REF: 073073-02BCA

BUILDING CODE OF AUSTRALIA REPORT

Crossroads Logistics Centre:

Precinct A – Warehouse 1

Contents

Date	Revision Number	No. of pages	Issue or Description of Amendment	Checked By	Approved By	Date Approved
14.03.2017	A	14	BCA Report for DA Submission	Elie Ishac	Geoffrey Pearce	14.03.2017

Executive Summary

As Accredited Certifiers, we have reviewed the architectural design documents prepared by Nettleton tribe (refer appendix A) for compliance with the Building Code of Australia 2016.

The assessment of the design documentation has revealed that the following areas are required to be assessed against the relevant performance requirements of the BCA. The submission for a Construction Certificate will need to include verification from a suitably accredited fire engineer:

DTS Clause	Description of Non-Compliance	Performance Requirement
C2.4	**Perimeter Vehicular Access** The following vehicular access paths will be required to be addressed as part of a performance based fire engineered solution: **Warehouse 1:** ▪ The minimum unobstructed width on the north-eastern and south-eastern façade will be 5m in lieu of the minimum 6m required once suitable barriers are installed near exits, ▪ The Perimeter Vehicular Access will be shared with Warehouse 2 located adjacent to Warehouse 1	CP9 & EP2.2
D1.4	**Extended Travel Distance** The following areas will be required to be addressed as part of the fire engineered solution for the development: **Warehouse 1:** ▪ Travel distance to a single exit is up to 90m in lieu of 40m, The above travel distances have been reviewed without internal fixtures and shelving which has the potential to increase travel distance further. This will be required to be assessed once internal configurations have been finalised.	DP4 & EP2.2
D1.5	**Extended Travel Distance Between Alternate Exits** The following areas will be required to be addressed as part of the fire engineered solution for the development: **Warehouse 1:** ▪ Travel distance to a single exit is up to 80m in lieu of 60m, The above travel distances have been reviewed without internal fixtures and shelving which has the potential to increase travel distance further. This will be required to be assessed once internal configurations have been finalised.	DP4 & EP2.2

E1.3	**Hydrant Location** Hydrants located under the front awning will be used as external hydrants for the purpose of coverage. This is required to be included as an engineered solution for the proposal.	EP1.3
E2.2	**Smoke Exhaust** Smoke exhaust will be rationalised as part of the fire engineered solution for the proposal.	EP2.2
E4.5	**Exit Sign** The following is required to be addressed in the Performance Solution Report: ▪ Direction signs will be installed at a greater distance from the Finish Floor Level (FFL) than 2.7m due to the ceiling height.	EP4.2

The fire engineered solution relating to CP9, EP1.3, and EP2.2 will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

Assessed By,

Elie Ishac
Building Surveyor

1.0 Introduction

The subject BCA Report has been prepared for the proposed development of Warehouse 1 of Precinct A

The site is known as the Crossroads Logistic Centre which is located at Lot 204 DP 1090110 & LOT 21 DP 1180366 Corner Beech Road & Campbelltown Road Casula.

1.1 Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate. **BCA 2016** has been used for this report.

2.0 Building Assessment Data

Summary of Construction Determination:

	Warehouse 1
Classification	5 & 7b
Number of Storeys Contained	3
Rise In Storeys	2
Type of Construction	C
Effective Height (m)	13.19m*

Note: Effective height has been determined based on (RL55.700- RL42.510)

Summary of the floor areas and relevant populations where applicable: -

Part of Project	**BCA Classification**	**Approx. Floor Area (m^2)**	**Assumed Population**
Car Park Basement Level	7a	1,495m2	-
Warehouse 1 & Dock Office Ground Floor Level	7b	20,375m2	-
Office Level 1	5	2,490m2	-
Work Shop Ground Floor Level	8	Included in warehouse	-
Total		**24,360m2**	**88 Male** **88 Female** **176 Occupants**

Notes:

1. Assumed populations for Warehouse 1 have been determined based on the number of car parking spaces provided

3.0 Structural Provisions

All structural works are to comply with Part B of the BCA and the applicable requirements of AS/NZS 1170.

Glazing is to comply with AS1288, and AS2047.

Prior to the issue of the Construction Certificate structural certification is required to be provided.

4.0 Fire Resistance

The buildings should be constructed generally in accordance with Table 5 of Specification C1.1 of the Building Code of Australia and be of **Type C Construction** based on the current configuration of the warehouses.

