two separate buildings.

It should, be recognised that this report does not provide a guarantee that a fire will not occur with potential to cause casualties or damage.

Norman Disney & Young shall not be held liable for any loss or damage resulting from any defect of the building or its services or equipment or for any non-compliance of the building or its services or equipment with any legislative or operational requirement, whether or not such defect or non-compliance is referred to or reported upon in this report, unless such defect or non-compliance should have been apparent to a competent engineer undertaking the assessment of the type undertaken for the purpose of preparation of this report.

The fire engineering recommendations are based on the building Architectural layouts and occupant information provided as detailed in the “Information Sources” section of this report. Any change in this information to suit future building works or re-organisation will require further analysis to confirm compliance with the regulations and the Fire Engineering Report.

4.2 Limitations

This report does not provide guidance in respect of areas, which are used for bulk storage, processing of flammable liquids, explosive materials, multiple fire ignitions or sabotage of existing fire safety systems.

Norman Disney & Young have compiled this report based on perusal of the information existing in the ‘Information Sources’ section.

Potential incendiary risks are limited in the scope of engineering design. Conventional building design can only provide limited protection against malicious attack; for example, large scale incendiary and multiple ignition sources can potentially overwhelm some fire safety systems.

Strategies such as security, housekeeping and other management procedures may be more effective than additional fire protection in addressing arson events.

APPENDIX A - FIRE & RESCUE NSW GUIDE SHEET NO. 5

APPENDIX B - FIRE & RESCUE NSW POLICY SHEET NO. 4

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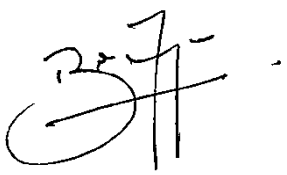

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