As the fire compartments currently exceed that specified in Table C2.2 this proposal has been assessed as a large isolated building (max floor area – 3,000m2 for Type C Construction). Therefore the following elements shall apply:

- Automatic sprinkler protection throughout in accordance with AS 2118.1-1999 and Specification E1.5 of the BCA,
- Perimeter emergency vehicular access 6m wide located within 18m of the entire building perimeter subject to the Fire Engineering Report in accordance with Clause C2.4 of the BCA,
- Hydrant system is to be installed in accordance with AS 2419.1-2005 and Clause E1.3 of the BCA. This is also required to be ring main system.
- Smoke exhaust or smoke and heat vents required throughout the development subject to the Fire Engineering Report

The following parameters are to be further documented in the design:-

- Continuous path of travel for fire brigade vehicles from a public road around the building; and
- Provide reasonable pedestrian access from the vehicular access to the building; and
- Have a loadbearing capacity and unobstructed height to permit fire brigade vehicles; and located wholly within the allotment.

It is noted that the plans provided indicate the vehicular access path does not meet the requirements of Clause C2.4 of the BCA. The following locations will be required to be addressed as part of the Fire Engineered Solution for the development.

Warehouse 1:

- The minimum unobstructed width on the north-eastern façade will be 5m in lieu of the minimum 6m required once suitable barriers are installed near exits,

4.1 Passive Fire Protection

Other passive fire protection issues that will need to be addressed in detailed documentation phase include:

- Hydrant Pump rooms,
- Sprinkler Pump Rooms,

To be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

4.2 Fire Hazard Properties

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to Specification C1.10 of the Building Code of Australia.

5.0 Egress

The egress provisions from the proposed building are provided by external perimeter doorways.

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation
- Details of the egress provisions to the Road.

5.1 Exit Travel Distances

The travel distances to exits should not exceed the below as stipulated in Clause D1.4:

Class 5-9

- 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m

The following areas will be required to be addressed as part of the fire engineered solution for the development:

Warehouse 1:

- Travel distance to a single exit is up to 45m in lieu of 20m,
- Travel distance is up to 90m in lieu of 40m.
- Distance between exits up to 80m in lieu of 60m

The above travel distances have been reviewed without internal fixtures and shelving which has the potential to increase travel distance further. This will be required to be assessed once internal configurations have been finalised.

Access to the public road from the exit on the north-eastern elevation of the Warehouse has been determined via the vehicular access ramp. As such, confirmation is required that the gradient of the vehicular access ramps leading into the underground carpark is not steeper than 1:14 or 1:8 if an exemption is applied to the Warehouse under clause D3.4 of the BCA. Should the ramps be steeper

than this, a performance solution will be required to be sought to address Performance Requirements DP4 and EP2.2 of the BCA 2016.

5.2 Dimensions of Exits

Minimum dimensions of 1000mm and 2000mm height to be provided within exits, with the paths of travel should provide a minimum width of 1000mm (note that all maintenance access, cat walks, etc may comply with AS1657 in which case a 600mm clear width is required).

Doorways are permitted to contain a clear opening width of 750mm with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e minimum 870 mm doors).

5.3 Balustrading and Handrail

Balustrading to a height of 1000mm with a maximum opening of 125mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm.

Where it is possible to fall more than 4m to the finished floor below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing.

Any windows with a sill height of less than 1.7m in bedrooms or 865mm in all other cases with a fall of more than 2m for windows, 4m for all other cases, openings are to be restricted or a protective barrier that does not allow a 125mm sphere to pass through.

Handrails should generally be provided at a minimum height of 865mm alongside of all ramps and stairs.

The main public stairs and ramps should be designed in accordance with the requirements of AS1428.1 for persons with disabilities. This requires a handrail on each side of the stair and ramp and for the handrail to extend approximately 550mm – 600mm past the last tread / end of ramp.

5.4 Access for Persons with a Disability

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2016. Parts of the building required to be accessible shall comply with the requirements of AS1428.1-2009.

The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken once the internal configurations, door widths and circulation have been finalised.

Where the main public entrance is via a ramp, tactile indicators shall be provided in accordance with AS 1428.4 at the top and bottom.

Parking has been provided for people with disabilities in accordance with in accordance with Clause D3.5 of the BCA. Facilities, services and features of the building accessible to people with disabilities shall be identified by signage complying with Clause D3.6 of the BCA.

General

Access to be provided to and within the building pursuant to AS1428.1-2009 as follows:

- Via the principle public entry and at least 50% of all other entrances

- From designated car parking spaces for the use of occupants with a disability.
- All areas used by the public.

Note that entrances that are not accessible are to be located within 50m of an entrance that is accessible.

6.0 Fire Services & Equipment

The following fire services will need to be provided throughout the building:

- An automatic sprinkler system in accordance with the relevant provision of clause E1.5 of the BCA and AS 2118.1-1999, throughout the building.
- Fire hydrants in accordance with clause E1.3 of the BCA and AS 2419.1-2005,
- Fire hose reels in accordance with clause E1.4 of the BCA and AS 2441-2005,
- Portable Fire Extinguishers in accordance with Clause E1.6 of the BCA and AS 2444-2001,
- Building occupant warning system which is triggered by the sprinklers being activated in accordance with Specification and E2.2a of the BCA and AS 1670-2015,
- Emergency lighting, exit signage and directional exit signage is required throughout the building in accordance with Part E of the BCA and AS/NZS 2293.1-2005

A single fire control centre is also required in accordance with the requirements of Clause E1.8 of the BCA and will be utilised by warehouse 1 and 2.

6.1 Automatic Sprinkler Protection

An Automatic Fire Suppression System is required to be installed in accordance with Specification E1.5 and AS 2118.1-1999.

An occupant warning system that is triggered upon activation of the sprinkler system should be provided in accordance with BCA Specification E1.5.

6.2 Fire Hydrants

A system of Fire Hydrants is required to be provided to the site in accordance with Clause E1.3 of the BCA and AS 2419.1-2005. We will reply upon design certificate from a Hydraulic Consultant.

If a booster assembly is proposed for the fire hydrant requirements, it must to be located at the main entry of the building. If remote from the building it must be at the main vehicle entry or within sight of the main entry of the building within 20m of a hardstand area.

Hydrants located under the front awning will be used as external hydrants on the basis that “fall back” hydrants are installed in the front landscaped area. All other external hydrants are provided with 90 minutes rated walls with heat shield 4.5 x 4.0m to each point.

6.3 Fire Hose Reels

A Fire Hose Reel System is required to be installed in accordance with Clause E1.4 and AS 2441-2005 and be located within 4m of exits.

Coverage within the building must not be greater than 36m.

7.0 Ventilation and Smoke Hazard Management

Smoke hazard management shall be provided throughout the building by means of the following systems:

- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2b subject to the Fire Engineered Report.

8.0 Sanitary Facilities

The sanitary & other facilities within the development would generally consist of:

- Unisex facilities provided for people with disabilities may be counted once for each sex.
- These facilities are to be provided in accordance with AS1428.1-2009.
- An ambulant facility in accordance with AS1428.1 is to be provided at each male and female sanitary facility bank.

F2.4 - Sanitary Facility Calculations									
Description of building or part	Occupant Number	Population No.		Required			Provided		
				WC	Urinals	Basins	WC	Urinals	Basins
Warehouse 1 & Office	176*	Male	88	5	3	5	11	7	8
		Female	88	6	-	5	16	-	8
		Accessible	-	2	-	2	2	-	2

Notes:

1. Sanitary facilities for Warehouse 1 and Office have been determined based on the number of Car parking space provided

9.0 Energy Efficiency

The proposed development shall comply with Part J of the BCA. To achieve compliance, there are two options available:

1. The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
   - Building Fabric
   - Glazing
   - Building Sealing
   - Air Conditioning & Ventilation Systems
   - Artificial Lighting & Power
   - Hot Water Supply

2. The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

Certification from an appropriately qualified engineer should be provided for either option with a report / computations outlining how compliance is achieved.

Access for maintenance is to be provided to the building in accordance with the requirements of BCA Part J8.The proposed site will be located in a **climate zone 6.**

Appendix A - Design Documentation

The following documentation was used in the assessment and preparation of this report:

Drawing No.	Title	Date	Drawn By	Revision
10388_DA-001	Location Plan	03.03.2017	Nettleton tribe	A
10388_DA-011	Ground Plan	02.03.2017	Nettleton tribe	A
10388_DA-012	Level 1 Plan	03.03.2017	Nettleton tribe	A
10388_DA-013	Roof Plan	03.03.2017	Nettleton tribe	A
10388_DA-015	Office Basement & Ground Plan	03.03.2017	Nettleton tribe	A
10388_DA-016	Office Level 1 & Roof	03.03.2017	Nettleton tribe	A
10388_DA-20	Elevation	03.03.2017	Nettleton tribe	A
10388_DA-30	Sections	03.03.2017	Nettleton tribe	A
10388_DA-050	Perspective	03.03.2017	Nettleton tribe	A

Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 1999
2.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & AS 1670 – 2015
3.	Emergency Evacuation Plan	AS 3745 – 2002
4.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
5.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
6.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005
7.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 2014
8.	Paths of Travel	EP&A Reg 2000 Clause 186
9.	Perimeter Vehicular Access	BCA Clause C2.4
10.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
11.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 2015

Appendix C- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2016:

Table 5 TYPE C CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building—FRL: (in minutes)			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	**5, 7a or 9**	**6**	**7b or 8**
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—				
Less than 1.5 m	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
1.5 to less than 3 m	–/–/–	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
Less than 1.5 m	90/–/–	90/–/–	90/–/–	90/–/–
1.5 to less than 3 m	–/–/–	60/–/–	60/–/–	60/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
INTERNAL WALLS-				
Bounding *public corridors*, public lobbies and the like—	60 / 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—	60/ 60/ 60	–/–/–	–/–/–	–/–/–
Bounding a stair if *required* to be rated—	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–